

Pensieve Header: Solving for a PPS associator degree by degree.

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In[*]:= SetDirectory["C:\\drorbn\\AcademicPensieve\\People\\Kuno"];
<< FreeLie.m
<< AwCalculus.m
<< FAA.m
<< EmergentChordDiagrams.m
```

FreeLie` implements / extends
 {*, +, **, \$SeriesShowDegree, ⟨⟩, ∫, ≡, ad, Ad, adSeries, AllCyclicWords, AllLyndonWords, AllWords, Arbitrator, AS, ASeries, AW, b, BCH, BooleanSequence, BracketForm, BS, CC, Crop, cw, CW, CWS, CWSeries, D, Deg, DegreeScale, DerivationSeries, div, DK, DKS, DKSeries, EulerE, Exp, Inverse, j, J, JA, LieDerivation, LieMorphism, LieSeries, LS, LW, LyndonFactorization, Morphism, New, RandomCWSeries, Randomizer, RandomLieSeries, RC, SeriesSolve, Support, t, tb, TopBracketForm, tr, UndeterminedCoefficients, αMap, Γ, ℓ, Δ, σ, ħ, ↦, ↪}.

FreeLie` is in the public domain. Dror Bar-Natan is committed to support it within reason until July 15, 2022. This is version 150814.

AwCalculus` implements / extends {*, **, ≡, dA, dc, deg, dm, dS, dΔ, dη, dσ, El, Es, hA, hm, hS, hΔ, hη, hσ, RandomElSeries, RandomEsSeries, tA, tha, tm, tS, tΔ, tη, tσ, Γ, Δ}.

AwCalculus` is in the public domain. Dror Bar-Natan is committed to support it within reason until July 15, 2022. This is version 150909.

FreeLie` implements / extends
 {*, +, **, \$SeriesShowDegree, ⟨⟩, ∫, ≡, ad, Ad, adSeries, AllCyclicWords, AllLyndonWords, AllWords, Arbitrator, AS, ASeries, AW, b, BCH, BooleanSequence, BracketForm, BS, CC, Crop, cw, CW, CWS, CWSeries, D, Deg, DegreeScale, DerivationSeries, div, DK, DKS, DKSeries, EulerE, Exp, Inverse, j, J, JA, LieDerivation, LieMorphism, LieSeries, LS, LW, LyndonFactorization, Morphism, New, RandomCWSeries, Randomizer, RandomLieSeries, RC, SeriesSolve, Support, t, tb, TopBracketForm, tr, UndeterminedCoefficients, αMap, Γ, ℓ, Δ, σ, ħ, ↦, ↪}.

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AwCalculus` implements / extends {*, **, ≡, dA, dc, deg, dm, dS, dΔ, dη, dσ, El, Es, hA, hm, hS, hΔ, hη, hσ, RandomElSeries, RandomEsSeries, tA, tha, tm, tS, tΔ, tη, tσ, Γ, Δ}.

AwCalculus` is in the public domain. Dror Bar-Natan is committed to support it within reason until July 15, 2022. This is version 150909.

```
In[*]:= 
$$\mathfrak{G}[2] = \mathcal{O}_{AR, \{x, y\}, \{1\}} \left[ \mathcal{A}_0 \left[ AW_1[] + \frac{1}{24} AW_1[x, y] - \frac{1}{24} AW_1[y, x] \right] \right]$$

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Out[*]= 
$$\mathcal{O}_{AR, \{x, y\}, \{1\}} \left[ \mathcal{A}_0 \left[ AW_1[] + \frac{1}{24} AW_1[x, y] - \frac{1}{24} AW_1[y, x] \right] \right]$$

```

```
In[*]:= Pentagon_d[ $\mathfrak{G}$ ] :=
IM_d[ $\mathfrak{G}$  // s $\eta_2$ ,  $\mathfrak{G}$  // s $\sigma_{1 \rightarrow 2}$  // p $\Delta_{y \rightarrow y, z}$  // p $2s_{z \rightarrow 1}$ ,  $\mathfrak{G}$  // s $\sigma_{1 \rightarrow 2}$  // p $2s_{y \rightarrow 1}$  // p $\sigma_{x \rightarrow y}$  // p $\eta_x$ ] -
IM_d[ $\mathfrak{G}$  // s $\sigma_{1 \rightarrow 2}$  // p $2s_{y \rightarrow 1}$  // p $\Delta_{x \rightarrow x, y}$ ,  $\mathfrak{G}$  // s $\Delta_{1 \rightarrow 1, 2}$ ]
```

Solving to Degree 3

In[]:= **Select**[**Basis**₃[$\mathbb{O}_{AR, \{x,y\}, \{1\}}$], **FreeQ**[#, $\mathcal{A}_c[1]$] &]

Out[]:=

{ $\mathbb{O}_{AR, \{x,y\}, \{1\}}[\mathcal{A}_0[AW_1[x, x, x]]]$, $\mathbb{O}_{AR, \{x,y\}, \{1\}}[\mathcal{A}_0[AW_1[x, x, y]]]$,
 $\mathbb{O}_{AR, \{x,y\}, \{1\}}[\mathcal{A}_0[AW_1[x, y, x]]]$, $\mathbb{O}_{AR, \{x,y\}, \{1\}}[\mathcal{A}_0[AW_1[x, y, y]]]$, $\mathbb{O}_{AR, \{x,y\}, \{1\}}[\mathcal{A}_0[AW_1[y, x, x]]]$,
 $\mathbb{O}_{AR, \{x,y\}, \{1\}}[\mathcal{A}_0[AW_1[y, x, y]]]$, $\mathbb{O}_{AR, \{x,y\}, \{1\}}[\mathcal{A}_0[AW_1[y, y, x]]]$, $\mathbb{O}_{AR, \{x,y\}, \{1\}}[\mathcal{A}_0[AW_1[y, y, y]]]$ }

In[]:= **d = 3; i = 0;**

$\bar{\mathfrak{e}}[d] = \bar{\mathfrak{e}}[d - 1] + \text{Sum}[c_{d,++i} B, \{B, \text{Select}[\text{Basis}_d[\mathbb{O}_{AR, \{x,y\}, \{1\}}], \text{FreeQ}[\#, \mathcal{A}_c[1]] \&]\}$

Out[]:=

$\mathbb{O}_{AR, \{x,y\}, \{1\}} \left[\begin{aligned} &\mathcal{A}_0 \left[AW_1[] + \frac{1}{24} AW_1[x, y] - \frac{1}{24} AW_1[y, x] + c_{3,1} AW_1[x, x, x] + c_{3,2} AW_1[x, x, y] + c_{3,3} AW_1[x, y, x] + \right. \\ &\left. c_{3,4} AW_1[x, y, y] + c_{3,5} AW_1[y, x, x] + c_{3,6} AW_1[y, x, y] + c_{3,7} AW_1[y, y, x] + c_{3,8} AW_1[y, y, y] \right] \end{aligned} \right]$

In[]:= **rels = Union@@(List@@Pentagon_d[$\bar{\mathfrak{e}}[d]$][[1]] /. {
 $\mathcal{A}_0[A_] \Rightarrow \text{Table}[\text{Coefficient}[A, B], \{B, \text{Basis}_d[\mathbb{O}_{AR, \{x,y\}}[AW_1 AW_2]\}]$,
 $\mathcal{A}_c[1,2][A_] \Rightarrow \text{Table}[\text{Coefficient}[A, B], \{B, AW_2[] \text{Basis}_{d-1}[\mathbb{O}_{AR, \{x,y\}}[AW_1 AW_2 AW_1]\}]$
})**

Out[]:=

{0, -4 c_{3,1}, -3 c_{3,1}, -c_{3,1}, 3 c_{3,1}, 5 c_{3,1}, -2 c_{3,2} - c_{3,3}, -c_{3,3} - 2 c_{3,5},
-c_{3,2} - c_{3,3} - c_{3,5}, -c_{3,2} - c_{3,3} - c_{3,4} - c_{3,5}, c_{3,3} + 2 c_{3,5}, -2 c_{3,4} - c_{3,6},
-c_{3,3} - 2 c_{3,5} - c_{3,6}, c_{3,2} - c_{3,5} - c_{3,6}, -c_{3,2} - c_{3,3} + 2 c_{3,4} - c_{3,5} + c_{3,6},
c_{3,3} + c_{3,4} + 2 c_{3,5} + c_{3,6}, -c_{3,6} - 2 c_{3,7}, c_{3,2} + 2 c_{3,3} + 3 c_{3,5} - c_{3,6} - 2 c_{3,7},
c_{3,2} + 2 c_{3,3} + 3 c_{3,5} - c_{3,7}, -c_{3,4} - c_{3,6} - c_{3,7}, -c_{3,2} - c_{3,3} - c_{3,5} + c_{3,6} + c_{3,7},
-c_{3,2} - 2 c_{3,3} - 3 c_{3,5} + c_{3,6} + 2 c_{3,7}, -c_{3,2} - c_{3,3} - c_{3,5} + c_{3,6} + 2 c_{3,7}, -3 c_{3,8}, 3 c_{3,8}}}

In[]:= **eqns = # == 0 & /@ rels**

Out[]:=

{True, -4 c_{3,1} == 0, -3 c_{3,1} == 0, -c_{3,1} == 0, 3 c_{3,1} == 0, 5 c_{3,1} == 0, -2 c_{3,2} - c_{3,3} == 0,
-c_{3,3} - 2 c_{3,5} == 0, -c_{3,2} - c_{3,3} - c_{3,5} == 0, -c_{3,2} - c_{3,3} - c_{3,4} - c_{3,5} == 0, c_{3,3} + 2 c_{3,5} == 0,
-2 c_{3,4} - c_{3,6} == 0, -c_{3,3} - 2 c_{3,5} - c_{3,6} == 0, c_{3,2} - c_{3,5} - c_{3,6} == 0, -c_{3,2} - c_{3,3} + 2 c_{3,4} - c_{3,5} + c_{3,6} == 0,
c_{3,3} + c_{3,4} + 2 c_{3,5} + c_{3,6} == 0, -c_{3,6} - 2 c_{3,7} == 0, c_{3,2} + 2 c_{3,3} + 3 c_{3,5} - c_{3,6} - 2 c_{3,7} == 0,
c_{3,2} + 2 c_{3,3} + 3 c_{3,5} - c_{3,7} == 0, -c_{3,4} - c_{3,6} - c_{3,7} == 0, -c_{3,2} - c_{3,3} - c_{3,5} + c_{3,6} + c_{3,7} == 0,
-c_{3,2} - 2 c_{3,3} - 3 c_{3,5} + c_{3,6} + 2 c_{3,7} == 0, -c_{3,2} - c_{3,3} - c_{3,5} + c_{3,6} + 2 c_{3,7} == 0, -3 c_{3,8} == 0, 3 c_{3,8} == 0}

In[]:= **vars = Union[Cases[eqns, c_{d,_, ∞}]]**

Out[]:=

{c_{3,1}, c_{3,2}, c_{3,3}, c_{3,4}, c_{3,5}, c_{3,6}, c_{3,7}, c_{3,8}}

In[]:= **sol = Solve[eqns, vars][[1]]**

Solve: Equations may not give solutions for all "solve" variables.

Out[]:=

{c_{3,1} → 0, c_{3,3} → -2 c_{3,2}, c_{3,4} → 0, c_{3,5} → c_{3,2}, c_{3,6} → 0, c_{3,7} → 0, c_{3,8} → 0}

In[*]:= sol /. Rule -> Set

Out[*]= {0, -2 c_{3,2}, 0, c_{3,2}, 0, 0, 0}

In[*]:= phi[3]

Out[*]= $\mathbb{O}_{AR, \{x,y\}, \{1\}} \left[\mathcal{A}_0 \left[AW_1[] + \frac{1}{24} AW_1[x, y] - \frac{1}{24} AW_1[y, x] + c_{3,2} AW_1[x, x, y] - 2 c_{3,2} AW_1[x, y, x] + c_{3,2} AW_1[y, x, x] \right] \right]$

In[*]:= c_{3,2} = 0

Out[*]= 0

In[*]:= phi[3]

Out[*]= $\mathbb{O}_{AR, \{x,y\}, \{1\}} \left[\mathcal{A}_0 \left[AW_1[] + \frac{1}{24} AW_1[x, y] - \frac{1}{24} AW_1[y, x] \right] \right]$

Solving to Degree 4

In[*]:= d = 4; i = 0;

phi[d] = phi[d - 1] + Sum[c_{d,++i} B, {B, Select[Basis_d[O_{AR, {x,y}, {1}]], FreeQ[#, A_c[1]] &]]}

Out[*]=

$\mathbb{O}_{AR, \{x,y\}, \{1\}} \left[\mathcal{A}_0 \left[AW_1[] + \frac{1}{24} AW_1[x, y] - \frac{1}{24} AW_1[y, x] + c_{4,1} AW_1[x, x, x, x] + c_{4,2} AW_1[x, x, x, y] + c_{4,3} AW_1[x, x, y, x] + c_{4,4} AW_1[x, x, y, y] + c_{4,5} AW_1[x, y, x, x] + c_{4,6} AW_1[x, y, x, y] + c_{4,7} AW_1[x, y, y, x] + c_{4,8} AW_1[x, y, y, y] + c_{4,9} AW_1[y, x, x, x] + c_{4,10} AW_1[y, x, x, y] + c_{4,11} AW_1[y, x, y, x] + c_{4,12} AW_1[y, x, y, y] + c_{4,13} AW_1[y, y, x, x] + c_{4,14} AW_1[y, y, x, y] + c_{4,15} AW_1[y, y, y, x] + c_{4,16} AW_1[y, y, y, y] \right] \right]$

In[*]:= rels = Union@@(List@@Pentagon_d[phi[d]][[1]] /. {
 $\mathcal{A}_0[A_] \Rightarrow \text{Table}[\text{Coefficient}[A, B], \{B, \text{Basis}_{d, \{x,y\}}[AW_1 AW_2]\}],$
 $\mathcal{A}_c[1,2][A_] \Rightarrow \text{Table}[\text{Coefficient}[A, B], \{B, AW_2[] \text{Basis}_{d-1, \{x,y\}}[AW_1 AW_2 AW_1]\}]$
 })

In[*]:= eqns = # == 0 & /@ rels

In[*]:= vars = Union[Cases[eqns, c_{d,_, ∞]]}

Out[*]= {c_{4,1}, c_{4,2}, c_{4,3}, c_{4,4}, c_{4,5}, c_{4,6}, c_{4,7}, c_{4,8}, c_{4,9}, c_{4,10}, c_{4,11}, c_{4,12}, c_{4,13}, c_{4,14}, c_{4,15}, c_{4,16}}

In[*]:= sol = Solve[eqns, vars] [[1]]

Out[*]=

$$\left\{ c_{4,1} \rightarrow 0, c_{4,2} \rightarrow -\frac{1}{1440}, c_{4,3} \rightarrow \frac{1}{480}, c_{4,4} \rightarrow \frac{7}{5760}, c_{4,5} \rightarrow -\frac{1}{480}, \right.$$

$$c_{4,6} \rightarrow -\frac{1}{640}, c_{4,7} \rightarrow -\frac{1}{1152}, c_{4,8} \rightarrow -\frac{7}{5760}, c_{4,9} \rightarrow \frac{1}{1440}, c_{4,10} \rightarrow -\frac{1}{1152},$$

$$\left. c_{4,11} \rightarrow \frac{19}{5760}, c_{4,12} \rightarrow \frac{7}{1920}, c_{4,13} \rightarrow -\frac{7}{5760}, c_{4,14} \rightarrow -\frac{7}{1920}, c_{4,15} \rightarrow \frac{7}{5760}, c_{4,16} \rightarrow 0 \right\}$$

In[*]:= sol /. Rule -> Set

Out[*]=

$$\left\{ 0, -\frac{1}{1440}, \frac{1}{480}, \frac{7}{5760}, -\frac{1}{480}, -\frac{1}{640}, -\frac{1}{1152}, \right.$$

$$\left. -\frac{7}{5760}, \frac{1}{1440}, -\frac{1}{1152}, \frac{19}{5760}, \frac{7}{1920}, -\frac{7}{5760}, -\frac{7}{1920}, \frac{7}{5760}, 0 \right\}$$

In[*]:= $\mathfrak{A}[d]$

Out[*]=

$$\mathbb{O}_{AR, \{x,y\}, \{1\}} \left[\mathfrak{A}_0 \left[AW_1[] + \frac{1}{24} AW_1[x, y] - \frac{1}{24} AW_1[y, x] - \frac{AW_1[x, x, x, y]}{1440} + \frac{1}{480} AW_1[x, x, y, x] + \right. \right.$$

$$\frac{7 AW_1[x, x, y, y]}{5760} - \frac{1}{480} AW_1[x, y, x, x] - \frac{1}{640} AW_1[x, y, x, y] - \frac{AW_1[x, y, y, x]}{1152} -$$

$$\frac{7 AW_1[x, y, y, y]}{5760} + \frac{AW_1[y, x, x, x]}{1440} - \frac{AW_1[y, x, x, y]}{1152} + \frac{19 AW_1[y, x, y, x]}{5760} +$$

$$\left. \left. \frac{7 AW_1[y, x, y, y]}{1920} - \frac{7 AW_1[y, y, x, x]}{5760} - \frac{7 AW_1[y, y, x, y]}{1920} + \frac{7 AW_1[y, y, y, x]}{5760} \right] \right]$$

Solving to Degree 5

```

In[*]:= d = 5; i = 0;
ϕ[d] = ϕ[d - 1] + Sum[cd,++i B, {B, Select[Basisd[OAR,{x,y},{1}], FreeQ[#, ϑc[1]] &]}]

Out[*]=
OAR,{x,y},{1} [ ϑ0 [
  AW1 [] +  $\frac{1}{24}$  AW1 [x, y] -  $\frac{1}{24}$  AW1 [y, x] -  $\frac{AW_1[x, x, x, y]}{1440}$  +  $\frac{1}{480}$  AW1 [x, x, y, x] +  $\frac{7 AW_1[x, x, y, y]}{5760}$  -
   $\frac{1}{480}$  AW1 [x, y, x, x] -  $\frac{1}{640}$  AW1 [x, y, x, y] -  $\frac{AW_1[x, y, y, x]}{1152}$  -  $\frac{7 AW_1[x, y, y, y]}{5760}$  +
   $\frac{AW_1[y, x, x, x]}{1440}$  -  $\frac{AW_1[y, x, x, y]}{1152}$  +  $\frac{19 AW_1[y, x, y, x]}{5760}$  +  $\frac{7 AW_1[y, x, y, y]}{1920}$  -  $\frac{7 AW_1[y, y, x, x]}{5760}$  -
   $\frac{7 AW_1[y, y, x, y]}{1920}$  +  $\frac{7 AW_1[y, y, y, x]}{5760}$  + c5,1 AW1 [x, x, x, x, x] + c5,2 AW1 [x, x, x, x, y] +
  c5,3 AW1 [x, x, x, y, x] + c5,4 AW1 [x, x, x, y, y] + c5,5 AW1 [x, x, y, x, x] +
  c5,6 AW1 [x, x, y, x, y] + c5,7 AW1 [x, x, y, y, x] + c5,8 AW1 [x, x, y, y, y] +
  c5,9 AW1 [x, y, x, x, x] + c5,10 AW1 [x, y, x, x, y] + c5,11 AW1 [x, y, x, y, x] +
  c5,12 AW1 [x, y, x, y, y] + c5,13 AW1 [x, y, y, x, x] + c5,14 AW1 [x, y, y, x, y] +
  c5,15 AW1 [x, y, y, y, x] + c5,16 AW1 [x, y, y, y, y] + c5,17 AW1 [y, x, x, x, x] +
  c5,18 AW1 [y, x, x, x, y] + c5,19 AW1 [y, x, x, y, x] + c5,20 AW1 [y, x, x, y, y] +
  c5,21 AW1 [y, x, y, x, x] + c5,22 AW1 [y, x, y, x, y] + c5,23 AW1 [y, x, y, y, x] +
  c5,24 AW1 [y, x, y, y, y] + c5,25 AW1 [y, y, x, x, x] + c5,26 AW1 [y, y, x, x, y] +
  c5,27 AW1 [y, y, x, y, x] + c5,28 AW1 [y, y, x, y, y] + c5,29 AW1 [y, y, y, x, x] +
  c5,30 AW1 [y, y, y, x, y] + c5,31 AW1 [y, y, y, y, x] + c5,32 AW1 [y, y, y, y, y] ] ]

In[*]:= Short [
  rels = Union @@ (List @@ Pentagond [ϕ[d]] [[1]] /. {
    ϑ0 [A_] => Table[Coefficient[A, B], {B, Basisd,{x,y} [AW1 AW2]}],
    ϑc[1,2] [A_] => Table[Coefficient[A, B], {B, AW2 [] Basisd-1,{x,y} [AW1 AW2 AW1]}]
  } ),
  10]

Out[*]//Short=
{0, -55 c5,1, -40 c5,1, -35 c5,1, -31 c5,1, -26 c5,1, -10 c5,1, -5 c5,1, -c5,1, 5 c5,1, 9 c5,1, 10 c5,1,
  49 c5,1, 50 c5,1, <<251>>, 3 c5,9 + 14 c5,16 + 12 c5,17 + 14 c5,24 + 14 c5,28 + 14 c5,30 + 14 c5,31,
  -3 c5,8 - 5 c5,12 - 8 c5,14 - 12 c5,15 - 6 c5,17 - 2 c5,20 - 3 c5,22 - 4 c5,23 - 6 c5,24 - c5,26 -
  c5,27 - 3 c5,28 + 6 c5,30 + 17 c5,31, -6 c5,8 - 3 c5,9 - 8 c5,12 - 10 c5,14 - 12 c5,15 - 12 c5,17 -
  4 c5,20 - 5 c5,22 - 6 c5,23 - 2 c5,26 - 2 c5,27 + 4 c5,28 + 11 c5,30 + 20 c5,31, -50 c5,32,
  -30 c5,32, -25 c5,32, -20 c5,32, -10 c5,32, -5 c5,32, 5 c5,32, 30 c5,32, 45 c5,32, 70 c5,32}

In[*]:= eqns = # == 0 & /@ rels;

In[*]:= vars = Union[Cases[eqns, cd,_, ∞] ]

Out[*]=
{c5,1, c5,2, c5,3, c5,4, c5,5, c5,6, c5,7, c5,8, c5,9, c5,10, c5,11, c5,12, c5,13, c5,14, c5,15, c5,16, c5,17,
  c5,18, c5,19, c5,20, c5,21, c5,22, c5,23, c5,24, c5,25, c5,26, c5,27, c5,28, c5,29, c5,30, c5,31, c5,32}

```

In[*]:= **sol = Solve [eqns, vars] [[1]**

Solve: Equations may not give solutions for all "solve" variables.

Out[*]=

$$\left\{ \begin{aligned} &C_{5,1} \rightarrow 0, C_{5,2} \rightarrow C_{5,8}, C_{5,3} \rightarrow -4 C_{5,8}, C_{5,4} \rightarrow -C_{5,8}, C_{5,5} \rightarrow 6 C_{5,8}, C_{5,6} \rightarrow \frac{3 C_{5,8}}{2}, \\ &C_{5,7} \rightarrow \frac{3 C_{5,8}}{2}, C_{5,9} \rightarrow -4 C_{5,8}, C_{5,10} \rightarrow \frac{3 C_{5,8}}{2}, C_{5,11} \rightarrow -6 C_{5,8}, C_{5,12} \rightarrow -4 C_{5,8}, C_{5,13} \rightarrow \frac{3 C_{5,8}}{2}, \\ &C_{5,14} \rightarrow 6 C_{5,8}, C_{5,15} \rightarrow -4 C_{5,8}, C_{5,16} \rightarrow 0, C_{5,17} \rightarrow C_{5,8}, C_{5,18} \rightarrow -C_{5,8}, C_{5,19} \rightarrow \frac{3 C_{5,8}}{2}, \\ &C_{5,20} \rightarrow C_{5,8}, C_{5,21} \rightarrow \frac{3 C_{5,8}}{2}, C_{5,22} \rightarrow -4 C_{5,8}, C_{5,23} \rightarrow 6 C_{5,8}, C_{5,24} \rightarrow 0, C_{5,25} \rightarrow -C_{5,8}, \\ &C_{5,26} \rightarrow C_{5,8}, C_{5,27} \rightarrow -4 C_{5,8}, C_{5,28} \rightarrow 0, C_{5,29} \rightarrow C_{5,8}, C_{5,30} \rightarrow 0, C_{5,31} \rightarrow 0, C_{5,32} \rightarrow 0 \end{aligned} \right\}$$

In[*]:= **sol /. Rule -> Set**

Out[*]=

$$\left\{ \begin{aligned} &0, C_{5,8}, -4 C_{5,8}, -C_{5,8}, 6 C_{5,8}, \frac{3 C_{5,8}}{2}, \frac{3 C_{5,8}}{2}, -4 C_{5,8}, \frac{3 C_{5,8}}{2}, -6 C_{5,8}, -4 C_{5,8}, \frac{3 C_{5,8}}{2}, 6 C_{5,8}, \\ &-4 C_{5,8}, 0, C_{5,8}, -C_{5,8}, \frac{3 C_{5,8}}{2}, C_{5,8}, \frac{3 C_{5,8}}{2}, -4 C_{5,8}, 6 C_{5,8}, 0, -C_{5,8}, C_{5,8}, -4 C_{5,8}, 0, C_{5,8}, 0, 0, 0 \end{aligned} \right\}$$

In[*]:= **C_{5,8} = 0**

Out[*]=

$$0$$

In[*]:= **ϕ[d]**

Out[*]=

$$\begin{aligned} &O_{AR, \{x, y\}, \{1\}} \left[\mathcal{A}_0 \left[AW_1 [] + \frac{1}{24} AW_1 [x, y] - \frac{1}{24} AW_1 [y, x] - \frac{AW_1 [x, x, x, y]}{1440} + \frac{1}{480} AW_1 [x, x, y, x] + \right. \right. \\ &\quad \frac{7 AW_1 [x, x, y, y]}{5760} - \frac{1}{480} AW_1 [x, y, x, x] - \frac{1}{640} AW_1 [x, y, x, y] - \frac{AW_1 [x, y, y, x]}{1152} - \\ &\quad \frac{7 AW_1 [x, y, y, y]}{5760} + \frac{AW_1 [y, x, x, x]}{1440} - \frac{AW_1 [y, x, x, y]}{1152} + \frac{19 AW_1 [y, x, y, x]}{5760} + \\ &\quad \left. \left. \frac{7 AW_1 [y, x, y, y]}{1920} - \frac{7 AW_1 [y, y, x, x]}{5760} - \frac{7 AW_1 [y, y, x, y]}{1920} + \frac{7 AW_1 [y, y, y, x]}{5760} \right] \right] \end{aligned}$$

Solving to Degree 6

In[*]:= **d = 6; i = 0;**

Ⓢ[d] = Ⓢ[d - 1] + Sum[c_{d,++i} B, {B, Select[Basis_d[O_{AR}, {x,y}, {1}], FreeQ[#, Ⓢ_c[1]] &]}]

Out[*]=

$$\begin{aligned}
 & \mathcal{O}_{AR, \{x,y\}, \{1\}} \left[\mathcal{A}_0 \left[AW_1[] + \frac{1}{24} AW_1[x, y] - \frac{1}{24} AW_1[y, x] - \frac{AW_1[x, x, x, y]}{1440} + \frac{1}{480} AW_1[x, x, y, x] + \right. \right. \\
 & \quad \frac{7 AW_1[x, x, y, y]}{5760} - \frac{1}{480} AW_1[x, y, x, x] - \frac{1}{640} AW_1[x, y, x, y] - \frac{AW_1[x, y, y, x]}{1152} - \\
 & \quad \frac{7 AW_1[x, y, y, y]}{5760} + \frac{AW_1[y, x, x, x]}{1440} - \frac{AW_1[y, x, x, y]}{1152} + \frac{19 AW_1[y, x, y, x]}{5760} + \frac{7 AW_1[y, x, y, y]}{1920} - \\
 & \quad \frac{7 AW_1[y, y, x, x]}{5760} - \frac{7 AW_1[y, y, x, y]}{1920} + \frac{7 AW_1[y, y, y, x]}{5760} + c_{6,1} AW_1[x, x, x, x, x, x] + \\
 & \quad c_{6,2} AW_1[x, x, x, x, x, y] + c_{6,3} AW_1[x, x, x, x, y, x] + c_{6,4} AW_1[x, x, x, x, y, y] + \\
 & \quad c_{6,5} AW_1[x, x, x, y, x, x] + c_{6,6} AW_1[x, x, x, y, x, y] + c_{6,7} AW_1[x, x, x, y, y, x] + \\
 & \quad c_{6,8} AW_1[x, x, x, y, y, y] + c_{6,9} AW_1[x, x, y, x, x, x] + c_{6,10} AW_1[x, x, y, x, x, y] + \\
 & \quad c_{6,11} AW_1[x, x, y, x, y, x] + c_{6,12} AW_1[x, x, y, x, y, y] + c_{6,13} AW_1[x, x, y, y, x, x] + \\
 & \quad c_{6,14} AW_1[x, x, y, y, x, y] + c_{6,15} AW_1[x, x, y, y, y, x] + c_{6,16} AW_1[x, x, y, y, y, y] + \\
 & \quad c_{6,17} AW_1[x, y, x, x, x, x] + c_{6,18} AW_1[x, y, x, x, x, y] + c_{6,19} AW_1[x, y, x, x, y, x] + \\
 & \quad c_{6,20} AW_1[x, y, x, x, y, y] + c_{6,21} AW_1[x, y, x, y, x, x] + c_{6,22} AW_1[x, y, x, y, x, y] + \\
 & \quad c_{6,23} AW_1[x, y, x, y, y, x] + c_{6,24} AW_1[x, y, x, y, y, y] + c_{6,25} AW_1[x, y, y, x, x, x] + \\
 & \quad c_{6,26} AW_1[x, y, y, x, x, y] + c_{6,27} AW_1[x, y, y, x, y, x] + c_{6,28} AW_1[x, y, y, x, y, y] + \\
 & \quad c_{6,29} AW_1[x, y, y, y, x, x] + c_{6,30} AW_1[x, y, y, y, x, y] + c_{6,31} AW_1[x, y, y, y, y, x] + \\
 & \quad c_{6,32} AW_1[x, y, y, y, y, y] + c_{6,33} AW_1[y, x, x, x, x, x] + c_{6,34} AW_1[y, x, x, x, x, y] + \\
 & \quad c_{6,35} AW_1[y, x, x, x, y, x] + c_{6,36} AW_1[y, x, x, x, y, y] + c_{6,37} AW_1[y, x, x, y, x, x] + \\
 & \quad c_{6,38} AW_1[y, x, x, y, x, y] + c_{6,39} AW_1[y, x, x, y, y, x] + c_{6,40} AW_1[y, x, x, y, y, y] + \\
 & \quad c_{6,41} AW_1[y, x, y, x, x, x] + c_{6,42} AW_1[y, x, y, x, x, y] + c_{6,43} AW_1[y, x, y, x, y, x] + \\
 & \quad c_{6,44} AW_1[y, x, y, x, y, y] + c_{6,45} AW_1[y, x, y, y, x, x] + c_{6,46} AW_1[y, x, y, y, x, y] + \\
 & \quad c_{6,47} AW_1[y, x, y, y, y, x] + c_{6,48} AW_1[y, x, y, y, y, y] + c_{6,49} AW_1[y, y, x, x, x, x] + \\
 & \quad c_{6,50} AW_1[y, y, x, x, x, y] + c_{6,51} AW_1[y, y, x, x, y, x] + c_{6,52} AW_1[y, y, x, x, y, y] + \\
 & \quad c_{6,53} AW_1[y, y, x, y, x, x] + c_{6,54} AW_1[y, y, x, y, x, y] + c_{6,55} AW_1[y, y, x, y, y, x] + \\
 & \quad c_{6,56} AW_1[y, y, x, y, y, y] + c_{6,57} AW_1[y, y, y, x, x, x] + c_{6,58} AW_1[y, y, y, x, x, y] + \\
 & \quad c_{6,59} AW_1[y, y, y, x, y, x] + c_{6,60} AW_1[y, y, y, x, y, y] + c_{6,61} AW_1[y, y, y, y, x, x] + \\
 & \quad c_{6,62} AW_1[y, y, y, y, x, y] + c_{6,63} AW_1[y, y, y, y, y, x] + c_{6,64} AW_1[y, y, y, y, y, y] \left. \right]
 \end{aligned}$$

```
In[*]:= Short[
  reIs = Union@@ (List@@Pentagond[ $\mathbb{Z}$ [d]][[1]] /. {
     $\mathcal{A}_0[A\_]$   $\Rightarrow$  Table[Coefficient[A, B], {B, Basisd, {x,y}[AW1 AW2] }},
     $\mathcal{A}_{C[1,2]}[A\_]$   $\Rightarrow$  Table[Coefficient[A, B], {B, AW2[[]] Basisd-1, {x,y}[AW1 AW2 AW1] }},
  }),
  10]
```

```
Out[*]//Short=
{0, -186 c6,1, -165 c6,1, -156 c6,1, -111 c6,1, -105 c6,1, -80 c6,1, -57 c6,1,
-20 c6,1, -15 c6,1, -11 c6,1, -6 c6,1, -c6,1, c6,1, 15 c6,1, 49 c6,1, <<752>>,
-12 c6,16 - 6 c6,17 - 18 c6,24 - 26 c6,28 - 36 c6,30 - 48 c6,31 - 30 c6,33 - 9 c6,40 - 13 c6,44 - 18 c6,46 -
24 c6,47 - 24 c6,48 - 6 c6,52 - 8 c6,54 - 10 c6,55 - 21 c6,56 - 3 c6,58 - 3 c6,59 + 3 c6,60 + 41 c6,62 + 85 c6,63,
-150 c6,64, -101 c6,64, -60 c6,64, -56 c6,64, -20 c6,64, -15 c6,64, -6 c6,64,
6 c6,64, 30 c6,64, 39 c6,64, 60 c6,64, 124 c6,64, 210 c6,64, 270 c6,64}
```

```
In[*]:= eqns = # == 0 & /@ reIs;
```

```
In[*]:= vars = Union[Cases[eqns, cd, _,  $\infty$ ]]
```

```
Out[*]=
{c6,1, c6,2, c6,3, c6,4, c6,5, c6,6, c6,7, c6,8, c6,9, c6,10, c6,11, c6,12, c6,13, c6,14, c6,15, c6,16, c6,17,
c6,18, c6,19, c6,20, c6,21, c6,22, c6,23, c6,24, c6,25, c6,26, c6,27, c6,28, c6,29, c6,30, c6,31, c6,32, c6,33,
c6,34, c6,35, c6,36, c6,37, c6,38, c6,39, c6,40, c6,41, c6,42, c6,43, c6,44, c6,45, c6,46, c6,47, c6,48, c6,49,
c6,50, c6,51, c6,52, c6,53, c6,54, c6,55, c6,56, c6,57, c6,58, c6,59, c6,60, c6,61, c6,62, c6,63, c6,64}
```


In[*]:= sol = Solve[eqns, vars] [[1]]

Out[*]=

$$\left\{ c_{6,1} \rightarrow 0, c_{6,2} \rightarrow \frac{1}{60480}, c_{6,3} \rightarrow -\frac{1}{12096}, c_{6,4} \rightarrow -\frac{13}{241920}, c_{6,5} \rightarrow \frac{1}{6048}, c_{6,6} \rightarrow \frac{19}{145152}, \right.$$

$$c_{6,7} \rightarrow \frac{61}{725760}, c_{6,8} \rightarrow \frac{83}{967680}, c_{6,9} \rightarrow -\frac{1}{6048}, c_{6,10} \rightarrow -\frac{17}{241920}, c_{6,11} \rightarrow -\frac{61}{241920},$$

$$c_{6,12} \rightarrow -\frac{89}{414720}, c_{6,13} \rightarrow 0, c_{6,14} \rightarrow \frac{71}{967680}, c_{6,15} \rightarrow -\frac{337}{2903040}, c_{6,16} \rightarrow -\frac{31}{483840},$$

$$c_{6,17} \rightarrow \frac{1}{12096}, c_{6,18} \rightarrow \frac{13}{725760}, c_{6,19} \rightarrow \frac{1}{11520}, c_{6,20} \rightarrow \frac{37}{580608}, c_{6,21} \rightarrow \frac{1}{6048}, c_{6,22} \rightarrow \frac{79}{967680},$$

$$c_{6,23} \rightarrow \frac{71}{322560}, c_{6,24} \rightarrow \frac{73}{483840}, c_{6,25} \rightarrow -\frac{1}{18144}, c_{6,26} \rightarrow -\frac{53}{967680}, c_{6,27} \rightarrow -\frac{23}{193536},$$

$$c_{6,28} \rightarrow -\frac{11}{161280}, c_{6,29} \rightarrow \frac{19}{290304}, c_{6,30} \rightarrow -\frac{1}{193536}, c_{6,31} \rightarrow \frac{7}{138240}, c_{6,32} \rightarrow \frac{31}{967680},$$

$$c_{6,33} \rightarrow -\frac{1}{60480}, c_{6,34} \rightarrow \frac{1}{34560}, c_{6,35} \rightarrow -\frac{1}{725760}, c_{6,36} \rightarrow -\frac{1}{967680}, c_{6,37} \rightarrow \frac{19}{120960},$$

$$c_{6,38} \rightarrow \frac{583}{2903040}, c_{6,39} \rightarrow \frac{53}{967680}, c_{6,40} \rightarrow \frac{17}{161280}, c_{6,41} \rightarrow -\frac{103}{181440}, c_{6,42} \rightarrow -\frac{289}{2903040},$$

$$c_{6,43} \rightarrow -\frac{55}{193536}, c_{6,44} \rightarrow -\frac{17}{53760}, c_{6,45} \rightarrow -\frac{11}{483840}, c_{6,46} \rightarrow \frac{7}{46080}, c_{6,47} \rightarrow -\frac{191}{967680},$$

$$c_{6,48} \rightarrow -\frac{31}{193536}, c_{6,49} \rightarrow \frac{13}{241920}, c_{6,50} \rightarrow \frac{1}{17920}, c_{6,51} \rightarrow -\frac{19}{1451520}, c_{6,52} \rightarrow 0, c_{6,53} \rightarrow \frac{89}{414720},$$

$$c_{6,54} \rightarrow \frac{53}{322560}, c_{6,55} \rightarrow \frac{71}{322560}, c_{6,56} \rightarrow \frac{31}{96768}, c_{6,57} \rightarrow -\frac{83}{967680}, c_{6,58} \rightarrow -\frac{53}{967680},$$

$$c_{6,59} \rightarrow -\frac{13}{64512}, c_{6,60} \rightarrow -\frac{31}{96768}, c_{6,61} \rightarrow \frac{31}{483840}, c_{6,62} \rightarrow \frac{31}{193536}, c_{6,63} \rightarrow -\frac{31}{967680}, c_{6,64} \rightarrow 0 \left. \right\}$$

In[*]:= sol /. Rule -> Set

Out[*]=

$$\left\{ 0, \frac{1}{60480}, -\frac{1}{12096}, -\frac{13}{241920}, \frac{1}{6048}, \frac{19}{145152}, \frac{61}{725760}, \frac{83}{967680}, -\frac{1}{6048}, -\frac{17}{241920}, \right.$$

$$-\frac{61}{241920}, -\frac{89}{414720}, 0, \frac{71}{967680}, -\frac{337}{2903040}, -\frac{31}{483840}, \frac{1}{12096}, \frac{13}{725760}, \frac{1}{11520},$$

$$\frac{37}{580608}, \frac{1}{6048}, \frac{79}{967680}, \frac{71}{322560}, \frac{73}{483840}, -\frac{1}{18144}, -\frac{53}{967680}, -\frac{23}{193536}, -\frac{11}{161280},$$

$$\frac{19}{290304}, -\frac{1}{193536}, \frac{7}{138240}, \frac{31}{967680}, -\frac{1}{60480}, \frac{1}{34560}, -\frac{1}{725760}, -\frac{1}{967680}, \frac{19}{120960},$$

$$\frac{583}{2903040}, \frac{53}{967680}, \frac{17}{161280}, \frac{29}{181440}, \frac{289}{2903040}, \frac{55}{193536}, \frac{17}{53760}, -\frac{11}{483840},$$

$$\frac{2903040}{7}, \frac{967680}{191}, -\frac{161280}{31}, -\frac{181440}{13}, -\frac{2903040}{1}, -\frac{193536}{19}, -\frac{53760}{89}, -\frac{483840}{53}, \frac{71}{322560},$$

$$\frac{46080}{31}, -\frac{967680}{83}, -\frac{193536}{53}, \frac{241920}{13}, \frac{17920}{31}, \frac{1451520}{31}, 0, \frac{414720}{31}, \frac{322560}{31}, \frac{322560}{96768},$$

$$\frac{13}{96768}, -\frac{31}{967680}, -\frac{31}{967680}, -\frac{64512}{96768}, -\frac{31}{96768}, \frac{31}{483840}, \frac{31}{193536}, -\frac{31}{967680}, 0 \left. \right\}$$

In[*]:= $\mathcal{A}[d]$

Out[*]=

$$\mathcal{O}_{AR, \{x, y\}, \{1\}} \left[\mathcal{A}_0 \left[AW_1[] \right] + \frac{1}{24} AW_1[x, y] - \frac{1}{24} AW_1[y, x] - \frac{AW_1[x, x, x, y]}{1440} + \frac{1}{480} AW_1[x, x, y, x] + \right.$$

$$\begin{aligned}
 & \frac{7 AW_1[x, x, y, y]}{5760} - \frac{1}{480} AW_1[x, y, x, x] - \frac{1}{640} AW_1[x, y, x, y] - \frac{AW_1[x, y, y, x]}{1152} - \\
 & \frac{7 AW_1[x, y, y, y]}{5760} + \frac{AW_1[y, x, x, x]}{1440} - \frac{AW_1[y, x, x, y]}{1152} + \frac{19 AW_1[y, x, y, x]}{5760} + \\
 & \frac{7 AW_1[y, x, y, y]}{1920} - \frac{7 AW_1[y, y, x, x]}{5760} - \frac{7 AW_1[y, y, x, y]}{1920} + \frac{7 AW_1[y, y, y, x]}{5760} + \\
 & \frac{AW_1[x, x, x, x, x, y]}{60480} - \frac{AW_1[x, x, x, x, y, x]}{12096} - \frac{13 AW_1[x, x, x, x, y, y]}{241920} + \\
 & \frac{AW_1[x, x, x, y, x, x]}{6048} + \frac{19 AW_1[x, x, x, y, x, y]}{145152} + \frac{61 AW_1[x, x, x, y, y, x]}{725760} + \\
 & \frac{83 AW_1[x, x, x, y, y, y]}{967680} - \frac{AW_1[x, x, y, x, x, x]}{6048} - \frac{17 AW_1[x, x, y, x, x, y]}{241920} - \\
 & \frac{61 AW_1[x, x, y, x, y, x]}{241920} - \frac{89 AW_1[x, x, y, x, y, y]}{414720} + \frac{71 AW_1[x, x, y, y, x, y]}{967680} - \\
 & \frac{337 AW_1[x, x, y, y, y, x]}{2903040} - \frac{31 AW_1[x, x, y, y, y, y]}{483840} + \frac{AW_1[x, y, x, x, x, x]}{12096} + \\
 & \frac{13 AW_1[x, y, x, x, x, y]}{725760} + \frac{AW_1[x, y, x, x, y, x]}{11520} + \frac{37 AW_1[x, y, x, x, y, y]}{580608} + \\
 & \frac{AW_1[x, y, x, y, x, x]}{6048} + \frac{79 AW_1[x, y, x, y, x, y]}{967680} + \frac{71 AW_1[x, y, x, y, y, x]}{322560} + \\
 & \frac{73 AW_1[x, y, x, y, y, y]}{483840} - \frac{AW_1[x, y, y, x, x, x]}{18144} - \frac{53 AW_1[x, y, y, x, x, y]}{967680} - \\
 & \frac{23 AW_1[x, y, y, x, y, x]}{193536} - \frac{11 AW_1[x, y, y, x, y, y]}{161280} + \frac{19 AW_1[x, y, y, y, x, x]}{290304} - \\
 & \frac{AW_1[x, y, y, y, x, y]}{193536} + \frac{7 AW_1[x, y, y, y, y, x]}{138240} + \frac{31 AW_1[x, y, y, y, y, y]}{967680} - \\
 & \frac{AW_1[y, x, x, x, x, x]}{60480} + \frac{AW_1[y, x, x, x, x, y]}{34560} - \frac{97 AW_1[y, x, x, x, y, x]}{725760} - \\
 & \frac{103 AW_1[y, x, x, x, y, y]}{967680} + \frac{19 AW_1[y, x, x, y, x, x]}{120960} + \frac{583 AW_1[y, x, x, y, x, y]}{2903040} + \\
 & \frac{53 AW_1[y, x, x, y, y, x]}{967680} + \frac{17 AW_1[y, x, x, y, y, y]}{161280} - \frac{29 AW_1[y, x, y, x, x, x]}{181440} - \\
 & \frac{289 AW_1[y, x, y, x, x, y]}{2903040} - \frac{55 AW_1[y, x, y, x, y, x]}{193536} - \frac{17 AW_1[y, x, y, x, y, y]}{53760} - \\
 & \frac{11 AW_1[y, x, y, y, x, x]}{483840} + \frac{7 AW_1[y, x, y, y, x, y]}{46080} - \frac{191 AW_1[y, x, y, y, y, x]}{967680} - \\
 & \frac{31 AW_1[y, x, y, y, y, y]}{193536} + \frac{13 AW_1[y, y, x, x, x, x]}{241920} + \frac{AW_1[y, y, x, x, x, y]}{17920} - \\
 & \frac{19 AW_1[y, y, x, x, y, x]}{1451520} + \frac{89 AW_1[y, y, x, y, x, x]}{414720} + \frac{53 AW_1[y, y, x, y, x, y]}{322560} + \\
 & \frac{71 AW_1[y, y, x, y, y, x]}{322560} + \frac{31 AW_1[y, y, x, y, y, y]}{96768} - \frac{83 AW_1[y, y, y, x, x, x]}{967680} - \\
 & \frac{53 AW_1[y, y, y, x, x, y]}{967680} - \frac{13 AW_1[y, y, y, x, y, x]}{64512} - \frac{31 AW_1[y, y, y, x, y, y]}{96768} +
 \end{aligned}$$

$$\left. \left. \left. \frac{31 AW_1[y, y, y, y, x, x]}{483840} + \frac{31 AW_1[y, y, y, y, x, y]}{193536} - \frac{31 AW_1[y, y, y, y, y, x]}{967680} \right] \right]$$

Solving to Degree 7

In[]:= **d = 7; i = 0;**

ϕ[d] = ϕ[d - 1] + Sum[c_{d,++i} B, {B, Select[Basis_d[O_{AR, {x,y}, {1}}], FreeQ[#, ϑ_{c[1]}] &]}]

Out[]:=

$$O_{AR, \{x,y\}, \{1\}} \left[\mathcal{A}_0 \left[\begin{aligned} & AW_1[] + \frac{1}{24} AW_1[x, y] - \frac{1}{24} AW_1[y, x] - \frac{AW_1[x, x, x, y]}{1440} + \frac{1}{480} AW_1[x, x, y, x] + \frac{7 AW_1[x, x, y, y]}{5760} - \\ & \frac{1}{480} AW_1[x, y, x, x] - \frac{1}{640} AW_1[x, y, x, y] - \frac{AW_1[x, y, y, x]}{1152} - \frac{7 AW_1[x, y, y, y]}{5760} + \\ & \frac{AW_1[y, x, x, x]}{1440} - \frac{AW_1[y, x, x, y]}{1152} + \frac{19 AW_1[y, x, y, x]}{5760} + \frac{7 AW_1[y, x, y, y]}{1920} - \frac{7 AW_1[y, y, x, x]}{5760} - \\ & \frac{7 AW_1[y, y, x, y]}{1920} + \frac{7 AW_1[y, y, y, x]}{5760} + \frac{AW_1[x, x, x, x, x, y]}{60480} - \frac{AW_1[x, x, x, x, y, x]}{12096} - \\ & \frac{13 AW_1[x, x, x, x, y, y]}{241920} + \frac{AW_1[x, x, x, y, x, x]}{6048} + \frac{19 AW_1[x, x, x, y, x, y]}{145152} + \\ & \frac{61 AW_1[x, x, x, y, y, x]}{725760} + \frac{83 AW_1[x, x, x, y, y, y]}{967680} - \frac{AW_1[x, x, y, x, x, x]}{6048} - \\ & \frac{17 AW_1[x, x, y, x, x, y]}{241920} - \frac{61 AW_1[x, x, y, x, y, x]}{241920} - \frac{89 AW_1[x, x, y, x, y, y]}{414720} + \\ & \frac{71 AW_1[x, x, y, y, x, y]}{967680} - \frac{337 AW_1[x, x, y, y, y, x]}{2903040} - \frac{31 AW_1[x, x, y, y, y, y]}{483840} + \\ & \frac{AW_1[x, y, x, x, x, x]}{12096} + \frac{13 AW_1[x, y, x, x, x, y]}{725760} + \frac{AW_1[x, y, x, x, y, x]}{11520} + \\ & \frac{37 AW_1[x, y, x, x, y, y]}{580608} + \frac{AW_1[x, y, x, y, x, x]}{6048} + \frac{79 AW_1[x, y, x, y, x, y]}{967680} + \\ & \frac{71 AW_1[x, y, x, y, y, x]}{322560} + \frac{73 AW_1[x, y, x, y, y, y]}{483840} - \frac{AW_1[x, y, y, x, x, x]}{18144} - \\ & \frac{53 AW_1[x, y, y, x, x, y]}{967680} - \frac{23 AW_1[x, y, y, x, y, x]}{193536} - \frac{11 AW_1[x, y, y, x, y, y]}{161280} + \\ & \frac{19 AW_1[x, y, y, y, x, x]}{290304} - \frac{AW_1[x, y, y, y, x, y]}{193536} + \frac{7 AW_1[x, y, y, y, y, x]}{138240} + \\ & \frac{31 AW_1[x, y, y, y, y, y]}{967680} - \frac{AW_1[y, x, x, x, x, x]}{60480} + \frac{AW_1[y, x, x, x, x, y]}{34560} - \\ & \frac{97 AW_1[y, x, x, x, y, x]}{725760} - \frac{103 AW_1[y, x, x, x, y, y]}{967680} + \frac{19 AW_1[y, x, x, y, x, x]}{120960} + \\ & \frac{583 AW_1[y, x, x, y, x, y]}{2903040} + \frac{53 AW_1[y, x, x, y, y, x]}{967680} + \frac{17 AW_1[y, x, x, y, y, y]}{161280} - \\ & \frac{29 AW_1[y, x, y, x, x, x]}{181440} - \frac{289 AW_1[y, x, y, x, x, y]}{2903040} - \frac{55 AW_1[y, x, y, x, y, x]}{193536} - \end{aligned} \right]$$

$$\begin{aligned}
 & \frac{17 AW_1[y, x, y, x, y, y]}{53760} - \frac{11 AW_1[y, x, y, y, x, x]}{483840} + \frac{7 AW_1[y, x, y, y, x, y]}{46080} - \\
 & \frac{191 AW_1[y, x, y, y, y, x]}{967680} - \frac{31 AW_1[y, x, y, y, y, y]}{193536} + \frac{13 AW_1[y, y, x, x, x, x]}{241920} + \\
 & \frac{AW_1[y, y, x, x, x, y]}{17920} - \frac{19 AW_1[y, y, x, x, y, x]}{1451520} + \frac{89 AW_1[y, y, x, y, x, x]}{414720} + \\
 & \frac{53 AW_1[y, y, x, y, x, y]}{322560} + \frac{71 AW_1[y, y, x, y, y, x]}{322560} + \frac{31 AW_1[y, y, x, y, y, y]}{96768} - \\
 & \frac{83 AW_1[y, y, y, x, x, x]}{967680} - \frac{53 AW_1[y, y, y, x, x, y]}{967680} - \frac{13 AW_1[y, y, y, x, y, x]}{64512} - \\
 & \frac{31 AW_1[y, y, y, x, y, y]}{96768} + \frac{31 AW_1[y, y, y, y, x, x]}{483840} + \frac{31 AW_1[y, y, y, y, x, y]}{193536} - \\
 & \frac{31 AW_1[y, y, y, y, y, x]}{967680} + c_{7,1} AW_1[x, x, x, x, x, x, x] + c_{7,2} AW_1[x, x, x, x, x, x, y] + \\
 & c_{7,3} AW_1[x, x, x, x, x, y, x] + c_{7,4} AW_1[x, x, x, x, x, y, y] + c_{7,5} AW_1[x, x, x, x, y, x, x] + \\
 & c_{7,6} AW_1[x, x, x, x, y, x, y] + c_{7,7} AW_1[x, x, x, x, y, y, x] + c_{7,8} AW_1[x, x, x, x, y, y, y] + \\
 & c_{7,9} AW_1[x, x, x, y, x, x, x] + c_{7,10} AW_1[x, x, x, y, x, x, y] + c_{7,11} AW_1[x, x, x, y, x, y, x] + \\
 & c_{7,12} AW_1[x, x, x, y, x, y, y] + c_{7,13} AW_1[x, x, x, y, y, x, x] + c_{7,14} AW_1[x, x, x, y, y, x, y] + \\
 & c_{7,15} AW_1[x, x, x, y, y, y, x] + c_{7,16} AW_1[x, x, x, y, y, y, y] + c_{7,17} AW_1[x, x, y, x, x, x, x] + \\
 & c_{7,18} AW_1[x, x, y, x, x, x, y] + c_{7,19} AW_1[x, x, y, x, x, y, x] + c_{7,20} AW_1[x, x, y, x, x, y, y] + \\
 & c_{7,21} AW_1[x, x, y, x, y, x, x] + c_{7,22} AW_1[x, x, y, x, y, x, y] + c_{7,23} AW_1[x, x, y, x, y, y, x] + \\
 & c_{7,24} AW_1[x, x, y, x, y, y, y] + c_{7,25} AW_1[x, x, y, y, x, x, x] + c_{7,26} AW_1[x, x, y, y, x, x, y] + \\
 & c_{7,27} AW_1[x, x, y, y, x, y, x] + c_{7,28} AW_1[x, x, y, y, x, y, y] + c_{7,29} AW_1[x, x, y, y, y, x, x] + \\
 & c_{7,30} AW_1[x, x, y, y, y, x, y] + c_{7,31} AW_1[x, x, y, y, y, y, x] + c_{7,32} AW_1[x, x, y, y, y, y, y] + \\
 & c_{7,33} AW_1[x, y, x, x, x, x, x] + c_{7,34} AW_1[x, y, x, x, x, x, y] + c_{7,35} AW_1[x, y, x, x, x, y, x] + \\
 & c_{7,36} AW_1[x, y, x, x, x, y, y] + c_{7,37} AW_1[x, y, x, x, y, x, x] + c_{7,38} AW_1[x, y, x, x, y, x, y] + \\
 & c_{7,39} AW_1[x, y, x, x, y, y, x] + c_{7,40} AW_1[x, y, x, x, y, y, y] + c_{7,41} AW_1[x, y, x, y, x, x, x] + \\
 & c_{7,42} AW_1[x, y, x, y, x, x, y] + c_{7,43} AW_1[x, y, x, y, x, y, x] + c_{7,44} AW_1[x, y, x, y, x, y, y] + \\
 & c_{7,45} AW_1[x, y, x, y, y, x, x] + c_{7,46} AW_1[x, y, x, y, y, x, y] + c_{7,47} AW_1[x, y, x, y, y, y, x] + \\
 & c_{7,48} AW_1[x, y, x, y, y, y, y] + c_{7,49} AW_1[x, y, y, x, x, x, x] + c_{7,50} AW_1[x, y, y, x, x, x, y] + \\
 & c_{7,51} AW_1[x, y, y, x, x, y, x] + c_{7,52} AW_1[x, y, y, x, x, y, y] + c_{7,53} AW_1[x, y, y, x, y, x, x] + \\
 & c_{7,54} AW_1[x, y, y, x, y, x, y] + c_{7,55} AW_1[x, y, y, x, y, y, x] + c_{7,56} AW_1[x, y, y, x, y, y, y] + \\
 & c_{7,57} AW_1[x, y, y, y, x, x, x] + c_{7,58} AW_1[x, y, y, y, x, x, y] + c_{7,59} AW_1[x, y, y, y, x, y, x] + \\
 & c_{7,60} AW_1[x, y, y, y, x, y, y] + c_{7,61} AW_1[x, y, y, y, y, x, x] + c_{7,62} AW_1[x, y, y, y, y, x, y] + \\
 & c_{7,63} AW_1[x, y, y, y, y, y, x] + c_{7,64} AW_1[x, y, y, y, y, y, y] + c_{7,65} AW_1[y, x, x, x, x, x, x] + \\
 & c_{7,66} AW_1[y, x, x, x, x, x, y] + c_{7,67} AW_1[y, x, x, x, x, y, x] + c_{7,68} AW_1[y, x, x, x, x, y, y] + \\
 & c_{7,69} AW_1[y, x, x, x, y, x, x] + c_{7,70} AW_1[y, x, x, x, y, x, y] + c_{7,71} AW_1[y, x, x, x, y, y, x] + \\
 & c_{7,72} AW_1[y, x, x, x, y, y, y] + c_{7,73} AW_1[y, x, x, y, x, x, x] + c_{7,74} AW_1[y, x, x, y, x, x, y] + \\
 & c_{7,75} AW_1[y, x, x, y, x, y, x] + c_{7,76} AW_1[y, x, x, y, x, y, y] + c_{7,77} AW_1[y, x, x, y, y, x, x] + \\
 & c_{7,78} AW_1[y, x, x, y, y, x, y] + c_{7,79} AW_1[y, x, x, y, y, y, x] + c_{7,80} AW_1[y, x, x, y, y, y, y] + \\
 & c_{7,81} AW_1[y, x, y, x, x, x, x] + c_{7,82} AW_1[y, x, y, x, x, x, y] + c_{7,83} AW_1[y, x, y, x, x, y, x] + \\
 & c_{7,84} AW_1[y, x, y, x, x, y, y] + c_{7,85} AW_1[y, x, y, x, y, x, x] + c_{7,86} AW_1[y, x, y, x, y, x, y] + \\
 & c_{7,87} AW_1[y, x, y, x, y, y, x] + c_{7,88} AW_1[y, x, y, x, y, y, y] + c_{7,89} AW_1[y, x, y, y, x, x, x] + \\
 & c_{7,90} AW_1[y, x, y, y, x, x, y] + c_{7,91} AW_1[y, x, y, y, x, y, x] + c_{7,92} AW_1[y, x, y, y, x, y, y] + \\
 & c_{7,93} AW_1[y, x, y, y, y, x, x] + c_{7,94} AW_1[y, x, y, y, y, x, y] + c_{7,95} AW_1[y, x, y, y, y, y, x] +
 \end{aligned}$$

$$\begin{aligned}
 & C_{7,96} AW_1[y, x, y, y, y, y, y] + C_{7,97} AW_1[y, y, x, x, x, x, x] + C_{7,98} AW_1[y, y, x, x, x, x, y] + \\
 & C_{7,99} AW_1[y, y, x, x, x, y, x] + C_{7,100} AW_1[y, y, x, x, x, y, y] + C_{7,101} AW_1[y, y, x, x, y, x, x] + \\
 & C_{7,102} AW_1[y, y, x, x, y, x, y] + C_{7,103} AW_1[y, y, x, x, y, y, x] + C_{7,104} AW_1[y, y, x, x, y, y, y] + \\
 & C_{7,105} AW_1[y, y, x, y, x, x, x] + C_{7,106} AW_1[y, y, x, y, x, x, y] + C_{7,107} AW_1[y, y, x, y, x, y, x] + \\
 & C_{7,108} AW_1[y, y, x, y, x, y, y] + C_{7,109} AW_1[y, y, x, y, y, x, x] + C_{7,110} AW_1[y, y, x, y, y, x, y] + \\
 & C_{7,111} AW_1[y, y, x, y, y, y, x] + C_{7,112} AW_1[y, y, x, y, y, y, y] + C_{7,113} AW_1[y, y, y, x, x, x, x] + \\
 & C_{7,114} AW_1[y, y, y, x, x, x, y] + C_{7,115} AW_1[y, y, y, x, x, y, x] + C_{7,116} AW_1[y, y, y, x, x, y, y] + \\
 & C_{7,117} AW_1[y, y, y, x, y, x, x] + C_{7,118} AW_1[y, y, y, x, y, x, y] + C_{7,119} AW_1[y, y, y, x, y, y, x] + \\
 & C_{7,120} AW_1[y, y, y, x, y, y, y] + C_{7,121} AW_1[y, y, y, y, x, x, x] + C_{7,122} AW_1[y, y, y, y, x, x, y] + \\
 & C_{7,123} AW_1[y, y, y, y, x, y, x] + C_{7,124} AW_1[y, y, y, y, x, y, y] + C_{7,125} AW_1[y, y, y, y, y, x, x] + \\
 & C_{7,126} AW_1[y, y, y, y, y, x, y] + C_{7,127} AW_1[y, y, y, y, y, y, x] + C_{7,128} AW_1[y, y, y, y, y, y, y] \Big]
 \end{aligned}$$

```

In[*]:= Short[
  rels = Union@@(List@@Pentagon_d[ $\emptyset$ ][d]][[1]] /. {
     $\mathcal{A}_0[A_] \Rightarrow$  Table[Coefficient[A, B], {B, Basis_d,{x,y}[AW_1 AW_2]}},
     $\mathcal{A}_c[1,2][A_] \Rightarrow$  Table[Coefficient[A, B], {B, AW_2[] Basis_d-1,{x,y}[AW_1 AW_2 AW_1]}},
  }),
  10]

```

```

Out[*]//Short=
{0, -777 c7,1, -651 c7,1, -546 c7,1, -399 c7,1, -385 c7,1, -351 c7,1, -245 c7,1, -140 c7,1, -120 c7,1,
-77 c7,1, -71 c7,1, -35 c7,1, -21 c7,1, -7 c7,1, -c7,1, 7 c7,1, 13 c7,1, 21 c7,1, 35 c7,1,
175 c7,1, 189 c7,1, <<2034>>, -707 c7,128, -525 c7,128, -392 c7,128, -350 c7,128, -336 c7,128,
-140 c7,128, -119 c7,128, -105 c7,128, -56 c7,128, -42 c7,128, -35 c7,128, -21 c7,128, -7 c7,128,
7 c7,128, 105 c7,128, 189 c7,128, 273 c7,128, 315 c7,128, 490 c7,128, 868 c7,128, 945 c7,128}

```

```

In[*]:= eqns = # == 0 & /@ rels;
In[*]:= vars = Union[Cases[eqns, c_d,_,  $\infty$ ]]

```

```

Out[*]=
{c7,1, c7,2, c7,3, c7,4, c7,5, c7,6, c7,7, c7,8, c7,9, c7,10, c7,11, c7,12, c7,13, c7,14, c7,15, c7,16,
c7,17, c7,18, c7,19, c7,20, c7,21, c7,22, c7,23, c7,24, c7,25, c7,26, c7,27, c7,28, c7,29, c7,30, c7,31,
c7,32, c7,33, c7,34, c7,35, c7,36, c7,37, c7,38, c7,39, c7,40, c7,41, c7,42, c7,43, c7,44, c7,45, c7,46,
c7,47, c7,48, c7,49, c7,50, c7,51, c7,52, c7,53, c7,54, c7,55, c7,56, c7,57, c7,58, c7,59, c7,60,
c7,61, c7,62, c7,63, c7,64, c7,65, c7,66, c7,67, c7,68, c7,69, c7,70, c7,71, c7,72, c7,73, c7,74,
c7,75, c7,76, c7,77, c7,78, c7,79, c7,80, c7,81, c7,82, c7,83, c7,84, c7,85, c7,86, c7,87, c7,88,
c7,89, c7,90, c7,91, c7,92, c7,93, c7,94, c7,95, c7,96, c7,97, c7,98, c7,99, c7,100, c7,101, c7,102,
c7,103, c7,104, c7,105, c7,106, c7,107, c7,108, c7,109, c7,110, c7,111, c7,112, c7,113, c7,114, c7,115,
c7,116, c7,117, c7,118, c7,119, c7,120, c7,121, c7,122, c7,123, c7,124, c7,125, c7,126, c7,127, c7,128}

```

```

In[*]:= sol = Solve[eqns, vars][[1]]

```

 Solve: Equations may not give solutions for all "solve" variables.

Out[]=

$$\begin{aligned}
& \{ c_{7,1} \rightarrow 0, c_{7,2} \rightarrow c_{7,32}, c_{7,3} \rightarrow -6 c_{7,32}, c_{7,4} \rightarrow -2 c_{7,32}, c_{7,5} \rightarrow 15 c_{7,32}, c_{7,6} \rightarrow 5 c_{7,32}, c_{7,7} \rightarrow 5 c_{7,32}, \\
& c_{7,8} \rightarrow 3 c_{7,32}, c_{7,9} \rightarrow -20 c_{7,32}, c_{7,10} \rightarrow -2 c_{7,32}, c_{7,11} \rightarrow -16 c_{7,32}, c_{7,12} \rightarrow -\frac{141 c_{7,32}}{16}, \\
& c_{7,13} \rightarrow -2 c_{7,32}, c_{7,14} \rightarrow \frac{45 c_{7,32}}{8}, c_{7,15} \rightarrow -\frac{141 c_{7,32}}{16}, c_{7,16} \rightarrow -2 c_{7,32}, c_{7,17} \rightarrow 15 c_{7,32}, \\
& c_{7,18} \rightarrow -2 c_{7,32}, c_{7,19} \rightarrow 12 c_{7,32}, c_{7,20} \rightarrow \frac{45 c_{7,32}}{8}, c_{7,21} \rightarrow 12 c_{7,32}, c_{7,22} \rightarrow -\frac{99 c_{7,32}}{16}, \\
& c_{7,23} \rightarrow \frac{171 c_{7,32}}{8}, c_{7,24} \rightarrow 5 c_{7,32}, c_{7,25} \rightarrow -2 c_{7,32}, c_{7,26} \rightarrow -\frac{9 c_{7,32}}{4}, c_{7,27} \rightarrow -\frac{99 c_{7,32}}{16}, \\
& c_{7,28} \rightarrow -2 c_{7,32}, c_{7,29} \rightarrow \frac{45 c_{7,32}}{8}, c_{7,30} \rightarrow -2 c_{7,32}, c_{7,31} \rightarrow 5 c_{7,32}, c_{7,33} \rightarrow -6 c_{7,32}, c_{7,34} \rightarrow 5 c_{7,32}, \\
& c_{7,35} \rightarrow -16 c_{7,32}, c_{7,36} \rightarrow -\frac{141 c_{7,32}}{16}, c_{7,37} \rightarrow 12 c_{7,32}, c_{7,38} \rightarrow \frac{171 c_{7,32}}{8}, c_{7,39} \rightarrow -\frac{99 c_{7,32}}{16}, \\
& c_{7,40} \rightarrow 5 c_{7,32}, c_{7,41} \rightarrow -16 c_{7,32}, c_{7,42} \rightarrow -\frac{99 c_{7,32}}{16}, c_{7,43} \rightarrow -18 c_{7,32}, c_{7,44} \rightarrow -16 c_{7,32}, \\
& c_{7,45} \rightarrow -\frac{99 c_{7,32}}{16}, c_{7,46} \rightarrow 12 c_{7,32}, c_{7,47} \rightarrow -16 c_{7,32}, c_{7,48} \rightarrow -6 c_{7,32}, c_{7,49} \rightarrow 5 c_{7,32}, \\
& c_{7,50} \rightarrow \frac{45 c_{7,32}}{8}, c_{7,51} \rightarrow -\frac{99 c_{7,32}}{16}, c_{7,52} \rightarrow -2 c_{7,32}, c_{7,53} \rightarrow \frac{171 c_{7,32}}{8}, c_{7,54} \rightarrow 12 c_{7,32}, \\
& c_{7,55} \rightarrow 12 c_{7,32}, c_{7,56} \rightarrow 15 c_{7,32}, c_{7,57} \rightarrow -\frac{141 c_{7,32}}{16}, c_{7,58} \rightarrow -2 c_{7,32}, c_{7,59} \rightarrow -16 c_{7,32}, \\
& c_{7,60} \rightarrow -20 c_{7,32}, c_{7,61} \rightarrow 5 c_{7,32}, c_{7,62} \rightarrow 15 c_{7,32}, c_{7,63} \rightarrow -6 c_{7,32}, c_{7,64} \rightarrow 0, c_{7,65} \rightarrow c_{7,32}, \\
& c_{7,66} \rightarrow -2 c_{7,32}, c_{7,67} \rightarrow 5 c_{7,32}, c_{7,68} \rightarrow 3 c_{7,32}, c_{7,69} \rightarrow -2 c_{7,32}, c_{7,70} \rightarrow -\frac{141 c_{7,32}}{16}, c_{7,71} \rightarrow \frac{45 c_{7,32}}{8}, \\
& c_{7,72} \rightarrow -2 c_{7,32}, c_{7,73} \rightarrow -2 c_{7,32}, c_{7,74} \rightarrow \frac{45 c_{7,32}}{8}, c_{7,75} \rightarrow -\frac{99 c_{7,32}}{16}, c_{7,76} \rightarrow 5 c_{7,32}, \\
& c_{7,77} \rightarrow -\frac{9 c_{7,32}}{4}, c_{7,78} \rightarrow -2 c_{7,32}, c_{7,79} \rightarrow -2 c_{7,32}, c_{7,80} \rightarrow c_{7,32}, c_{7,81} \rightarrow 5 c_{7,32}, c_{7,82} \rightarrow -\frac{141 c_{7,32}}{16}, \\
& c_{7,83} \rightarrow \frac{171 c_{7,32}}{8}, c_{7,84} \rightarrow 5 c_{7,32}, c_{7,85} \rightarrow -\frac{99 c_{7,32}}{16}, c_{7,86} \rightarrow -16 c_{7,32}, c_{7,87} \rightarrow 12 c_{7,32}, \\
& c_{7,88} \rightarrow -6 c_{7,32}, c_{7,89} \rightarrow \frac{45 c_{7,32}}{8}, c_{7,90} \rightarrow -2 c_{7,32}, c_{7,91} \rightarrow 12 c_{7,32}, c_{7,92} \rightarrow 15 c_{7,32}, c_{7,93} \rightarrow -2 c_{7,32}, \\
& c_{7,94} \rightarrow -20 c_{7,32}, c_{7,95} \rightarrow 15 c_{7,32}, c_{7,96} \rightarrow 0, c_{7,97} \rightarrow -2 c_{7,32}, c_{7,98} \rightarrow 3 c_{7,32}, c_{7,99} \rightarrow -\frac{141 c_{7,32}}{16}, \\
& c_{7,100} \rightarrow -2 c_{7,32}, c_{7,101} \rightarrow \frac{45 c_{7,32}}{8}, c_{7,102} \rightarrow 5 c_{7,32}, c_{7,103} \rightarrow -2 c_{7,32}, c_{7,104} \rightarrow c_{7,32}, \\
& c_{7,105} \rightarrow -\frac{141 c_{7,32}}{16}, c_{7,106} \rightarrow 5 c_{7,32}, c_{7,107} \rightarrow -16 c_{7,32}, c_{7,108} \rightarrow -6 c_{7,32}, c_{7,109} \rightarrow -2 c_{7,32}, \\
& c_{7,110} \rightarrow 15 c_{7,32}, c_{7,111} \rightarrow -20 c_{7,32}, c_{7,112} \rightarrow 0, c_{7,113} \rightarrow 3 c_{7,32}, c_{7,114} \rightarrow -2 c_{7,32}, c_{7,115} \rightarrow 5 c_{7,32}, \\
& c_{7,116} \rightarrow c_{7,32}, c_{7,117} \rightarrow 5 c_{7,32}, c_{7,118} \rightarrow -6 c_{7,32}, c_{7,119} \rightarrow 15 c_{7,32}, c_{7,120} \rightarrow 0, c_{7,121} \rightarrow -2 c_{7,32}, \\
& c_{7,122} \rightarrow c_{7,32}, c_{7,123} \rightarrow -6 c_{7,32}, c_{7,124} \rightarrow 0, c_{7,125} \rightarrow c_{7,32}, c_{7,126} \rightarrow 0, c_{7,127} \rightarrow 0, c_{7,128} \rightarrow 0 \}
\end{aligned}$$

In[*]:= sol /. Rule -> Set

Out[*]=

$$\left\{ 0, c_{7,32}, -6 c_{7,32}, -2 c_{7,32}, 15 c_{7,32}, 5 c_{7,32}, 5 c_{7,32}, 3 c_{7,32}, -20 c_{7,32}, -2 c_{7,32}, -16 c_{7,32}, \right. \\ \left. -\frac{141 c_{7,32}}{16}, -2 c_{7,32}, \frac{45 c_{7,32}}{8}, -\frac{141 c_{7,32}}{16}, -2 c_{7,32}, 15 c_{7,32}, -2 c_{7,32}, 12 c_{7,32}, \frac{45 c_{7,32}}{8}, \right. \\ \left. 12 c_{7,32}, -\frac{99 c_{7,32}}{16}, \frac{171 c_{7,32}}{8}, 5 c_{7,32}, -2 c_{7,32}, -\frac{9 c_{7,32}}{4}, -\frac{99 c_{7,32}}{16}, -2 c_{7,32}, \frac{45 c_{7,32}}{8}, \right. \\ \left. -2 c_{7,32}, 5 c_{7,32}, -6 c_{7,32}, 5 c_{7,32}, -16 c_{7,32}, -\frac{141 c_{7,32}}{16}, 12 c_{7,32}, \frac{171 c_{7,32}}{8}, -\frac{99 c_{7,32}}{16}, \right. \\ \left. 5 c_{7,32}, -16 c_{7,32}, -\frac{99 c_{7,32}}{16}, -18 c_{7,32}, -16 c_{7,32}, -\frac{99 c_{7,32}}{16}, 12 c_{7,32}, -16 c_{7,32}, -6 c_{7,32}, \right. \\ \left. 5 c_{7,32}, \frac{45 c_{7,32}}{8}, -\frac{99 c_{7,32}}{16}, -2 c_{7,32}, \frac{171 c_{7,32}}{8}, 12 c_{7,32}, 12 c_{7,32}, 15 c_{7,32}, -\frac{141 c_{7,32}}{16}, \right. \\ \left. -2 c_{7,32}, -16 c_{7,32}, -20 c_{7,32}, 5 c_{7,32}, 15 c_{7,32}, -6 c_{7,32}, 0, c_{7,32}, -2 c_{7,32}, 5 c_{7,32}, \right. \\ \left. 3 c_{7,32}, -2 c_{7,32}, -\frac{141 c_{7,32}}{16}, \frac{45 c_{7,32}}{8}, -2 c_{7,32}, -2 c_{7,32}, \frac{45 c_{7,32}}{8}, -\frac{99 c_{7,32}}{16}, 5 c_{7,32}, \right. \\ \left. -\frac{9 c_{7,32}}{4}, -2 c_{7,32}, -2 c_{7,32}, c_{7,32}, 5 c_{7,32}, -\frac{141 c_{7,32}}{16}, \frac{171 c_{7,32}}{8}, 5 c_{7,32}, -\frac{99 c_{7,32}}{16}, \right. \\ \left. -16 c_{7,32}, 12 c_{7,32}, -6 c_{7,32}, \frac{45 c_{7,32}}{8}, -2 c_{7,32}, 12 c_{7,32}, 15 c_{7,32}, -2 c_{7,32}, -20 c_{7,32}, \right. \\ \left. 15 c_{7,32}, 0, -2 c_{7,32}, 3 c_{7,32}, -\frac{141 c_{7,32}}{16}, -2 c_{7,32}, \frac{45 c_{7,32}}{8}, 5 c_{7,32}, -2 c_{7,32}, c_{7,32}, \right. \\ \left. -\frac{141 c_{7,32}}{16}, 5 c_{7,32}, -16 c_{7,32}, -6 c_{7,32}, -2 c_{7,32}, 15 c_{7,32}, -20 c_{7,32}, 0, 3 c_{7,32}, -2 c_{7,32}, \right. \\ \left. 5 c_{7,32}, c_{7,32}, 5 c_{7,32}, -6 c_{7,32}, 15 c_{7,32}, 0, -2 c_{7,32}, c_{7,32}, -6 c_{7,32}, 0, c_{7,32}, 0, 0, 0 \right\}$$

In[*]:= c_{7,32} = 0

Out[*]=

$$0$$

In[*]:= \mathfrak{d} [d]

Out[*]=

$$\begin{aligned} & \mathcal{O}_{AR, \{x,y\}, \{1\}} \left[\mathcal{A}_0 \left[AW_1[] + \frac{1}{24} AW_1[x, y] - \frac{1}{24} AW_1[y, x] - \frac{AW_1[x, x, x, y]}{1440} + \frac{1}{480} AW_1[x, x, y, x] + \right. \right. \\ & \frac{7 AW_1[x, x, y, y]}{5760} - \frac{1}{480} AW_1[x, y, x, x] - \frac{1}{640} AW_1[x, y, x, y] - \frac{AW_1[x, y, y, x]}{1152} - \\ & \frac{7 AW_1[x, y, y, y]}{5760} + \frac{AW_1[y, x, x, x]}{1440} - \frac{AW_1[y, x, x, y]}{1152} + \frac{19 AW_1[y, x, y, x]}{5760} + \\ & \frac{7 AW_1[y, x, y, y]}{1920} - \frac{7 AW_1[y, y, x, x]}{5760} - \frac{7 AW_1[y, y, x, y]}{1920} + \frac{7 AW_1[y, y, y, x]}{5760} + \\ & \frac{AW_1[x, x, x, x, x, y]}{60480} - \frac{AW_1[x, x, x, x, y, x]}{12096} - \frac{13 AW_1[x, x, x, x, y, y]}{241920} + \\ & \left. \frac{AW_1[x, x, x, y, x, x]}{6048} + \frac{19 AW_1[x, x, x, y, x, y]}{145152} + \frac{61 AW_1[x, x, x, y, y, x]}{725760} + \right. \end{aligned}$$

$$\begin{aligned}
 & \frac{83 \text{ AW}_1[x, x, x, y, y, y]}{967680} - \frac{\text{ AW}_1[x, x, y, x, x, x]}{6048} - \frac{17 \text{ AW}_1[x, x, y, x, x, y]}{241920} - \\
 & \frac{61 \text{ AW}_1[x, x, y, x, y, x]}{241920} - \frac{89 \text{ AW}_1[x, x, y, x, y, y]}{414720} + \frac{71 \text{ AW}_1[x, x, y, y, x, y]}{967680} - \\
 & \frac{337 \text{ AW}_1[x, x, y, y, y, x]}{2903040} - \frac{31 \text{ AW}_1[x, x, y, y, y, y]}{483840} + \frac{\text{ AW}_1[x, y, x, x, x, x]}{12096} + \\
 & \frac{13 \text{ AW}_1[x, y, x, x, x, y]}{725760} + \frac{\text{ AW}_1[x, y, x, x, y, x]}{11520} + \frac{37 \text{ AW}_1[x, y, x, x, y, y]}{580608} + \\
 & \frac{\text{ AW}_1[x, y, x, y, x, x]}{6048} + \frac{79 \text{ AW}_1[x, y, x, y, x, y]}{967680} + \frac{71 \text{ AW}_1[x, y, x, y, y, x]}{322560} + \\
 & \frac{73 \text{ AW}_1[x, y, x, y, y, y]}{483840} - \frac{\text{ AW}_1[x, y, y, x, x, x]}{18144} - \frac{53 \text{ AW}_1[x, y, y, x, x, y]}{967680} - \\
 & \frac{23 \text{ AW}_1[x, y, y, x, y, x]}{193536} - \frac{11 \text{ AW}_1[x, y, y, x, y, y]}{161280} + \frac{19 \text{ AW}_1[x, y, y, y, x, x]}{290304} - \\
 & \frac{\text{ AW}_1[x, y, y, y, x, y]}{193536} + \frac{7 \text{ AW}_1[x, y, y, y, y, x]}{138240} + \frac{31 \text{ AW}_1[x, y, y, y, y, y]}{967680} - \\
 & \frac{\text{ AW}_1[y, x, x, x, x, x]}{60480} + \frac{\text{ AW}_1[y, x, x, x, x, y]}{34560} - \frac{97 \text{ AW}_1[y, x, x, x, y, x]}{725760} - \\
 & \frac{103 \text{ AW}_1[y, x, x, x, y, y]}{967680} + \frac{19 \text{ AW}_1[y, x, x, y, x, x]}{120960} + \frac{583 \text{ AW}_1[y, x, x, y, x, y]}{2903040} + \\
 & \frac{53 \text{ AW}_1[y, x, x, y, y, x]}{967680} + \frac{17 \text{ AW}_1[y, x, x, y, y, y]}{161280} - \frac{29 \text{ AW}_1[y, x, y, x, x, x]}{181440} - \\
 & \frac{289 \text{ AW}_1[y, x, y, x, x, y]}{2903040} - \frac{55 \text{ AW}_1[y, x, y, x, y, x]}{193536} - \frac{17 \text{ AW}_1[y, x, y, x, y, y]}{53760} - \\
 & \frac{11 \text{ AW}_1[y, x, y, y, x, x]}{483840} + \frac{7 \text{ AW}_1[y, x, y, y, x, y]}{46080} - \frac{191 \text{ AW}_1[y, x, y, y, y, x]}{967680} - \\
 & \frac{31 \text{ AW}_1[y, x, y, y, y, y]}{193536} + \frac{13 \text{ AW}_1[y, y, x, x, x, x]}{241920} + \frac{\text{ AW}_1[y, y, x, x, x, y]}{17920} - \\
 & \frac{19 \text{ AW}_1[y, y, x, x, y, x]}{1451520} + \frac{89 \text{ AW}_1[y, y, x, y, x, x]}{414720} + \frac{53 \text{ AW}_1[y, y, x, y, x, y]}{322560} + \\
 & \frac{71 \text{ AW}_1[y, y, x, y, y, x]}{322560} + \frac{31 \text{ AW}_1[y, y, x, y, y, y]}{96768} - \frac{83 \text{ AW}_1[y, y, y, x, x, x]}{967680} - \\
 & \frac{53 \text{ AW}_1[y, y, y, x, x, y]}{967680} - \frac{13 \text{ AW}_1[y, y, y, x, y, x]}{64512} - \frac{31 \text{ AW}_1[y, y, y, x, y, y]}{96768} + \\
 & \frac{31 \text{ AW}_1[y, y, y, y, x, x]}{483840} + \frac{31 \text{ AW}_1[y, y, y, y, x, y]}{193536} - \frac{31 \text{ AW}_1[y, y, y, y, y, x]}{967680} \Big]
 \end{aligned}$$

Solving to Degree 8

In[]:= **d = 8; i = 0;**

ϕ[d] = ϕ[d - 1] + Sum[c_{d,++i} B, {B, Select[Basis_d[O_{AR, {x,y}, {1}}], FreeQ[#, ϑ_{c[1]}] &]}]

Out[]:=

O_{AR, {x,y}, {1}} [ϑ₀ [

$$\begin{aligned}
 & AW_1[] + \frac{1}{24} AW_1[x, y] - \frac{1}{24} AW_1[y, x] - \frac{AW_1[x, x, x, y]}{1440} + \frac{1}{480} AW_1[x, x, y, x] + \frac{7 AW_1[x, x, y, y]}{5760} - \\
 & \frac{1}{480} AW_1[x, y, x, x] - \frac{1}{640} AW_1[x, y, x, y] - \frac{AW_1[x, y, y, x]}{1152} - \frac{7 AW_1[x, y, y, y]}{5760} + \\
 & \frac{AW_1[y, x, x, x]}{1440} - \frac{AW_1[y, x, x, y]}{1152} + \frac{19 AW_1[y, x, y, x]}{5760} + \frac{7 AW_1[y, x, y, y]}{1920} - \frac{7 AW_1[y, y, x, x]}{5760} - \\
 & \frac{7 AW_1[y, y, x, y]}{1920} + \frac{7 AW_1[y, y, y, x]}{5760} + \frac{AW_1[x, x, x, x, x, y]}{60480} - \frac{AW_1[x, x, x, x, y, x]}{12096} - \\
 & \frac{13 AW_1[x, x, x, x, y, y]}{241920} + \frac{AW_1[x, x, x, y, x, x]}{6048} + \frac{19 AW_1[x, x, x, y, x, y]}{145152} + \\
 & \frac{61 AW_1[x, x, x, y, y, x]}{725760} + \frac{83 AW_1[x, x, x, y, y, y]}{967680} - \frac{AW_1[x, x, y, x, x, x]}{6048} - \\
 & \frac{17 AW_1[x, x, y, x, x, y]}{725760} - \frac{61 AW_1[x, x, y, x, y, x]}{967680} - \frac{89 AW_1[x, x, y, x, y, y]}{6048} + \\
 & \frac{71 AW_1[x, x, y, y, x, y]}{241920} - \frac{337 AW_1[x, x, y, y, y, x]}{241920} - \frac{31 AW_1[x, x, y, y, y, y]}{414720} + \\
 & \frac{AW_1[x, y, x, x, x, x]}{967680} + \frac{13 AW_1[x, y, x, x, x, y]}{2903040} + \frac{AW_1[x, y, x, x, y, x]}{483840} + \\
 & \frac{37 AW_1[x, y, x, x, y, y]}{12096} + \frac{AW_1[x, y, x, y, x, x]}{725760} + \frac{79 AW_1[x, y, x, y, x, y]}{11520} + \\
 & \frac{71 AW_1[x, y, x, y, y, x]}{580608} + \frac{73 AW_1[x, y, x, y, y, y]}{6048} - \frac{AW_1[x, y, y, x, x, x]}{967680} - \\
 & \frac{53 AW_1[x, y, y, x, x, y]}{322560} - \frac{23 AW_1[x, y, y, x, y, x]}{483840} - \frac{11 AW_1[x, y, y, x, y, y]}{18144} + \\
 & \frac{19 AW_1[x, y, y, y, x, x]}{967680} - \frac{AW_1[x, y, y, y, x, y]}{193536} + \frac{7 AW_1[x, y, y, y, y, x]}{161280} + \\
 & \frac{31 AW_1[x, y, y, y, y, y]}{290304} - \frac{AW_1[y, x, x, x, x, x]}{193536} + \frac{AW_1[y, x, x, x, x, y]}{138240} - \\
 & \frac{97 AW_1[y, x, x, x, y, x]}{967680} - \frac{103 AW_1[y, x, x, x, y, y]}{60480} + \frac{19 AW_1[y, x, x, y, x, x]}{34560} + \\
 & \frac{583 AW_1[y, x, x, y, x, y]}{725760} + \frac{53 AW_1[y, x, x, y, y, x]}{967680} + \frac{17 AW_1[y, x, x, y, y, y]}{120960} - \\
 & \frac{29 AW_1[y, x, y, x, x, x]}{2903040} - \frac{289 AW_1[y, x, y, x, x, y]}{967680} - \frac{55 AW_1[y, x, y, x, y, x]}{161280} - \\
 & \frac{17 AW_1[y, x, y, x, y, y]}{181440} - \frac{11 AW_1[y, x, y, y, x, x]}{2903040} + \frac{7 AW_1[y, x, y, y, x, y]}{193536} - \\
 & \frac{191 AW_1[y, x, y, y, y, x]}{53760} - \frac{31 AW_1[y, x, y, y, y, y]}{483840} + \frac{13 AW_1[y, y, x, x, x, x]}{46080} + \\
 & \frac{AW_1[y, y, x, x, x, y]}{967680} - \frac{19 AW_1[y, y, x, x, y, x]}{193536} + \frac{89 AW_1[y, y, x, y, x, x]}{241920} + \\
 & \frac{53 AW_1[y, y, x, y, x, y]}{17920} + \frac{71 AW_1[y, y, x, y, y, x]}{1451520} + \frac{31 AW_1[y, y, x, y, y, y]}{414720} - \\
 & \frac{83 AW_1[y, y, y, x, x, x]}{322560} - \frac{53 AW_1[y, y, y, x, x, y]}{322560} - \frac{13 AW_1[y, y, y, x, y, x]}{96768} - \\
 & \frac{967680}{967680} - \frac{967680}{967680} - \frac{64512}{64512}
 \end{aligned}$$

$$\begin{aligned}
 & \frac{31 AW_1[y, y, y, x, y, y]}{96768} + \frac{31 AW_1[y, y, y, y, x, x]}{483840} + \frac{31 AW_1[y, y, y, y, x, y]}{193536} - \\
 & \frac{31 AW_1[y, y, y, y, y, x]}{967680} + c_{8,1} AW_1[x, x, x, x, x, x, x, x] + c_{8,2} AW_1[x, x, x, x, x, x, x, y] + \\
 & c_{8,3} AW_1[x, x, x, x, x, x, y, x] + c_{8,4} AW_1[x, x, x, x, x, x, y, y] + \\
 & c_{8,5} AW_1[x, x, x, x, x, y, x, x] + c_{8,6} AW_1[x, x, x, x, x, y, x, y] + \\
 & c_{8,7} AW_1[x, x, x, x, x, y, y, x] + c_{8,8} AW_1[x, x, x, x, x, y, y, y] + \\
 & c_{8,9} AW_1[x, x, x, x, y, x, x, x] + c_{8,10} AW_1[x, x, x, x, y, x, x, y] + \\
 & c_{8,11} AW_1[x, x, x, x, y, x, y, x] + c_{8,12} AW_1[x, x, x, x, y, x, y, y] + \\
 & c_{8,13} AW_1[x, x, x, x, y, y, x, x] + c_{8,14} AW_1[x, x, x, x, y, y, x, y] + \\
 & c_{8,15} AW_1[x, x, x, x, y, y, y, x] + c_{8,16} AW_1[x, x, x, x, y, y, y, y] + \\
 & c_{8,17} AW_1[x, x, x, y, x, x, x, x] + c_{8,18} AW_1[x, x, x, y, x, x, x, y] + \\
 & c_{8,19} AW_1[x, x, x, y, x, x, y, x] + c_{8,20} AW_1[x, x, x, y, x, x, y, y] + \\
 & c_{8,21} AW_1[x, x, x, y, x, y, x, x] + c_{8,22} AW_1[x, x, x, y, x, y, x, y] + \\
 & c_{8,23} AW_1[x, x, x, y, x, y, y, x] + c_{8,24} AW_1[x, x, x, y, x, y, y, y] + \\
 & c_{8,25} AW_1[x, x, x, y, y, x, x, x] + c_{8,26} AW_1[x, x, x, y, y, x, x, y] + \\
 & c_{8,27} AW_1[x, x, x, y, y, x, y, x] + c_{8,28} AW_1[x, x, x, y, y, x, y, y] + \\
 & c_{8,29} AW_1[x, x, x, y, y, y, x, x] + c_{8,30} AW_1[x, x, x, y, y, y, x, y] + \\
 & c_{8,31} AW_1[x, x, x, y, y, y, y, x] + c_{8,32} AW_1[x, x, x, y, y, y, y, y] + \\
 & c_{8,33} AW_1[x, x, y, x, x, x, x, x] + c_{8,34} AW_1[x, x, y, x, x, x, x, y] + \\
 & c_{8,35} AW_1[x, x, y, x, x, x, y, x] + c_{8,36} AW_1[x, x, y, x, x, x, y, y] + \\
 & c_{8,37} AW_1[x, x, y, x, x, y, x, x] + c_{8,38} AW_1[x, x, y, x, x, y, x, y] + \\
 & c_{8,39} AW_1[x, x, y, x, x, y, y, x] + c_{8,40} AW_1[x, x, y, x, x, y, y, y] + \\
 & c_{8,41} AW_1[x, x, y, x, y, x, x, x] + c_{8,42} AW_1[x, x, y, x, y, x, x, y] + \\
 & c_{8,43} AW_1[x, x, y, x, y, x, y, x] + c_{8,44} AW_1[x, x, y, x, y, x, y, y] + \\
 & c_{8,45} AW_1[x, x, y, x, y, y, x, x] + c_{8,46} AW_1[x, x, y, x, y, y, x, y] + \\
 & c_{8,47} AW_1[x, x, y, x, y, y, y, x] + c_{8,48} AW_1[x, x, y, x, y, y, y, y] + \\
 & c_{8,49} AW_1[x, x, y, y, x, x, x, x] + c_{8,50} AW_1[x, x, y, y, x, x, x, y] + \\
 & c_{8,51} AW_1[x, x, y, y, x, x, y, x] + c_{8,52} AW_1[x, x, y, y, x, x, y, y] + \\
 & c_{8,53} AW_1[x, x, y, y, x, y, x, x] + c_{8,54} AW_1[x, x, y, y, x, y, x, y] + \\
 & c_{8,55} AW_1[x, x, y, y, x, y, y, x] + c_{8,56} AW_1[x, x, y, y, x, y, y, y] + \\
 & c_{8,57} AW_1[x, x, y, y, y, x, x, x] + c_{8,58} AW_1[x, x, y, y, y, x, x, y] + \\
 & c_{8,59} AW_1[x, x, y, y, y, x, y, x] + c_{8,60} AW_1[x, x, y, y, y, x, y, y] + \\
 & c_{8,61} AW_1[x, x, y, y, y, y, x, x] + c_{8,62} AW_1[x, x, y, y, y, y, x, y] + \\
 & c_{8,63} AW_1[x, x, y, y, y, y, y, x] + c_{8,64} AW_1[x, x, y, y, y, y, y, y] + \\
 & c_{8,65} AW_1[x, y, x, x, x, x, x, x] + c_{8,66} AW_1[x, y, x, x, x, x, x, y] + \\
 & c_{8,67} AW_1[x, y, x, x, x, x, y, x] + c_{8,68} AW_1[x, y, x, x, x, x, y, y] + \\
 & c_{8,69} AW_1[x, y, x, x, x, y, x, x] + c_{8,70} AW_1[x, y, x, x, x, y, x, y] + \\
 & c_{8,71} AW_1[x, y, x, x, x, y, y, x] + c_{8,72} AW_1[x, y, x, x, x, y, y, y] + \\
 & c_{8,73} AW_1[x, y, x, x, y, x, x, x] + c_{8,74} AW_1[x, y, x, x, y, x, x, y] + \\
 & c_{8,75} AW_1[x, y, x, x, y, x, y, x] + c_{8,76} AW_1[x, y, x, x, y, x, y, y] + \\
 & c_{8,77} AW_1[x, y, x, x, y, y, x, x] + c_{8,78} AW_1[x, y, x, x, y, y, x, y] + \\
 & c_{8,79} AW_1[x, y, x, x, y, y, y, x] + c_{8,80} AW_1[x, y, x, x, y, y, y, y] + \\
 & c_{8,81} AW_1[x, y, x, y, x, x, x, x] + c_{8,82} AW_1[x, y, x, y, x, x, x, y] + \\
 & c_{8,83} AW_1[x, y, x, y, x, x, y, x] + c_{8,84} AW_1[x, y, x, y, x, x, y, y] +
 \end{aligned}$$

$$\begin{aligned}
 & C_{8,85} AW_1[x, y, x, y, x, y, x, x] + C_{8,86} AW_1[x, y, x, y, x, y, x, y] + \\
 & C_{8,87} AW_1[x, y, x, y, x, y, y, x] + C_{8,88} AW_1[x, y, x, y, x, y, y, y] + \\
 & C_{8,89} AW_1[x, y, x, y, y, x, x, x] + C_{8,90} AW_1[x, y, x, y, y, x, x, y] + \\
 & C_{8,91} AW_1[x, y, x, y, y, x, y, x] + C_{8,92} AW_1[x, y, x, y, y, x, y, y] + \\
 & C_{8,93} AW_1[x, y, x, y, y, y, x, x] + C_{8,94} AW_1[x, y, x, y, y, y, x, y] + \\
 & C_{8,95} AW_1[x, y, x, y, y, y, y, x] + C_{8,96} AW_1[x, y, x, y, y, y, y, y] + \\
 & C_{8,97} AW_1[x, y, y, x, x, x, x, x] + C_{8,98} AW_1[x, y, y, x, x, x, x, y] + \\
 & C_{8,99} AW_1[x, y, y, x, x, x, y, x] + C_{8,100} AW_1[x, y, y, x, x, x, y, y] + \\
 & C_{8,101} AW_1[x, y, y, x, x, y, x, x] + C_{8,102} AW_1[x, y, y, x, x, y, x, y] + \\
 & C_{8,103} AW_1[x, y, y, x, x, y, y, x] + C_{8,104} AW_1[x, y, y, x, x, y, y, y] + \\
 & C_{8,105} AW_1[x, y, y, x, y, x, x, x] + C_{8,106} AW_1[x, y, y, x, y, x, x, y] + \\
 & C_{8,107} AW_1[x, y, y, x, y, x, y, x] + C_{8,108} AW_1[x, y, y, x, y, x, y, y] + \\
 & C_{8,109} AW_1[x, y, y, x, y, y, x, x] + C_{8,110} AW_1[x, y, y, x, y, y, x, y] + \\
 & C_{8,111} AW_1[x, y, y, x, y, y, y, x] + C_{8,112} AW_1[x, y, y, x, y, y, y, y] + \\
 & C_{8,113} AW_1[x, y, y, y, x, x, x, x] + C_{8,114} AW_1[x, y, y, y, x, x, x, y] + \\
 & C_{8,115} AW_1[x, y, y, y, x, x, y, x] + C_{8,116} AW_1[x, y, y, y, x, x, y, y] + \\
 & C_{8,117} AW_1[x, y, y, y, x, y, x, x] + C_{8,118} AW_1[x, y, y, y, x, y, x, y] + \\
 & C_{8,119} AW_1[x, y, y, y, x, y, y, x] + C_{8,120} AW_1[x, y, y, y, x, y, y, y] + \\
 & C_{8,121} AW_1[x, y, y, y, y, x, x, x] + C_{8,122} AW_1[x, y, y, y, y, x, x, y] + \\
 & C_{8,123} AW_1[x, y, y, y, y, x, y, x] + C_{8,124} AW_1[x, y, y, y, y, x, y, y] + \\
 & C_{8,125} AW_1[x, y, y, y, y, y, x, x] + C_{8,126} AW_1[x, y, y, y, y, y, x, y] + \\
 & C_{8,127} AW_1[x, y, y, y, y, y, y, x] + C_{8,128} AW_1[x, y, y, y, y, y, y, y] + \\
 & C_{8,129} AW_1[y, x, x, x, x, x, x, x] + C_{8,130} AW_1[y, x, x, x, x, x, x, y] + \\
 & C_{8,131} AW_1[y, x, x, x, x, x, y, x] + C_{8,132} AW_1[y, x, x, x, x, x, y, y] + \\
 & C_{8,133} AW_1[y, x, x, x, x, y, x, x] + C_{8,134} AW_1[y, x, x, x, x, y, x, y] + \\
 & C_{8,135} AW_1[y, x, x, x, x, y, y, x] + C_{8,136} AW_1[y, x, x, x, x, y, y, y] + \\
 & C_{8,137} AW_1[y, x, x, x, y, x, x, x] + C_{8,138} AW_1[y, x, x, x, y, x, x, y] + \\
 & C_{8,139} AW_1[y, x, x, x, y, x, y, x] + C_{8,140} AW_1[y, x, x, x, y, x, y, y] + \\
 & C_{8,141} AW_1[y, x, x, x, y, y, x, x] + C_{8,142} AW_1[y, x, x, x, y, y, x, y] + \\
 & C_{8,143} AW_1[y, x, x, x, y, y, y, x] + C_{8,144} AW_1[y, x, x, x, y, y, y, y] + \\
 & C_{8,145} AW_1[y, x, x, y, x, x, x, x] + C_{8,146} AW_1[y, x, x, y, x, x, x, y] + \\
 & C_{8,147} AW_1[y, x, x, y, x, x, y, x] + C_{8,148} AW_1[y, x, x, y, x, x, y, y] + \\
 & C_{8,149} AW_1[y, x, x, y, x, y, x, x] + C_{8,150} AW_1[y, x, x, y, x, y, x, y] + \\
 & C_{8,151} AW_1[y, x, x, y, x, y, y, x] + C_{8,152} AW_1[y, x, x, y, x, y, y, y] + \\
 & C_{8,153} AW_1[y, x, x, y, y, x, x, x] + C_{8,154} AW_1[y, x, x, y, y, x, x, y] + \\
 & C_{8,155} AW_1[y, x, x, y, y, x, y, x] + C_{8,156} AW_1[y, x, x, y, y, x, y, y] + \\
 & C_{8,157} AW_1[y, x, x, y, y, y, x, x] + C_{8,158} AW_1[y, x, x, y, y, y, x, y] + \\
 & C_{8,159} AW_1[y, x, x, y, y, y, y, x] + C_{8,160} AW_1[y, x, x, y, y, y, y, y] + \\
 & C_{8,161} AW_1[y, x, y, x, x, x, x, x] + C_{8,162} AW_1[y, x, y, x, x, x, x, y] + \\
 & C_{8,163} AW_1[y, x, y, x, x, x, y, x] + C_{8,164} AW_1[y, x, y, x, x, x, y, y] + \\
 & C_{8,165} AW_1[y, x, y, x, x, y, x, x] + C_{8,166} AW_1[y, x, y, x, x, y, x, y] + \\
 & C_{8,167} AW_1[y, x, y, x, x, y, y, x] + C_{8,168} AW_1[y, x, y, x, x, y, y, y] + \\
 & C_{8,169} AW_1[y, x, y, x, y, x, x, x] + C_{8,170} AW_1[y, x, y, x, y, x, x, y] + \\
 & C_{8,171} AW_1[y, x, y, x, y, x, y, x] + C_{8,172} AW_1[y, x, y, x, y, x, y, y] + \\
 & C_{8,173} AW_1[y, x, y, x, y, y, x, x] + C_{8,174} AW_1[y, x, y, x, y, y, x, y] +
 \end{aligned}$$

$$\begin{aligned}
 & C_{8,175} AW_1 [y, x, y, x, y, y, y, x] + C_{8,176} AW_1 [y, x, y, x, y, y, y, y] + \\
 & C_{8,177} AW_1 [y, x, y, y, x, x, x, x] + C_{8,178} AW_1 [y, x, y, y, x, x, x, y] + \\
 & C_{8,179} AW_1 [y, x, y, y, x, x, y, x] + C_{8,180} AW_1 [y, x, y, y, x, x, y, y] + \\
 & C_{8,181} AW_1 [y, x, y, y, x, y, x, x] + C_{8,182} AW_1 [y, x, y, y, x, y, x, y] + \\
 & C_{8,183} AW_1 [y, x, y, y, x, y, y, x] + C_{8,184} AW_1 [y, x, y, y, x, y, y, y] + \\
 & C_{8,185} AW_1 [y, x, y, y, y, x, x, x] + C_{8,186} AW_1 [y, x, y, y, y, x, x, y] + \\
 & C_{8,187} AW_1 [y, x, y, y, y, x, y, x] + C_{8,188} AW_1 [y, x, y, y, y, x, y, y] + \\
 & C_{8,189} AW_1 [y, x, y, y, y, y, x, x] + C_{8,190} AW_1 [y, x, y, y, y, y, x, y] + \\
 & C_{8,191} AW_1 [y, x, y, y, y, y, y, x] + C_{8,192} AW_1 [y, x, y, y, y, y, y, y] + \\
 & C_{8,193} AW_1 [y, y, x, x, x, x, x, x] + C_{8,194} AW_1 [y, y, x, x, x, x, x, y] + \\
 & C_{8,195} AW_1 [y, y, x, x, x, x, y, x] + C_{8,196} AW_1 [y, y, x, x, x, x, y, y] + \\
 & C_{8,197} AW_1 [y, y, x, x, x, y, x, x] + C_{8,198} AW_1 [y, y, x, x, x, y, x, y] + \\
 & C_{8,199} AW_1 [y, y, x, x, x, y, y, x] + C_{8,200} AW_1 [y, y, x, x, x, y, y, y] + \\
 & C_{8,201} AW_1 [y, y, x, x, y, x, x, x] + C_{8,202} AW_1 [y, y, x, x, y, x, x, y] + \\
 & C_{8,203} AW_1 [y, y, x, x, y, x, y, x] + C_{8,204} AW_1 [y, y, x, x, y, x, y, y] + \\
 & C_{8,205} AW_1 [y, y, x, x, y, y, x, x] + C_{8,206} AW_1 [y, y, x, x, y, y, x, y] + \\
 & C_{8,207} AW_1 [y, y, x, x, y, y, y, x] + C_{8,208} AW_1 [y, y, x, x, y, y, y, y] + \\
 & C_{8,209} AW_1 [y, y, x, y, x, x, x, x] + C_{8,210} AW_1 [y, y, x, y, x, x, x, y] + \\
 & C_{8,211} AW_1 [y, y, x, y, x, x, y, x] + C_{8,212} AW_1 [y, y, x, y, x, x, y, y] + \\
 & C_{8,213} AW_1 [y, y, x, y, x, y, x, x] + C_{8,214} AW_1 [y, y, x, y, x, y, x, y] + \\
 & C_{8,215} AW_1 [y, y, x, y, x, y, y, x] + C_{8,216} AW_1 [y, y, x, y, x, y, y, y] + \\
 & C_{8,217} AW_1 [y, y, x, y, y, x, x, x] + C_{8,218} AW_1 [y, y, x, y, y, x, x, y] + \\
 & C_{8,219} AW_1 [y, y, x, y, y, x, y, x] + C_{8,220} AW_1 [y, y, x, y, y, x, y, y] + \\
 & C_{8,221} AW_1 [y, y, x, y, y, y, x, x] + C_{8,222} AW_1 [y, y, x, y, y, y, x, y] + \\
 & C_{8,223} AW_1 [y, y, x, y, y, y, y, x] + C_{8,224} AW_1 [y, y, x, y, y, y, y, y] + \\
 & C_{8,225} AW_1 [y, y, y, x, x, x, x, x] + C_{8,226} AW_1 [y, y, y, x, x, x, x, y] + \\
 & C_{8,227} AW_1 [y, y, y, x, x, x, y, x] + C_{8,228} AW_1 [y, y, y, x, x, x, y, y] + \\
 & C_{8,229} AW_1 [y, y, y, x, x, y, x, x] + C_{8,230} AW_1 [y, y, y, x, x, y, x, y] + \\
 & C_{8,231} AW_1 [y, y, y, x, x, y, y, x] + C_{8,232} AW_1 [y, y, y, x, x, y, y, y] + \\
 & C_{8,233} AW_1 [y, y, y, x, y, x, x, x] + C_{8,234} AW_1 [y, y, y, x, y, x, x, y] + \\
 & C_{8,235} AW_1 [y, y, y, x, y, x, y, x] + C_{8,236} AW_1 [y, y, y, x, y, x, y, y] + \\
 & C_{8,237} AW_1 [y, y, y, x, y, y, x, x] + C_{8,238} AW_1 [y, y, y, x, y, y, x, y] + \\
 & C_{8,239} AW_1 [y, y, y, x, y, y, y, x] + C_{8,240} AW_1 [y, y, y, x, y, y, y, y] + \\
 & C_{8,241} AW_1 [y, y, y, y, x, x, x, x] + C_{8,242} AW_1 [y, y, y, y, x, x, x, y] + \\
 & C_{8,243} AW_1 [y, y, y, y, x, x, y, x] + C_{8,244} AW_1 [y, y, y, y, x, x, y, y] + \\
 & C_{8,245} AW_1 [y, y, y, y, x, y, x, x] + C_{8,246} AW_1 [y, y, y, y, x, y, x, y] + \\
 & C_{8,247} AW_1 [y, y, y, y, x, y, y, x] + C_{8,248} AW_1 [y, y, y, y, x, y, y, y] + \\
 & C_{8,249} AW_1 [y, y, y, y, y, x, x, x] + C_{8,250} AW_1 [y, y, y, y, y, x, x, y] + \\
 & C_{8,251} AW_1 [y, y, y, y, y, x, y, x] + C_{8,252} AW_1 [y, y, y, y, y, x, y, y] + \\
 & C_{8,253} AW_1 [y, y, y, y, y, y, x, x] + C_{8,254} AW_1 [y, y, y, y, y, y, x, y] + \\
 & C_{8,255} AW_1 [y, y, y, y, y, y, y, x] + C_{8,256} AW_1 [y, y, y, y, y, y, y, y]]]]
 \end{aligned}$$

```
In[*]:= Short[
  reIs = Union@@ (List@@Pentagond[ $\mathfrak{C}$ [d]] [[1]] /. {
     $\mathfrak{A}_0[A\_]$   $\Rightarrow$  Table[Coefficient[A, B], {B, Basisd, {x,y}[AW1 AW2]}},
     $\mathfrak{A}_{C[1,2]}[A\_]$   $\Rightarrow$  Table[Coefficient[A, B], {B, AW2[ ] Basisd-1, {x,y}[AW1 AW2 AW1]}},
  }) ,
  10]
```

```
Out[*]//Short=
{0, -3108 C8,1, -2808 C8,1, -1736 C8,1, -1596 C8,1, -1456 C8,1, -1023 C8,1, -960 C8,1,
-770 C8,1, -568 C8,1, -490 C8,1, -351 C8,1, -308 C8,1, -247 C8,1, -224 C8,1, -70 C8,1,
-56 C8,1, -28 C8,1, -15 C8,1, -8 C8,1, -C8,1, C8,1, 28 C8,1, 70 C8,1, 97 C8,1, 104 C8,1,
280 C8,1, <<5259>>, -2688 C8,256, -1568 C8,256, -1400 C8,256, -1002 C8,256, -952 C8,256,
-700 C8,256, -448 C8,256, -316 C8,256, -280 C8,256, -246 C8,256, -168 C8,256, -70 C8,256,
-56 C8,256, -28 C8,256, -8 C8,256, 8 C8,256, 56 C8,256, 76 C8,256, 168 C8,256, 280 C8,256,
734 C8,256, 762 C8,256, 980 C8,256, 1092 C8,256, 1512 C8,256, 2520 C8,256, 3472 C8,256}
```

```
In[*]:= eqns = # == 0 & /@ reIs;
```

```
In[*]:= vars = Union[Cases[eqns, Cd, _,  $\infty$ ]]
```

```
Out[*]=
{C8,1, C8,2, C8,3, C8,4, C8,5, C8,6, C8,7, C8,8, C8,9, C8,10, C8,11, C8,12, C8,13, C8,14, C8,15, C8,16,
C8,17, C8,18, C8,19, C8,20, C8,21, C8,22, C8,23, C8,24, C8,25, C8,26, C8,27, C8,28, C8,29, C8,30,
C8,31, C8,32, C8,33, C8,34, C8,35, C8,36, C8,37, C8,38, C8,39, C8,40, C8,41, C8,42, C8,43, C8,44,
C8,45, C8,46, C8,47, C8,48, C8,49, C8,50, C8,51, C8,52, C8,53, C8,54, C8,55, C8,56, C8,57, C8,58,
C8,59, C8,60, C8,61, C8,62, C8,63, C8,64, C8,65, C8,66, C8,67, C8,68, C8,69, C8,70, C8,71, C8,72,
C8,73, C8,74, C8,75, C8,76, C8,77, C8,78, C8,79, C8,80, C8,81, C8,82, C8,83, C8,84, C8,85, C8,86,
C8,87, C8,88, C8,89, C8,90, C8,91, C8,92, C8,93, C8,94, C8,95, C8,96, C8,97, C8,98, C8,99, C8,100,
C8,101, C8,102, C8,103, C8,104, C8,105, C8,106, C8,107, C8,108, C8,109, C8,110, C8,111, C8,112, C8,113,
C8,114, C8,115, C8,116, C8,117, C8,118, C8,119, C8,120, C8,121, C8,122, C8,123, C8,124, C8,125, C8,126,
C8,127, C8,128, C8,129, C8,130, C8,131, C8,132, C8,133, C8,134, C8,135, C8,136, C8,137, C8,138, C8,139,
C8,140, C8,141, C8,142, C8,143, C8,144, C8,145, C8,146, C8,147, C8,148, C8,149, C8,150, C8,151, C8,152,
C8,153, C8,154, C8,155, C8,156, C8,157, C8,158, C8,159, C8,160, C8,161, C8,162, C8,163, C8,164, C8,165,
C8,166, C8,167, C8,168, C8,169, C8,170, C8,171, C8,172, C8,173, C8,174, C8,175, C8,176, C8,177, C8,178,
C8,179, C8,180, C8,181, C8,182, C8,183, C8,184, C8,185, C8,186, C8,187, C8,188, C8,189, C8,190, C8,191,
C8,192, C8,193, C8,194, C8,195, C8,196, C8,197, C8,198, C8,199, C8,200, C8,201, C8,202, C8,203, C8,204,
C8,205, C8,206, C8,207, C8,208, C8,209, C8,210, C8,211, C8,212, C8,213, C8,214, C8,215, C8,216, C8,217,
C8,218, C8,219, C8,220, C8,221, C8,222, C8,223, C8,224, C8,225, C8,226, C8,227, C8,228, C8,229, C8,230,
C8,231, C8,232, C8,233, C8,234, C8,235, C8,236, C8,237, C8,238, C8,239, C8,240, C8,241, C8,242, C8,243,
C8,244, C8,245, C8,246, C8,247, C8,248, C8,249, C8,250, C8,251, C8,252, C8,253, C8,254, C8,255, C8,256}
```

```
In[*]:= sol = Solve[eqns, vars] [[1]]
```

Solve: Equations may not give solutions for all "solve" variables.

```
Out[*]=
{C8,1  $\rightarrow$  0, C8,2  $\rightarrow$  - $\frac{1}{2\,419\,200}$ , C8,3  $\rightarrow$   $\frac{1}{345\,600}$ , C8,4  $\rightarrow$   $\frac{19}{9\,676\,800}$ , C8,5  $\rightarrow$  - $\frac{1}{115\,200}$ ,
C8,7  $\rightarrow$  - $\frac{19}{1\,612\,800}$  - C8,6, C8,8  $\rightarrow$  - $\frac{271}{58\,060\,800}$ , C8,9  $\rightarrow$   $\frac{1}{69\,120}$ , C8,10  $\rightarrow$  - $\frac{457}{58\,060\,800}$  -  $\frac{5\,C_{8,6}}{2}$ ,
```

$$\begin{aligned}
 C_{8,11} &\rightarrow \frac{457}{29\,030\,400}, C_{8,12} \rightarrow \frac{587}{69\,672\,960} - \frac{3 C_{8,6}}{4}, C_{8,13} \rightarrow \frac{179}{8\,294\,400} + \frac{5 C_{8,6}}{2}, C_{8,14} \rightarrow \frac{223}{174\,182\,400}, \\
 C_{8,15} &\rightarrow \frac{1583}{116\,121\,600} + \frac{3 C_{8,6}}{4}, C_{8,16} \rightarrow \frac{2893}{464\,486\,400}, C_{8,17} \rightarrow -\frac{1}{69\,120}, C_{8,18} \rightarrow -\frac{73}{9\,676\,800}, \\
 C_{8,19} &\rightarrow \frac{1571}{29\,030\,400} + 10 C_{8,6}, C_{8,20} \rightarrow \frac{1619}{116\,121\,600} + \frac{15 C_{8,6}}{4}, C_{8,21} \rightarrow -\frac{71}{829\,440} - 10 C_{8,6}, \\
 C_{8,22} &\rightarrow -\frac{79}{1\,935\,360} - \frac{9 C_{8,6}}{2}, C_{8,23} \rightarrow -\frac{3617}{174\,182\,400}, C_{8,24} \rightarrow -\frac{83}{7\,962\,624} + \frac{3 C_{8,6}}{4}, C_{8,25} \rightarrow -\frac{1}{4\,147\,200}, \\
 C_{8,26} &\rightarrow \frac{109}{58\,060\,800}, C_{8,27} \rightarrow \frac{1391}{43\,545\,600} + \frac{9 C_{8,6}}{2}, C_{8,28} \rightarrow -\frac{35\,237}{1\,393\,459\,200} - \frac{15 C_{8,6}}{4}, \\
 C_{8,29} &\rightarrow -\frac{109}{3\,317\,760} - \frac{15 C_{8,6}}{4}, C_{8,30} \rightarrow \frac{32\,899}{1\,393\,459\,200} + \frac{15 C_{8,6}}{4}, C_{8,31} \rightarrow -\frac{5951}{464\,486\,400} - \frac{3 C_{8,6}}{4}, \\
 C_{8,32} &\rightarrow -\frac{2399}{464\,486\,400}, C_{8,33} \rightarrow \frac{1}{115\,200}, C_{8,34} \rightarrow \frac{1093}{58\,060\,800} + \frac{5 C_{8,6}}{2}, C_{8,35} \rightarrow -\frac{1529}{29\,030\,400} - 10 C_{8,6}, \\
 C_{8,36} &\rightarrow -\frac{4813}{348\,364\,800} - \frac{15 C_{8,6}}{4}, C_{8,37} \rightarrow -\frac{1}{460\,800}, C_{8,38} \rightarrow \frac{1517}{38\,707\,200} + \frac{27 C_{8,6}}{4}, \\
 C_{8,39} &\rightarrow -\frac{919}{23\,224\,320} - \frac{27 C_{8,6}}{4}, C_{8,40} \rightarrow \frac{2311}{1\,393\,459\,200}, C_{8,41} \rightarrow \frac{361}{4\,147\,200} + 10 C_{8,6}, \\
 C_{8,42} &\rightarrow \frac{113}{11\,612\,160}, C_{8,43} \rightarrow \frac{1429}{58\,060\,800}, C_{8,44} \rightarrow \frac{25\,189}{464\,486\,400} + \frac{9 C_{8,6}}{2}, C_{8,45} \rightarrow \frac{323}{5\,529\,600} + \frac{27 C_{8,6}}{4}, \\
 C_{8,46} &\rightarrow -\frac{22\,231}{464\,486\,400} - \frac{27 C_{8,6}}{4}, C_{8,47} \rightarrow \frac{4297}{199\,065\,600}, C_{8,48} \rightarrow \frac{10\,963}{1\,393\,459\,200} - C_{8,6}, \\
 C_{8,49} &\rightarrow -\frac{179}{8\,294\,400} - \frac{5 C_{8,6}}{2}, C_{8,50} \rightarrow -\frac{467}{87\,091\,200}, C_{8,51} \rightarrow \frac{1}{1\,382\,400}, C_{8,52} \rightarrow -\frac{419}{464\,486\,400}, \\
 C_{8,53} &\rightarrow -\frac{337}{5\,529\,600} - \frac{27 C_{8,6}}{4}, C_{8,54} \rightarrow -\frac{31}{2\,457\,600}, C_{8,55} \rightarrow \frac{3349}{92\,897\,280} + \frac{27 C_{8,6}}{4}, \\
 C_{8,56} &\rightarrow \frac{83}{17\,203\,200} + \frac{5 C_{8,6}}{2}, C_{8,57} \rightarrow \frac{559}{16\,588\,800} + \frac{15 C_{8,6}}{4}, C_{8,58} \rightarrow \frac{1027}{278\,691\,840}, \\
 C_{8,59} &\rightarrow -\frac{24\,697}{1\,393\,459\,200} - \frac{9 C_{8,6}}{2}, C_{8,60} \rightarrow \frac{19\,619}{1\,393\,459\,200}, C_{8,61} \rightarrow -\frac{49}{66\,355\,200}, \\
 C_{8,62} &\rightarrow -\frac{3697}{154\,828\,800} - \frac{5 C_{8,6}}{2}, C_{8,63} \rightarrow \frac{1951}{154\,828\,800} + C_{8,6}, C_{8,64} \rightarrow \frac{127}{51\,609\,600}, C_{8,65} \rightarrow -\frac{1}{345\,600}, \\
 C_{8,66} &\rightarrow -\frac{31}{4\,838\,400} - C_{8,6}, C_{8,67} \rightarrow -\frac{163}{29\,030\,400}, C_{8,68} \rightarrow \frac{29}{16\,588\,800} + \frac{3 C_{8,6}}{4}, C_{8,69} \rightarrow \frac{53}{829\,440} + 10 C_{8,6}, \\
 C_{8,70} &\rightarrow -\frac{391}{174\,182\,400}, C_{8,71} \rightarrow \frac{1993}{87\,091\,200} + \frac{9 C_{8,6}}{2}, C_{8,72} \rightarrow -\frac{13\,781}{1\,393\,459\,200} - \frac{3 C_{8,6}}{4}, \\
 C_{8,73} &\rightarrow -\frac{259}{4\,147\,200} - 10 C_{8,6}, C_{8,74} \rightarrow -\frac{4559}{116\,121\,600} - \frac{27 C_{8,6}}{4}, C_{8,75} \rightarrow \frac{19}{2\,764\,800}, \\
 C_{8,76} &\rightarrow \frac{4679}{1\,393\,459\,200}, C_{8,77} \rightarrow \frac{1}{552\,960}, C_{8,78} \rightarrow \frac{133}{2\,457\,600} + \frac{27 C_{8,6}}{4}, C_{8,79} \rightarrow -\frac{43\,369}{1\,393\,459\,200} - \frac{9 C_{8,6}}{2}, \\
 C_{8,80} &\rightarrow \frac{12\,323}{1\,393\,459\,200} + C_{8,6}, C_{8,81} \rightarrow -\frac{17}{1\,382\,400}, C_{8,82} \rightarrow \frac{661}{24\,883\,200} + \frac{9 C_{8,6}}{2}, C_{8,83} \rightarrow -\frac{599}{29\,030\,400}, \\
 C_{8,84} &\rightarrow -\frac{12\,637}{278\,691\,840} - \frac{9 C_{8,6}}{2}, C_{8,85} \rightarrow -\frac{1}{92\,160}, C_{8,86} \rightarrow -\frac{2339}{464\,486\,400}, C_{8,87} \rightarrow -\frac{1807}{92\,897\,280},
 \end{aligned}$$

$$\begin{aligned}
 C_{8,88} &\rightarrow -\frac{5687}{464\,486\,400}, C_{8,89} \rightarrow -\frac{101}{2\,764\,800} - \frac{9 C_{8,6}}{2}, C_{8,90} \rightarrow \frac{677}{464\,486\,400}, C_{8,91} \rightarrow -\frac{1609}{154\,828\,800}, \\
 C_{8,92} &\rightarrow -\frac{5257}{66\,355\,200} - 10 C_{8,6}, C_{8,93} \rightarrow \frac{541}{22\,118\,400} + \frac{9 C_{8,6}}{2}, C_{8,94} \rightarrow \frac{33\,893}{464\,486\,400} + 10 C_{8,6}, \\
 C_{8,95} &\rightarrow -\frac{6931}{464\,486\,400}, C_{8,96} \rightarrow -\frac{3881}{464\,486\,400}, C_{8,97} \rightarrow \frac{23}{2\,073\,600} + C_{8,6}, C_{8,98} \rightarrow \frac{53}{29\,030\,400}, \\
 C_{8,99} &\rightarrow -\frac{4031}{174\,182\,400} - \frac{9 C_{8,6}}{2}, C_{8,100} \rightarrow \frac{8863}{278\,691\,840} + \frac{15 C_{8,6}}{4}, C_{8,101} \rightarrow \frac{49}{1\,105\,920} + \frac{27 C_{8,6}}{4}, \\
 C_{8,102} &\rightarrow -\frac{69\,901}{1\,393\,459\,200} - \frac{27 C_{8,6}}{4}, C_{8,103} \rightarrow \frac{59}{30\,965\,760}, C_{8,104} \rightarrow -\frac{1097}{66\,355\,200} - \frac{5 C_{8,6}}{2}, \\
 C_{8,105} &\rightarrow \frac{61}{4\,147\,200}, C_{8,106} \rightarrow \frac{77\,299}{1\,393\,459\,200} + \frac{27 C_{8,6}}{4}, C_{8,107} \rightarrow \frac{365}{18\,579\,456}, \\
 C_{8,108} &\rightarrow \frac{869}{10\,321\,920} + 10 C_{8,6}, C_{8,109} \rightarrow -\frac{101}{2\,654\,208} - \frac{27 C_{8,6}}{4}, C_{8,110} \rightarrow \frac{2213}{464\,486\,400}, \\
 C_{8,111} &\rightarrow -\frac{4951}{92\,897\,280} - 10 C_{8,6}, C_{8,112} \rightarrow \frac{4927}{464\,486\,400}, C_{8,113} \rightarrow -\frac{7}{614\,400} - \frac{3 C_{8,6}}{4}, \\
 C_{8,114} &\rightarrow -\frac{13\,549}{464\,486\,400} - \frac{15 C_{8,6}}{4}, C_{8,115} \rightarrow \frac{32\,341}{1\,393\,459\,200} + \frac{9 C_{8,6}}{2}, C_{8,116} \rightarrow -\frac{8417}{1\,393\,459\,200}, \\
 C_{8,117} &\rightarrow -\frac{671}{66\,355\,200}, C_{8,118} \rightarrow -\frac{35\,459}{464\,486\,400} - 10 C_{8,6}, C_{8,119} \rightarrow \frac{5137}{92\,897\,280} + 10 C_{8,6}, \\
 C_{8,120} &\rightarrow -\frac{683}{92\,897\,280}, C_{8,121} \rightarrow \frac{557}{66\,355\,200} + \frac{3 C_{8,6}}{4}, C_{8,122} \rightarrow \frac{359}{17\,203\,200} + \frac{5 C_{8,6}}{2}, \\
 C_{8,123} &\rightarrow \frac{307}{66\,355\,200}, C_{8,124} \rightarrow -\frac{319}{464\,486\,400}, C_{8,125} \rightarrow -\frac{187}{22\,118\,400} - C_{8,6}, C_{8,126} \rightarrow \frac{13}{4\,423\,680}, \\
 C_{8,127} &\rightarrow -\frac{107}{51\,609\,600}, C_{8,128} \rightarrow -\frac{127}{154\,828\,800}, C_{8,129} \rightarrow \frac{1}{2\,419\,200}, C_{8,130} \rightarrow -\frac{1}{1\,075\,200}, \\
 C_{8,131} &\rightarrow \frac{29}{2\,419\,200} + C_{8,6}, C_{8,132} \rightarrow \frac{43}{11\,612\,160}, C_{8,133} \rightarrow -\frac{1577}{58\,060\,800} - \frac{5 C_{8,6}}{2}, \\
 C_{8,134} &\rightarrow -\frac{5413}{348\,364\,800} - \frac{3 C_{8,6}}{4}, C_{8,135} \rightarrow -\frac{823}{174\,182\,400}, C_{8,136} \rightarrow -\frac{323}{51\,609\,600}, C_{8,137} \rightarrow \frac{433}{29\,030\,400}, \\
 C_{8,138} &\rightarrow \frac{899}{23\,224\,320} + \frac{15 C_{8,6}}{4}, C_{8,139} \rightarrow -\frac{1}{76\,800} - \frac{9 C_{8,6}}{2}, C_{8,140} \rightarrow \frac{4829}{199\,065\,600} + \frac{3 C_{8,6}}{4}, \\
 C_{8,141} &\rightarrow \frac{787}{174\,182\,400}, C_{8,142} \rightarrow -\frac{36\,941}{1\,393\,459\,200} - \frac{15 C_{8,6}}{4}, C_{8,143} \rightarrow \frac{51\,803}{1\,393\,459\,200} + \frac{15 C_{8,6}}{4}, \\
 C_{8,144} &\rightarrow \frac{1411}{154\,828\,800}, C_{8,145} \rightarrow \frac{257}{58\,060\,800} + \frac{5 C_{8,6}}{2}, C_{8,146} \rightarrow -\frac{2587}{69\,672\,960} - \frac{15 C_{8,6}}{4}, \\
 C_{8,147} &\rightarrow \frac{4009}{116\,121\,600} + \frac{27 C_{8,6}}{4}, C_{8,148} \rightarrow -\frac{16\,801}{1\,393\,459\,200}, C_{8,149} \rightarrow -\frac{107}{5\,806\,080}, \\
 C_{8,150} &\rightarrow \frac{1163}{66\,355\,200} + \frac{9 C_{8,6}}{2}, C_{8,151} \rightarrow -\frac{32\,303}{464\,486\,400} - \frac{27 C_{8,6}}{4}, C_{8,152} \rightarrow -\frac{40\,237}{1\,393\,459\,200} - C_{8,6}, \\
 C_{8,153} &\rightarrow \frac{89}{87\,091\,200}, C_{8,154} \rightarrow \frac{59}{30\,965\,760}, C_{8,155} \rightarrow \frac{631}{154\,828\,800}, C_{8,156} \rightarrow \frac{10\,457}{464\,486\,400} + \frac{5 C_{8,6}}{2}, \\
 C_{8,157} &\rightarrow -\frac{2081}{278\,691\,840}, C_{8,158} \rightarrow -\frac{313}{55\,738\,368}, C_{8,159} \rightarrow -\frac{11\,243}{464\,486\,400} - \frac{5 C_{8,6}}{2},
 \end{aligned}$$

$$\begin{aligned}
 C_{8,160} &\rightarrow -\frac{2977}{464486400}, C_{8,161} \rightarrow \frac{1}{1451520} - C_{8,6}, C_{8,162} \rightarrow \frac{181}{23224320} + \frac{3 C_{8,6}}{4}, C_{8,163} \rightarrow \frac{1439}{87091200}, \\
 C_{8,164} &\rightarrow \frac{11219}{1393459200} - \frac{3 C_{8,6}}{4}, C_{8,165} \rightarrow -\frac{5689}{116121600} - \frac{27 C_{8,6}}{4}, C_{8,166} \rightarrow -\frac{13361}{1393459200}, \\
 C_{8,167} &\rightarrow \frac{2833}{51609600} + \frac{27 C_{8,6}}{4}, C_{8,168} \rightarrow \frac{13843}{1393459200} + C_{8,6}, C_{8,169} \rightarrow \frac{8459}{174182400} + \frac{9 C_{8,6}}{2}, \\
 C_{8,170} &\rightarrow -\frac{25273}{1393459200} - \frac{9 C_{8,6}}{2}, C_{8,171} \rightarrow \frac{11813}{464486400}, C_{8,172} \rightarrow \frac{12449}{464486400}, \\
 C_{8,173} &\rightarrow \frac{5417}{464486400}, C_{8,174} \rightarrow -\frac{32507}{464486400} - 10 C_{8,6}, C_{8,175} \rightarrow \frac{14447}{154828800} + 10 C_{8,6}, \\
 C_{8,176} &\rightarrow \frac{9551}{464486400}, C_{8,177} \rightarrow -\frac{613}{174182400}, C_{8,178} \rightarrow \frac{25913}{1393459200} + \frac{15 C_{8,6}}{4}, \\
 C_{8,179} &\rightarrow -\frac{59807}{1393459200} - \frac{27 C_{8,6}}{4}, C_{8,180} \rightarrow -\frac{1093}{66355200} - \frac{5 C_{8,6}}{2}, C_{8,181} \rightarrow \frac{43649}{1393459200} + \frac{27 C_{8,6}}{4}, \\
 C_{8,182} &\rightarrow \frac{23741}{464486400} + 10 C_{8,6}, C_{8,183} \rightarrow -\frac{5003}{464486400}, C_{8,184} \rightarrow -\frac{9463}{464486400}, \\
 C_{8,185} &\rightarrow -\frac{24391}{1393459200} - \frac{15 C_{8,6}}{4}, C_{8,186} \rightarrow \frac{197}{39813120}, C_{8,187} \rightarrow -\frac{389}{7372800} - 10 C_{8,6}, \\
 C_{8,188} &\rightarrow \frac{11521}{464486400}, C_{8,189} \rightarrow \frac{7793}{464486400} + \frac{5 C_{8,6}}{2}, C_{8,190} \rightarrow -\frac{6187}{464486400}, C_{8,191} \rightarrow \frac{1471}{154828800}, \\
 C_{8,192} &\rightarrow \frac{127}{22118400}, C_{8,193} \rightarrow -\frac{19}{9676800}, C_{8,194} \rightarrow -\frac{1}{1612800}, C_{8,195} \rightarrow -\frac{757}{116121600} - \frac{3 C_{8,6}}{4}, \\
 C_{8,196} &\rightarrow -\frac{49}{66355200}, C_{8,197} \rightarrow \frac{1139}{69672960} + \frac{15 C_{8,6}}{4}, C_{8,198} \rightarrow -\frac{2393}{1393459200} + \frac{3 C_{8,6}}{4}, \\
 C_{8,199} &\rightarrow -\frac{1961}{55738368} - \frac{15 C_{8,6}}{4}, C_{8,200} \rightarrow -\frac{581}{66355200}, C_{8,201} \rightarrow -\frac{1717}{116121600} - \frac{15 C_{8,6}}{4}, \\
 C_{8,202} &\rightarrow \frac{1619}{154828800}, C_{8,203} \rightarrow \frac{973}{22118400} + \frac{9 C_{8,6}}{2}, C_{8,204} \rightarrow \frac{491}{66355200} - C_{8,6}, \\
 C_{8,205} &\rightarrow \frac{221}{92897280}, C_{8,206} \rightarrow \frac{1387}{66355200} + \frac{5 C_{8,6}}{2}, C_{8,207} \rightarrow \frac{6359}{1393459200}, C_{8,208} \rightarrow \frac{127}{22118400}, \\
 C_{8,209} &\rightarrow -\frac{587}{69672960} + \frac{3 C_{8,6}}{4}, C_{8,210} \rightarrow -\frac{509}{39813120} - \frac{3 C_{8,6}}{4}, C_{8,211} \rightarrow -\frac{9241}{464486400}, \\
 C_{8,212} &\rightarrow -\frac{157}{13271040} + C_{8,6}, C_{8,213} \rightarrow -\frac{21661}{464486400} - \frac{9 C_{8,6}}{2}, C_{8,214} \rightarrow -\frac{3683}{464486400}, \\
 C_{8,215} &\rightarrow -\frac{2917}{30965760} - 10 C_{8,6}, C_{8,216} \rightarrow -\frac{17}{819200}, C_{8,217} \rightarrow \frac{31709}{1393459200} + \frac{15 C_{8,6}}{4}, \\
 C_{8,218} &\rightarrow -\frac{7667}{464486400} - \frac{5 C_{8,6}}{2}, C_{8,219} \rightarrow \frac{29893}{464486400} + 10 C_{8,6}, C_{8,220} \rightarrow -\frac{49}{7372800}, \\
 C_{8,221} &\rightarrow -\frac{2689}{278691840}, C_{8,222} \rightarrow \frac{853}{464486400}, C_{8,223} \rightarrow -\frac{7939}{464486400}, C_{8,224} \rightarrow -\frac{127}{7372800}, \\
 C_{8,225} &\rightarrow \frac{271}{58060800}, C_{8,226} \rightarrow \frac{19}{10321920}, C_{8,227} \rightarrow \frac{22289}{1393459200} + \frac{3 C_{8,6}}{4}, C_{8,228} \rightarrow \frac{679}{66355200}, \\
 C_{8,229} &\rightarrow -\frac{5839}{1393459200}, C_{8,230} \rightarrow -\frac{22609}{1393459200} - C_{8,6}, C_{8,231} \rightarrow \frac{9229}{464486400} + \frac{5 C_{8,6}}{2},
 \end{aligned}$$

$$\begin{aligned}
 C_{8,232} &\rightarrow -\frac{49}{66\,355\,200}, C_{8,233} \rightarrow \frac{2243}{199\,065\,600} - \frac{3 C_{8,6}}{4}, C_{8,234} \rightarrow \frac{30\,007}{1\,393\,459\,200} + C_{8,6}, C_{8,235} \rightarrow \frac{10\,469}{464\,486\,400}, \\
 C_{8,236} &\rightarrow \frac{557}{22\,118\,400}, C_{8,237} \rightarrow -\frac{2927}{464\,486\,400} - \frac{5 C_{8,6}}{2}, C_{8,238} \rightarrow \frac{241}{92\,897\,280}, C_{8,239} \rightarrow \frac{10\,301}{464\,486\,400}, \\
 C_{8,240} &\rightarrow \frac{127}{4\,423\,680}, C_{8,241} \rightarrow -\frac{2893}{464\,486\,400}, C_{8,242} \rightarrow -\frac{2993}{464\,486\,400}, C_{8,243} \rightarrow -\frac{16\,043}{1\,393\,459\,200} - C_{8,6}, \\
 C_{8,244} &\rightarrow -\frac{127}{22\,118\,400}, C_{8,245} \rightarrow -\frac{10\,963}{1\,393\,459\,200} + C_{8,6}, C_{8,246} \rightarrow -\frac{6451}{464\,486\,400}, C_{8,247} \rightarrow -\frac{8027}{464\,486\,400}, \\
 C_{8,248} &\rightarrow -\frac{127}{4\,423\,680}, C_{8,249} \rightarrow \frac{2399}{464\,486\,400}, C_{8,250} \rightarrow \frac{2357}{464\,486\,400}, C_{8,251} \rightarrow \frac{643}{66\,355\,200}, \\
 C_{8,252} &\rightarrow \frac{127}{7\,372\,800}, C_{8,253} \rightarrow -\frac{127}{51\,609\,600}, C_{8,254} \rightarrow -\frac{127}{22\,118\,400}, C_{8,255} \rightarrow \frac{127}{154\,828\,800}, C_{8,256} \rightarrow 0
 \end{aligned}$$

In[*]:= sol /. Rule -> Set

Out[*]=

$$\left\{ 0, -\frac{1}{2\,419\,200}, \frac{1}{345\,600}, \frac{19}{9\,676\,800}, -\frac{1}{115\,200}, -\frac{19}{1\,612\,800} - C_{8,6}, -\frac{271}{58\,060\,800}, \frac{1}{69\,120}, \right. \\
 -\frac{457}{58\,060\,800} + \frac{5 C_{8,6}}{2}, \frac{1}{29\,030\,400}, \frac{19}{69\,672\,960} - \frac{3 C_{8,6}}{4}, \frac{179}{8\,294\,400} + \frac{5 C_{8,6}}{2}, \frac{223}{174\,182\,400}, \\
 \frac{1583}{116\,121\,600} + \frac{3 C_{8,6}}{4}, \frac{2893}{464\,486\,400}, -\frac{1}{69\,120}, -\frac{73}{9\,676\,800}, \frac{1571}{29\,030\,400} + 10 C_{8,6}, \frac{1619}{116\,121\,600} + \frac{15 C_{8,6}}{4}, \\
 -\frac{71}{829\,440} - 10 C_{8,6}, -\frac{79}{1\,935\,360} - \frac{9 C_{8,6}}{2}, -\frac{3617}{174\,182\,400}, -\frac{83}{7\,962\,624} + \frac{3 C_{8,6}}{4}, -\frac{1}{4\,147\,200}, \frac{109}{58\,060\,800}, \\
 \frac{1391}{43\,545\,600} + \frac{9 C_{8,6}}{2}, -\frac{35\,237}{1\,393\,459\,200} - \frac{15 C_{8,6}}{4}, -\frac{109}{3\,317\,760} - \frac{15 C_{8,6}}{4}, \frac{32\,899}{1\,393\,459\,200} + \frac{15 C_{8,6}}{4}, \\
 -\frac{5951}{464\,486\,400} - \frac{3 C_{8,6}}{4}, -\frac{2399}{464\,486\,400}, \frac{1}{115\,200}, \frac{1093}{58\,060\,800} + \frac{5 C_{8,6}}{2}, -\frac{1529}{29\,030\,400} - 10 C_{8,6}, \\
 -\frac{4813}{348\,364\,800} - \frac{15 C_{8,6}}{4}, -\frac{1}{460\,800}, \frac{1517}{38\,707\,200} + \frac{27 C_{8,6}}{4}, -\frac{919}{23\,224\,320} - \frac{27 C_{8,6}}{4}, \frac{2311}{1\,393\,459\,200}, \\
 \frac{361}{4\,147\,200} + 10 C_{8,6}, \frac{113}{11\,612\,160}, \frac{1429}{58\,060\,800}, \frac{25\,189}{464\,486\,400} + \frac{9 C_{8,6}}{2}, \frac{323}{5\,529\,600} + \frac{27 C_{8,6}}{4}, \\
 -\frac{22\,231}{464\,486\,400} - \frac{27 C_{8,6}}{4}, \frac{4297}{199\,065\,600}, \frac{10\,963}{1\,393\,459\,200} - C_{8,6}, -\frac{179}{8\,294\,400} - \frac{5 C_{8,6}}{2}, -\frac{467}{87\,091\,200}, \\
 \frac{1}{1\,382\,400}, -\frac{419}{464\,486\,400}, -\frac{337}{5\,529\,600} - \frac{27 C_{8,6}}{4}, -\frac{31}{2\,457\,600}, \frac{3349}{92\,897\,280} + \frac{27 C_{8,6}}{4}, \\
 \frac{83}{17\,203\,200} + \frac{5 C_{8,6}}{2}, \frac{559}{16\,588\,800} + \frac{15 C_{8,6}}{4}, \frac{1027}{278\,691\,840}, -\frac{24\,697}{1\,393\,459\,200} - \frac{9 C_{8,6}}{2}, \frac{19\,619}{1\,393\,459\,200}, \\
 -\frac{49}{66\,355\,200}, -\frac{3697}{154\,828\,800} - \frac{5 C_{8,6}}{2}, \frac{1951}{154\,828\,800} + C_{8,6}, \frac{127}{51\,609\,600}, -\frac{1}{345\,600}, -\frac{31}{4\,838\,400} - C_{8,6}, \\
 -\frac{163}{29\,030\,400}, \frac{29}{16\,588\,800} + \frac{3 C_{8,6}}{4}, \frac{53}{829\,440} + 10 C_{8,6}, -\frac{391}{174\,182\,400}, \frac{1993}{87\,091\,200} + \frac{9 C_{8,6}}{2}, \\
 \frac{13\,781}{1\,393\,459\,200} - \frac{3 C_{8,6}}{4}, -\frac{259}{4\,147\,200} - 10 C_{8,6}, -\frac{4559}{116\,121\,600} - \frac{27 C_{8,6}}{4}, \frac{19}{2\,764\,800}, \frac{4679}{1\,393\,459\,200}, \\
 \frac{1}{552\,960}, \frac{133}{2\,457\,600} + \frac{27 C_{8,6}}{4}, -\frac{43\,369}{1\,393\,459\,200} - \frac{9 C_{8,6}}{2}, \frac{12\,323}{1\,393\,459\,200} + C_{8,6}, -\frac{17}{1\,382\,400},
 \right.$$

$$\begin{array}{r}
 \begin{array}{cccccccc}
 661 & + & 9 c_{8,6} & , & 599 & , & 12\ 637 & - & 9 c_{8,6} & , & 1 & , & 2339 & , & 1807 & , \\
 \hline
 24\ 883\ 200 & + & 2 & , & 29\ 030\ 400 & , & 278\ 691\ 840 & - & 2 & , & 92\ 160 & , & 464\ 486\ 400 & , & 92\ 897\ 280 & , \\
 5687 & & & & 101 & , & 677 & & & & 1609 & & 5257 & & & , \\
 \hline
 464\ 486\ 400 & , & 2764\ 800 & - & 2 & , & 464\ 486\ 400 & , & 154\ 828\ 800 & , & 66\ 355\ 200 & - & 10 c_{8,6} & , & & , \\
 541 & + & 9 c_{8,6} & , & 33\ 893 & + & 6931 & - & 3881 & , & 23 & + & c_{8,6} & , & & , \\
 \hline
 22\ 118\ 400 & + & 2 & , & 464\ 486\ 400 & + & 10 c_{8,6} & , & 464\ 486\ 400 & , & 464\ 486\ 400 & , & 2\ 073\ 600 & + & c_{8,6} & , \\
 53 & & & & 4031 & , & 9 c_{8,6} & , & 8863 & + & 15 c_{8,6} & , & 49 & + & 27 c_{8,6} & , \\
 \hline
 29\ 030\ 400 & , & 174\ 182\ 400 & - & 2 & , & 278\ 691\ 840 & + & 4 & , & 1\ 105\ 920 & + & 4 & , & & , \\
 69\ 901 & & 27 c_{8,6} & , & 59 & & 1097 & + & 5 c_{8,6} & , & 61 & + & 77\ 299 & + & 27 c_{8,6} & , \\
 \hline
 1\ 393\ 459\ 200 & + & 4 & , & 30\ 965\ 760 & , & 66\ 355\ 200 & - & 2 & , & 4\ 147\ 200 & , & 1\ 393\ 459\ 200 & + & 4 & , \\
 365 & & & & 869 & & 101 & - & 27 c_{8,6} & , & 2213 & & 4951 & & & , \\
 \hline
 18\ 579\ 456 & + & 10 c_{8,6} & , & 10\ 321\ 920 & - & 2\ 654\ 208 & - & 4 & , & 464\ 486\ 400 & , & 92\ 897\ 280 & - & 10 c_{8,6} & , \\
 4927 & & & & 7 & , & 3 c_{8,6} & , & 13\ 549 & + & 15 c_{8,6} & , & 32\ 341 & + & 9 c_{8,6} & , & 8417 & , \\
 \hline
 464\ 486\ 400 & , & 614\ 400 & - & 4 & , & 464\ 486\ 400 & - & 4 & , & 1\ 393\ 459\ 200 & + & 2 & , & 1\ 393\ 459\ 200 & , \\
 671 & & & & 35\ 459 & - & 10 c_{8,6} & , & 5137 & + & 10 c_{8,6} & , & 683 & + & 557 & + & 3 c_{8,6} & , \\
 \hline
 66\ 355\ 200 & , & 464\ 486\ 400 & - & 10 c_{8,6} & , & 92\ 897\ 280 & + & 10 c_{8,6} & , & 92\ 897\ 280 & , & 66\ 355\ 200 & + & 4 & , & & , \\
 359 & + & 5 c_{8,6} & , & 307 & , & 319 & - & 187 & - & c_{8,6} & , & 13 & - & 107 & , & & , \\
 \hline
 17\ 203\ 200 & + & 2 & , & 66\ 355\ 200 & , & 464\ 486\ 400 & , & 22\ 118\ 400 & - & c_{8,6} & , & 4\ 423\ 680 & , & 51\ 609\ 600 & , & & , \\
 127 & & & & 1 & & 1 & & 29 & & 43 & & 1577 & + & 5 c_{8,6} & , & & , \\
 \hline
 154\ 828\ 800 & , & 2\ 419\ 200 & - & 1\ 075\ 200 & , & 2\ 419\ 200 & + & c_{8,6} & , & 11\ 612\ 160 & , & 58\ 060\ 800 & - & 2 & , & & , \\
 5413 & & 3 c_{8,6} & , & 823 & & 323 & & 433 & & 899 & + & 15 c_{8,6} & , & & & & , \\
 \hline
 348\ 364\ 800 & - & 4 & , & 174\ 182\ 400 & , & 51\ 609\ 600 & , & 29\ 030\ 400 & , & 23\ 224\ 320 & + & 4 & , & & & & , \\
 1 & + & 9 c_{8,6} & , & 4829 & + & 3 c_{8,6} & , & 787 & - & 36\ 941 & - & 15 c_{8,6} & , & & & & , \\
 \hline
 76\ 800 & - & 2 & , & 199\ 065\ 600 & + & 4 & , & 174\ 182\ 400 & , & 1\ 393\ 459\ 200 & - & 4 & , & & & & , \\
 51\ 803 & + & 15 c_{8,6} & , & 1411 & , & 257 & + & 5 c_{8,6} & , & 2587 & - & 15 c_{8,6} & , & & & & , \\
 \hline
 1\ 393\ 459\ 200 & + & 4 & , & 154\ 828\ 800 & , & 58\ 060\ 800 & + & 2 & , & 69\ 672\ 960 & - & 4 & , & & & & , \\
 4009 & + & 27 c_{8,6} & , & 16\ 801 & , & 107 & , & 1163 & + & 9 c_{8,6} & , & 32\ 303 & - & 27 c_{8,6} & , & & , \\
 \hline
 116\ 121\ 600 & + & 4 & , & 1\ 393\ 459\ 200 & , & 5\ 806\ 080 & , & 66\ 355\ 200 & + & 2 & , & 464\ 486\ 400 & - & 4 & , & & , \\
 40\ 237 & & & & 89 & & 59 & & 631 & & 10\ 457 & + & 5 c_{8,6} & , & 2081 & , & & , \\
 \hline
 1\ 393\ 459\ 200 & - & c_{8,6} & , & 87\ 091\ 200 & , & 30\ 965\ 760 & , & 154\ 828\ 800 & , & 464\ 486\ 400 & + & 2 & , & 278\ 691\ 840 & , & & , \\
 313 & & & & 11\ 243 & + & 5 c_{8,6} & , & 2977 & - & 1 & - & 181 & + & 3 c_{8,6} & , & & , \\
 \hline
 55\ 738\ 368 & , & 464\ 486\ 400 & - & 2 & , & 464\ 486\ 400 & , & 1\ 451\ 520 & - & c_{8,6} & , & 23\ 224\ 320 & + & 4 & , & & , \\
 1439 & & 11\ 219 & + & 3 c_{8,6} & , & 5689 & + & 27 c_{8,6} & , & 13\ 361 & , & 2833 & + & 27 c_{8,6} & , & & , \\
 \hline
 87\ 091\ 200 & , & 1\ 393\ 459\ 200 & - & 4 & , & 116\ 121\ 600 & - & 4 & , & 1\ 393\ 459\ 200 & , & 51\ 609\ 600 & + & 4 & , & & , \\
 13\ 843 & + & c_{8,6} & , & 8459 & + & 9 c_{8,6} & , & 25\ 273 & - & 9 c_{8,6} & , & 11\ 813 & , & 12\ 449 & , & & , \\
 \hline
 1\ 393\ 459\ 200 & + & c_{8,6} & , & 174\ 182\ 400 & + & 2 & , & 1\ 393\ 459\ 200 & - & 2 & , & 464\ 486\ 400 & , & 464\ 486\ 400 & , & & , \\
 5417 & & & & 32\ 507 & & 14\ 447 & + & 10 c_{8,6} & , & 9551 & - & 613 & , & & & & , \\
 \hline
 464\ 486\ 400 & , & 464\ 486\ 400 & - & 10 c_{8,6} & , & 154\ 828\ 800 & + & 10 c_{8,6} & , & 464\ 486\ 400 & , & 174\ 182\ 400 & , & & & & , \\
 25\ 913 & + & 15 c_{8,6} & , & 59\ 807 & - & 27 c_{8,6} & , & 1093 & + & 5 c_{8,6} & , & 43\ 649 & + & 27 c_{8,6} & , & & , \\
 \hline
 1\ 393\ 459\ 200 & + & 4 & , & 1\ 393\ 459\ 200 & - & 4 & , & 66\ 355\ 200 & - & 2 & , & 1\ 393\ 459\ 200 & + & 4 & , & & , \\
 23\ 741 & & & & 5003 & & 9463 & & 24\ 391 & + & 15 c_{8,6} & , & 197 & & & & & , \\
 \hline
 464\ 486\ 400 & + & 10 c_{8,6} & , & 464\ 486\ 400 & , & 464\ 486\ 400 & , & 1\ 393\ 459\ 200 & - & 4 & , & 39\ 813\ 120 & , & & & & , \\
 389 & - & 10 c_{8,6} & , & 11\ 521 & , & 7793 & + & 5 c_{8,6} & , & 6187 & - & 1471 & , & & & & , \\
 \hline
 7\ 372\ 800 & - & 10 c_{8,6} & , & 464\ 486\ 400 & , & 464\ 486\ 400 & + & 2 & , & 464\ 486\ 400 & , & 154\ 828\ 800 & , & & & & , \\
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 \frac{127}{22\,118\,400} - \frac{19}{9\,676\,800} - \frac{1}{1\,612\,800} - \frac{757}{116\,121\,600} - \frac{3 c_{8,6}}{4} - \frac{49}{66\,355\,200} - \frac{1139}{69\,672\,960} + \frac{15 c_{8,6}}{4}, \\
 - \frac{2393}{1\,393\,459\,200} + \frac{3 c_{8,6}}{4} - \frac{1961}{55\,738\,368} - \frac{15 c_{8,6}}{4} - \frac{581}{66\,355\,200} - \frac{1717}{116\,121\,600} - \frac{15 c_{8,6}}{4}, \\
 \frac{1619}{154\,828\,800} - \frac{973}{22\,118\,400} + \frac{9 c_{8,6}}{2} - \frac{491}{66\,355\,200} - \frac{221}{92\,897\,280} - \frac{1387}{66\,355\,200} + \frac{5 c_{8,6}}{2}, \\
 \frac{6359}{1\,393\,459\,200} - \frac{127}{22\,118\,400} - \frac{587}{69\,672\,960} + \frac{3 c_{8,6}}{4} - \frac{509}{39\,813\,120} - \frac{3 c_{8,6}}{4} - \frac{9241}{464\,486\,400}, \\
 - \frac{157}{13\,271\,040} + c_{8,6} - \frac{21\,661}{464\,486\,400} - \frac{9 c_{8,6}}{2} - \frac{3683}{464\,486\,400} - \frac{2917}{30\,965\,760} - 10 c_{8,6} - \frac{17}{819\,200}, \\
 \frac{31\,709}{1\,393\,459\,200} + \frac{15 c_{8,6}}{4} - \frac{7667}{464\,486\,400} - \frac{5 c_{8,6}}{2} - \frac{29\,893}{464\,486\,400} + 10 c_{8,6} - \frac{49}{7\,372\,800} - \frac{2689}{278\,691\,840}, \\
 \frac{853}{464\,486\,400} - \frac{7939}{464\,486\,400} - \frac{127}{7\,372\,800} - \frac{271}{58\,060\,800} - \frac{19}{10\,321\,920} - \frac{22\,289}{1\,393\,459\,200} + \frac{3 c_{8,6}}{4}, \\
 \frac{679}{66\,355\,200} - \frac{5839}{1\,393\,459\,200} - \frac{22\,609}{1\,393\,459\,200} - c_{8,6} - \frac{9229}{464\,486\,400} + \frac{5 c_{8,6}}{2} - \frac{49}{66\,355\,200}, \\
 \frac{2243}{199\,065\,600} - \frac{3 c_{8,6}}{4} - \frac{30\,007}{1\,393\,459\,200} + c_{8,6} - \frac{10\,469}{464\,486\,400} - \frac{557}{22\,118\,400} - \frac{2927}{464\,486\,400} - \frac{5 c_{8,6}}{2}, \\
 \frac{241}{92\,897\,280} - \frac{10\,301}{464\,486\,400} - \frac{127}{4\,423\,680} - \frac{2893}{464\,486\,400} - \frac{2993}{464\,486\,400} - \frac{16\,043}{1\,393\,459\,200} - c_{8,6}, \\
 - \frac{127}{22\,118\,400} - \frac{10\,963}{1\,393\,459\,200} + c_{8,6} - \frac{6451}{464\,486\,400} - \frac{8027}{464\,486\,400} - \frac{127}{4\,423\,680} - \frac{2399}{464\,486\,400}, \\
 \frac{2357}{464\,486\,400} - \frac{643}{66\,355\,200} - \frac{127}{7\,372\,800} - \frac{127}{51\,609\,600} - \frac{127}{22\,118\,400} - \frac{127}{154\,828\,800}, \} \\
 \end{array}$$

In[*]:= $c_{8,6} = -\frac{13}{3\,628\,800}$

Out[*]= $-\frac{13}{3\,628\,800}$

In[*]:= \mathfrak{d}

Out[*]=
$$\begin{aligned}
 & \mathcal{O}_{AR, \{x,y\}, \{1\}} \left[\mathcal{F}_0 \left[\right. \right. \\
 & \quad \frac{1}{24} AW_1[x, y] - \frac{1}{24} AW_1[y, x] - \frac{AW_1[x, x, x, y]}{1440} + \frac{1}{480} AW_1[x, x, y, x] + \frac{7 AW_1[x, x, y, y]}{5760} - \\
 & \quad \frac{1}{480} AW_1[x, y, x, x] - \frac{1}{640} AW_1[x, y, x, y] - \frac{AW_1[x, y, y, x]}{1152} - \frac{7 AW_1[x, y, y, y]}{5760} + \\
 & \quad \frac{AW_1[y, x, x, x]}{1440} - \frac{AW_1[y, x, x, y]}{1152} + \frac{19 AW_1[y, x, y, x]}{5760} + \frac{7 AW_1[y, x, y, y]}{1920} - \frac{7 AW_1[y, y, x, x]}{5760} - \\
 & \quad \frac{7 AW_1[y, y, x, y]}{1920} + \frac{7 AW_1[y, y, y, x]}{5760} + \frac{AW_1[x, x, x, x, x, y]}{60480} - \frac{AW_1[x, x, x, x, y, x]}{12096} - \\
 & \quad \frac{13 AW_1[x, x, x, x, y, y]}{241920} + \frac{AW_1[x, x, x, y, x, x]}{6048} + \frac{19 AW_1[x, x, x, y, x, y]}{145152} + \left. \left. \right] \right]
 \end{aligned}$$

$$\begin{aligned}
 & \frac{61 \text{ AW}_1[x, x, x, y, y, x]}{725\,760} + \frac{83 \text{ AW}_1[x, x, x, y, y, y]}{967\,680} - \frac{\text{AW}_1[x, x, y, x, x, x]}{6048} - \\
 & \frac{17 \text{ AW}_1[x, x, y, x, x, y]}{241\,920} - \frac{61 \text{ AW}_1[x, x, y, x, y, x]}{241\,920} - \frac{89 \text{ AW}_1[x, x, y, x, y, y]}{414\,720} + \\
 & \frac{71 \text{ AW}_1[x, x, y, y, x, y]}{967\,680} - \frac{337 \text{ AW}_1[x, x, y, y, y, x]}{2\,903\,040} - \frac{31 \text{ AW}_1[x, x, y, y, y, y]}{483\,840} + \\
 & \frac{\text{AW}_1[x, y, x, x, x, x]}{12\,096} + \frac{13 \text{ AW}_1[x, y, x, x, x, y]}{725\,760} + \frac{\text{AW}_1[x, y, x, x, y, x]}{11\,520} + \\
 & \frac{37 \text{ AW}_1[x, y, x, x, y, y]}{580\,608} + \frac{\text{AW}_1[x, y, x, y, x, x]}{6048} + \frac{79 \text{ AW}_1[x, y, x, y, x, y]}{967\,680} + \\
 & \frac{71 \text{ AW}_1[x, y, x, y, y, x]}{322\,560} + \frac{73 \text{ AW}_1[x, y, x, y, y, y]}{483\,840} - \frac{\text{AW}_1[x, y, y, x, x, x]}{18\,144} - \\
 & \frac{53 \text{ AW}_1[x, y, y, x, x, y]}{967\,680} - \frac{23 \text{ AW}_1[x, y, y, x, y, x]}{193\,536} - \frac{11 \text{ AW}_1[x, y, y, x, y, y]}{161\,280} + \\
 & \frac{19 \text{ AW}_1[x, y, y, y, x, x]}{290\,304} - \frac{\text{AW}_1[x, y, y, y, x, y]}{193\,536} + \frac{7 \text{ AW}_1[x, y, y, y, y, x]}{138\,240} + \\
 & \frac{31 \text{ AW}_1[x, y, y, y, y, y]}{967\,680} - \frac{\text{AW}_1[y, x, x, x, x, x]}{60\,480} + \frac{\text{AW}_1[y, x, x, x, x, y]}{34\,560} - \\
 & \frac{97 \text{ AW}_1[y, x, x, x, y, x]}{725\,760} - \frac{103 \text{ AW}_1[y, x, x, x, y, y]}{967\,680} + \frac{19 \text{ AW}_1[y, x, x, y, x, x]}{120\,960} + \\
 & \frac{583 \text{ AW}_1[y, x, x, y, x, y]}{2\,903\,040} + \frac{53 \text{ AW}_1[y, x, x, y, y, x]}{967\,680} + \frac{17 \text{ AW}_1[y, x, x, y, y, y]}{161\,280} - \\
 & \frac{29 \text{ AW}_1[y, x, y, x, x, x]}{181\,440} - \frac{289 \text{ AW}_1[y, x, y, x, x, y]}{2\,903\,040} - \frac{55 \text{ AW}_1[y, x, y, x, y, x]}{193\,536} - \\
 & \frac{17 \text{ AW}_1[y, x, y, x, y, y]}{53\,760} - \frac{11 \text{ AW}_1[y, x, y, y, x, x]}{483\,840} + \frac{7 \text{ AW}_1[y, x, y, y, x, y]}{46\,080} - \\
 & \frac{191 \text{ AW}_1[y, x, y, y, y, x]}{967\,680} - \frac{31 \text{ AW}_1[y, x, y, y, y, y]}{193\,536} + \frac{13 \text{ AW}_1[y, y, x, x, x, x]}{241\,920} + \\
 & \frac{\text{AW}_1[y, y, x, x, x, y]}{17\,920} - \frac{19 \text{ AW}_1[y, y, x, x, y, x]}{1\,451\,520} + \frac{89 \text{ AW}_1[y, y, x, y, x, x]}{414\,720} + \\
 & \frac{53 \text{ AW}_1[y, y, x, y, x, y]}{322\,560} + \frac{71 \text{ AW}_1[y, y, x, y, y, x]}{322\,560} + \frac{31 \text{ AW}_1[y, y, x, y, y, y]}{96\,768} - \\
 & \frac{83 \text{ AW}_1[y, y, y, x, x, x]}{967\,680} - \frac{53 \text{ AW}_1[y, y, y, x, x, y]}{967\,680} - \frac{13 \text{ AW}_1[y, y, y, x, y, x]}{64\,512} - \\
 & \frac{31 \text{ AW}_1[y, y, y, x, y, y]}{96\,768} + \frac{31 \text{ AW}_1[y, y, y, y, x, x]}{483\,840} + \frac{31 \text{ AW}_1[y, y, y, y, x, y]}{193\,536} - \\
 & \frac{31 \text{ AW}_1[y, y, y, y, y, x]}{967\,680} - \frac{\text{AW}_1[x, x, x, x, x, x, y]}{2\,419\,200} + \frac{\text{AW}_1[x, x, x, x, x, x, y, x]}{345\,600} + \\
 & \frac{19 \text{ AW}_1[x, x, x, x, x, x, y, y]}{9\,676\,800} - \frac{\text{AW}_1[x, x, x, x, x, y, x, x]}{115\,200} - \frac{13 \text{ AW}_1[x, x, x, x, x, y, x, y]}{3\,628\,800} - \\
 & \frac{17 \text{ AW}_1[x, x, x, x, x, y, y, x]}{2\,073\,600} - \frac{271 \text{ AW}_1[x, x, x, x, x, y, y, y]}{58\,060\,800} + \\
 & \frac{\text{AW}_1[x, x, x, x, y, x, x, x]}{69\,120} + \frac{\text{AW}_1[x, x, x, x, y, x, x, y]}{921\,600} + \frac{457 \text{ AW}_1[x, x, x, x, y, x, y, x]}{29\,030\,400} +
 \end{aligned}$$

$$\begin{aligned}
 & \frac{553 \text{ AW}_1[x, x, x, x, y, x, y, y]}{49766400} + \frac{733 \text{ AW}_1[x, x, x, x, y, y, x, x]}{58060800} + \\
 & \frac{223 \text{ AW}_1[x, x, x, x, y, y, x, y]}{174182400} + \frac{1271 \text{ AW}_1[x, x, x, x, y, y, y, x]}{116121600} + \\
 & \frac{2893 \text{ AW}_1[x, x, x, x, y, y, y, y]}{464486400} - \frac{\text{AW}_1[x, x, x, y, x, x, x, x]}{69120} - \frac{73 \text{ AW}_1[x, x, x, y, x, x, x, y]}{9676800} + \\
 & \frac{59 \text{ AW}_1[x, x, x, y, x, x, y, x]}{3225600} + \frac{59 \text{ AW}_1[x, x, x, y, x, x, y, y]}{116121600} - \\
 & \frac{289 \text{ AW}_1[x, x, x, y, x, y, x, x]}{5806080} - \frac{239 \text{ AW}_1[x, x, x, y, x, y, x, y]}{9676800} - \\
 & \frac{3617 \text{ AW}_1[x, x, x, y, x, y, y, x]}{174182400} - \frac{18269 \text{ AW}_1[x, x, x, y, x, y, y, y]}{1393459200} - \\
 & \frac{\text{AW}_1[x, x, x, y, y, x, x, x]}{4147200} + \frac{109 \text{ AW}_1[x, x, x, y, y, x, x, y]}{58060800} + \frac{689 \text{ AW}_1[x, x, x, y, y, x, y, x]}{43545600} - \\
 & \frac{16517 \text{ AW}_1[x, x, x, y, y, x, y, y]}{1393459200} - \frac{451 \text{ AW}_1[x, x, x, y, y, y, x, x]}{23224320} + \\
 & \frac{14179 \text{ AW}_1[x, x, x, y, y, y, x, y]}{1393459200} - \frac{4703 \text{ AW}_1[x, x, x, y, y, y, y, x]}{464486400} - \\
 & \frac{2399 \text{ AW}_1[x, x, x, y, y, y, y, y]}{464486400} + \frac{\text{AW}_1[x, x, y, x, x, x, x, x]}{115200} + \\
 & \frac{191 \text{ AW}_1[x, x, y, x, x, x, x, y]}{19353600} - \frac{163 \text{ AW}_1[x, x, y, x, x, x, y, x]}{9676800} - \\
 & \frac{19 \text{ AW}_1[x, x, y, x, x, x, y, y]}{49766400} - \frac{\text{AW}_1[x, x, y, x, x, y, x, x]}{460800} + \frac{83 \text{ AW}_1[x, x, y, x, x, y, x, y]}{5529600} - \\
 & \frac{1787 \text{ AW}_1[x, x, y, x, x, y, y, x]}{116121600} + \frac{2311 \text{ AW}_1[x, x, y, x, x, y, y, y]}{1393459200} + \\
 & \frac{1487 \text{ AW}_1[x, x, y, x, y, x, x, x]}{29030400} + \frac{113 \text{ AW}_1[x, x, y, x, y, x, x, y]}{11612160} + \\
 & \frac{1429 \text{ AW}_1[x, x, y, x, y, x, y, x]}{58060800} + \frac{17701 \text{ AW}_1[x, x, y, x, y, x, y, y]}{464486400} + \\
 & \frac{53 \text{ AW}_1[x, x, y, x, y, y, x, x]}{1548288} - \frac{10999 \text{ AW}_1[x, x, y, x, y, y, x, y]}{464486400} + \\
 & \frac{4297 \text{ AW}_1[x, x, y, x, y, y, y, x]}{199065600} + \frac{3191 \text{ AW}_1[x, x, y, x, y, y, y, y]}{278691840} - \\
 & \frac{733 \text{ AW}_1[x, x, y, y, x, x, x, x]}{58060800} - \frac{467 \text{ AW}_1[x, x, y, y, x, x, x, y]}{87091200} + \frac{\text{AW}_1[x, x, y, y, x, x, y, x]}{1382400} - \\
 & \frac{419 \text{ AW}_1[x, x, y, y, x, x, y, y]}{464486400} - \frac{1423 \text{ AW}_1[x, x, y, y, x, y, x, x]}{38707200} - \\
 & \frac{31 \text{ AW}_1[x, x, y, y, x, y, x, y]}{2457600} + \frac{5513 \text{ AW}_1[x, x, y, y, x, y, y, x]}{464486400} - \\
 & \frac{1919 \text{ AW}_1[x, x, y, y, x, y, y, y]}{464486400} + \frac{2353 \text{ AW}_1[x, x, y, y, y, x, x, x]}{116121600} + \\
 & \frac{1027 \text{ AW}_1[x, x, y, y, y, x, x, y]}{278691840} - \frac{319 \text{ AW}_1[x, x, y, y, y, x, y, x]}{199065600} +
 \end{aligned}$$

$$\begin{aligned}
 & \frac{19\,619\,AW_1[x, x, y, y, y, x, y, y]}{1\,393\,459\,200} - \frac{49\,AW_1[x, x, y, y, y, y, x, x]}{66\,355\,200} - \\
 & \frac{6931\,AW_1[x, x, y, y, y, y, x, y]}{464\,486\,400} + \frac{4189\,AW_1[x, x, y, y, y, y, y, x]}{464\,486\,400} + \\
 & \frac{127\,AW_1[x, x, y, y, y, y, y, y]}{51\,609\,600} - \frac{AW_1[x, y, x, x, x, x, x, x]}{345\,600} - \frac{41\,AW_1[x, y, x, x, x, x, x, y]}{14\,515\,200} - \\
 & \frac{163\,AW_1[x, y, x, x, x, x, y, x]}{29\,030\,400} - \frac{109\,AW_1[x, y, x, x, x, x, y, y]}{116\,121\,600} + \\
 & \frac{163\,AW_1[x, y, x, x, x, y, x, x]}{5\,806\,080} - \frac{391\,AW_1[x, y, x, x, x, y, x, y]}{174\,182\,400} + \\
 & \frac{589\,AW_1[x, y, x, x, x, y, y, x]}{87\,091\,200} - \frac{10\,037\,AW_1[x, y, x, x, x, y, y, y]}{1\,393\,459\,200} - \\
 & \frac{773\,AW_1[x, y, x, x, y, x, x, x]}{29\,030\,400} - \frac{1751\,AW_1[x, y, x, x, y, x, x, y]}{116\,121\,600} + \\
 & \frac{19\,AW_1[x, y, x, x, y, x, y, x]}{2\,764\,800} + \frac{4679\,AW_1[x, y, x, x, y, x, y, y]}{1\,393\,459\,200} + \frac{AW_1[x, y, x, x, y, y, x, x]}{552\,960} + \\
 & \frac{103\,AW_1[x, y, x, x, y, y, x, y]}{3\,440\,640} - \frac{4181\,AW_1[x, y, x, x, y, y, y, x]}{278\,691\,840} + \\
 & \frac{7331\,AW_1[x, y, x, x, y, y, y, y]}{17\,AW_1[x, y, x, y, x, x, x, x]} + \\
 & \frac{1819\,AW_1[x, y, x, y, x, x, x, y]}{1\,393\,459\,200} - \frac{599\,AW_1[x, y, x, y, x, x, y, x]}{1\,382\,400} - \\
 & \frac{174\,182\,400}{40\,721\,AW_1[x, y, x, y, x, x, y, y]} - \frac{29\,030\,400}{AW_1[x, y, x, y, x, y, x, x]} - \\
 & \frac{2339\,AW_1[x, y, x, y, x, y, x, y]}{1\,393\,459\,200} - \frac{1807\,AW_1[x, y, x, y, x, y, y, x]}{92\,160} - \\
 & \frac{5687\,AW_1[x, y, x, y, x, y, y, y]}{464\,486\,400} - \frac{79\,AW_1[x, y, x, y, y, x, x, x]}{92\,897\,280} + \\
 & \frac{677\,AW_1[x, y, x, y, y, x, x, y]}{464\,486\,400} - \frac{1609\,AW_1[x, y, x, y, y, x, y, x]}{3\,870\,720} - \\
 & \frac{20\,159\,AW_1[x, y, x, y, y, x, y, y]}{464\,486\,400} - \frac{1291\,AW_1[x, y, x, y, y, y, x, x]}{154\,828\,800} + \\
 & \frac{213\,AW_1[x, y, x, y, y, y, x, y]}{464\,486\,400} - \frac{6931\,AW_1[x, y, x, y, y, y, y, x]}{5\,734\,400} - \\
 & \frac{3881\,AW_1[x, y, x, y, y, y, y, y]}{109\,AW_1[x, y, y, x, x, x, x, x]} + \\
 & \frac{53\,AW_1[x, y, y, x, x, x, x, y]}{464\,486\,400} - \frac{1223\,AW_1[x, y, y, x, x, x, y, x]}{14\,515\,200} + \\
 & \frac{5119\,AW_1[x, y, y, x, x, x, y, y]}{29\,030\,400} - \frac{779\,AW_1[x, y, y, x, x, y, x, x]}{174\,182\,400} - \\
 & \frac{7241\,AW_1[x, y, y, x, x, y, x, y]}{278\,691\,840} + \frac{59\,AW_1[x, y, y, x, x, y, y, x]}{38\,707\,200} - \\
 & \frac{391\,AW_1[x, y, y, x, x, y, y, y]}{278\,691\,840} + \frac{61\,AW_1[x, y, y, x, y, x, x, x]}{30\,965\,760} + \\
 & \frac{51\,609\,600}{4\,147\,200}
 \end{aligned}$$

$$\begin{aligned}
 & \frac{6229 \text{ AW}_1[x, y, y, x, y, x, x, y]}{199065600} + \frac{365 \text{ AW}_1[x, y, y, x, y, x, y, x]}{18579456} + \\
 & \frac{4493 \text{ AW}_1[x, y, y, x, y, x, y, y]}{92897280} - \frac{6443 \text{ AW}_1[x, y, y, x, y, y, x, x]}{464486400} + \\
 & \frac{2213 \text{ AW}_1[x, y, y, x, y, y, x, y]}{464486400} - \frac{541 \text{ AW}_1[x, y, y, x, y, y, y, x]}{30965760} + \\
 & \frac{4927 \text{ AW}_1[x, y, y, x, y, y, y, y]}{464486400} - \frac{337 \text{ AW}_1[x, y, y, y, x, x, x, x]}{38707200} - \\
 & \frac{7309 \text{ AW}_1[x, y, y, y, x, x, x, y]}{464486400} + \frac{1411 \text{ AW}_1[x, y, y, y, x, x, y, x]}{199065600} - \\
 & \frac{8417 \text{ AW}_1[x, y, y, y, x, x, y, y]}{1393459200} - \frac{671 \text{ AW}_1[x, y, y, y, x, y, x, x]}{66355200} - \\
 & \frac{697 \text{ AW}_1[x, y, y, y, x, y, x, y]}{17203200} + \frac{67 \text{ AW}_1[x, y, y, y, x, y, y, x]}{3440640} - \\
 & \frac{683 \text{ AW}_1[x, y, y, y, x, y, y, y]}{92897280} + \frac{2651 \text{ AW}_1[x, y, y, y, y, x, x, x]}{464486400} + \\
 & \frac{5533 \text{ AW}_1[x, y, y, y, y, x, x, y]}{464486400} + \frac{307 \text{ AW}_1[x, y, y, y, y, x, y, x]}{66355200} - \\
 & \frac{319 \text{ AW}_1[x, y, y, y, y, x, y, y]}{464486400} - \frac{2263 \text{ AW}_1[x, y, y, y, y, y, x, x]}{464486400} + \\
 & \frac{13 \text{ AW}_1[x, y, y, y, y, y, x, y]}{4423680} - \frac{107 \text{ AW}_1[x, y, y, y, y, y, y, x]}{51609600} - \\
 & \frac{127 \text{ AW}_1[x, y, y, y, y, y, y, y]}{154828800} + \frac{\text{AW}_1[y, x, x, x, x, x, x, x]}{2419200} - \frac{\text{AW}_1[y, x, x, x, x, x, x, y]}{1075200} + \\
 & \frac{61 \text{ AW}_1[y, x, x, x, x, x, y, x]}{7257600} + \frac{43 \text{ AW}_1[y, x, x, x, x, x, y, y]}{11612160} - \\
 & \frac{151 \text{ AW}_1[y, x, x, x, x, y, x, x]}{8294400} - \frac{4477 \text{ AW}_1[y, x, x, x, x, y, x, y]}{348364800} - \\
 & \frac{823 \text{ AW}_1[y, x, x, x, x, y, y, x]}{174182400} - \frac{323 \text{ AW}_1[y, x, x, x, x, y, y, y]}{51609600} + \\
 & \frac{433 \text{ AW}_1[y, x, x, x, y, x, x, x]}{29030400} + \frac{587 \text{ AW}_1[y, x, x, x, y, x, x, y]}{23224320} + \frac{\text{AW}_1[y, x, x, x, y, x, y, x]}{322560} + \\
 & \frac{30059 \text{ AW}_1[y, x, x, x, y, x, y, y]}{1393459200} + \frac{787 \text{ AW}_1[y, x, x, x, y, y, x, x]}{174182400} - \\
 & \frac{2603 \text{ AW}_1[y, x, x, x, y, y, x, y]}{199065600} + \frac{33083 \text{ AW}_1[y, x, x, x, y, y, y, x]}{1393459200} + \\
 & \frac{1411 \text{ AW}_1[y, x, x, x, y, y, y, y]}{154828800} - \frac{263 \text{ AW}_1[y, x, x, y, x, x, x, x]}{58060800} - \\
 & \frac{1651 \text{ AW}_1[y, x, x, y, x, x, x, y]}{69672960} + \frac{1201 \text{ AW}_1[y, x, x, y, x, x, y, x]}{116121600} - \\
 & \frac{16801 \text{ AW}_1[y, x, x, y, x, x, y, y]}{1393459200} - \frac{107 \text{ AW}_1[y, x, x, y, x, y, x, x]}{5806080} + \\
 & \frac{653 \text{ AW}_1[y, x, x, y, x, y, x, y]}{464486400} - \frac{21071 \text{ AW}_1[y, x, x, y, x, y, y, x]}{464486400} -
 \end{aligned}$$

$$\begin{array}{r}
 \frac{1007 \text{ AW}_1 [y, x, x, y, x, y, y, y]}{39\,813\,120} + \frac{89 \text{ AW}_1 [y, x, x, y, y, x, x, x]}{87\,091\,200} + \\
 \frac{59 \text{ AW}_1 [y, x, x, y, y, x, x, y]}{30\,965\,760} + \frac{631 \text{ AW}_1 [y, x, x, y, y, x, y, x]}{154\,828\,800} + \\
 \frac{2099 \text{ AW}_1 [y, x, x, y, y, x, y, y]}{154\,828\,800} - \frac{2081 \text{ AW}_1 [y, x, x, y, y, y, x, x]}{278\,691\,840} - \\
 \frac{313 \text{ AW}_1 [y, x, x, y, y, y, x, y]}{55\,738\,368} - \frac{787 \text{ AW}_1 [y, x, x, y, y, y, y, x]}{51\,609\,600} - \\
 \frac{2977 \text{ AW}_1 [y, x, x, y, y, y, y, y]}{464\,486\,400} + \frac{31 \text{ AW}_1 [y, x, y, x, x, x, x, x]}{7\,257\,600} + \\
 \frac{593 \text{ AW}_1 [y, x, y, x, x, x, x, y]}{116\,121\,600} + \frac{1439 \text{ AW}_1 [y, x, y, x, x, x, y, x]}{87\,091\,200} + \\
 \frac{14\,963 \text{ AW}_1 [y, x, y, x, x, x, y, y]}{1\,393\,459\,200} - \frac{2881 \text{ AW}_1 [y, x, y, x, x, y, x, x]}{116\,121\,600} - \\
 \frac{13\,361 \text{ AW}_1 [y, x, y, x, x, y, x, y]}{1\,393\,459\,200} + \frac{317 \text{ AW}_1 [y, x, y, x, x, y, y, x]}{10\,321\,920} + \\
 \frac{8851 \text{ AW}_1 [y, x, y, x, x, y, y, y]}{1\,393\,459\,200} + \frac{5651 \text{ AW}_1 [y, x, y, x, y, x, x, x]}{174\,182\,400} - \\
 \frac{2809 \text{ AW}_1 [y, x, y, x, y, x, x, y]}{1\,393\,459\,200} + \frac{11\,813 \text{ AW}_1 [y, x, y, x, y, x, y, x]}{464\,486\,400} + \\
 \frac{12\,449 \text{ AW}_1 [y, x, y, x, y, x, y, y]}{464\,486\,400} + \frac{5417 \text{ AW}_1 [y, x, y, x, y, y, x, x]}{464\,486\,400} - \\
 \frac{1763 \text{ AW}_1 [y, x, y, x, y, y, x, y]}{51\,609\,600} + \frac{26\,701 \text{ AW}_1 [y, x, y, x, y, y, y, x]}{464\,486\,400} + \\
 \frac{9551 \text{ AW}_1 [y, x, y, x, y, y, y, y]}{464\,486\,400} - \frac{613 \text{ AW}_1 [y, x, y, y, x, x, x, x]}{174\,182\,400} + \\
 \frac{7193 \text{ AW}_1 [y, x, y, y, x, x, x, y]}{1\,393\,459\,200} - \frac{26\,111 \text{ AW}_1 [y, x, y, y, x, x, y, x]}{1\,393\,459\,200} - \\
 \frac{3491 \text{ AW}_1 [y, x, y, y, x, x, y, y]}{464\,486\,400} + \frac{9953 \text{ AW}_1 [y, x, y, y, x, y, x, x]}{1\,393\,459\,200} + \\
 \frac{263 \text{ AW}_1 [y, x, y, y, x, y, x, y]}{17\,203\,200} - \frac{5003 \text{ AW}_1 [y, x, y, y, x, y, y, x]}{464\,486\,400} - \\
 \frac{9463 \text{ AW}_1 [y, x, y, y, x, y, y, y]}{464\,486\,400} - \frac{5671 \text{ AW}_1 [y, x, y, y, y, x, x, x]}{1\,393\,459\,200} + \\
 \frac{197 \text{ AW}_1 [y, x, y, y, y, x, x, y]}{39\,813\,120} - \frac{7867 \text{ AW}_1 [y, x, y, y, y, x, y, x]}{464\,486\,400} + \\
 \frac{11\,521 \text{ AW}_1 [y, x, y, y, y, x, y, y]}{464\,486\,400} + \frac{173 \text{ AW}_1 [y, x, y, y, y, y, x, x]}{22\,118\,400} - \\
 \frac{6187 \text{ AW}_1 [y, x, y, y, y, y, x, y]}{464\,486\,400} + \frac{1471 \text{ AW}_1 [y, x, y, y, y, y, y, x]}{154\,828\,800} + \\
 \frac{127 \text{ AW}_1 [y, x, y, y, y, y, y, y]}{22\,118\,400} - \frac{19 \text{ AW}_1 [y, y, x, x, x, x, x, x]}{9\,676\,800} - \frac{\text{AW}_1 [y, y, x, x, x, x, x, y]}{1\,612\,800} \\
 \frac{89 \text{ AW}_1 [y, y, x, x, x, x, y, x]}{23\,224\,320} - \frac{49 \text{ AW}_1 [y, y, x, x, x, x, y, y]}{66\,355\,200} + \frac{29 \text{ AW}_1 [y, y, x, x, x, y, x, x]}{9\,953\,280} -
 \end{array}$$

$$\begin{array}{r}
 \frac{6137 \text{ AW}_1 [y, y, x, x, x, y, x, y]}{1393459200} - \frac{6061 \text{ AW}_1 [y, y, x, x, x, y, y, x]}{278691840} - \\
 \frac{581 \text{ AW}_1 [y, y, x, x, x, y, y, y]}{66355200} - \frac{157 \text{ AW}_1 [y, y, x, x, y, x, x, x]}{116121600} + \\
 \frac{1619 \text{ AW}_1 [y, y, x, x, y, x, x, y]}{154828800} + \frac{863 \text{ AW}_1 [y, y, x, x, y, x, y, x]}{30965760} + \\
 \frac{5101 \text{ AW}_1 [y, y, x, x, y, x, y, y]}{464486400} + \frac{221 \text{ AW}_1 [y, y, x, x, y, y, x, x]}{92897280} + \\
 \frac{5549 \text{ AW}_1 [y, y, x, x, y, y, x, y]}{464486400} + \frac{6359 \text{ AW}_1 [y, y, x, x, y, y, y, x]}{1393459200} + \\
 \frac{127 \text{ AW}_1 [y, y, x, x, y, y, y, y]}{22118400} - \frac{553 \text{ AW}_1 [y, y, x, y, x, x, x, x]}{49766400} - \\
 \frac{14071 \text{ AW}_1 [y, y, x, y, x, x, x, y]}{1393459200} - \frac{9241 \text{ AW}_1 [y, y, x, y, x, x, y, x]}{464486400} - \\
 \frac{7159 \text{ AW}_1 [y, y, x, y, x, x, y, y]}{464486400} - \frac{14173 \text{ AW}_1 [y, y, x, y, x, y, x, x]}{464486400} - \\
 \frac{3683 \text{ AW}_1 [y, y, x, y, x, y, x, y]}{464486400} - \frac{5423 \text{ AW}_1 [y, y, x, y, x, y, y, x]}{92897280} - \\
 \frac{17 \text{ AW}_1 [y, y, x, y, x, y, y, y]}{819200} + \frac{12989 \text{ AW}_1 [y, y, x, y, y, x, x, x]}{1393459200} - \\
 \frac{167 \text{ AW}_1 [y, y, x, y, y, x, x, y]}{22118400} + \frac{13253 \text{ AW}_1 [y, y, x, y, y, x, y, x]}{464486400} - \\
 \frac{49 \text{ AW}_1 [y, y, x, y, y, x, y, y]}{7372800} - \frac{2689 \text{ AW}_1 [y, y, x, y, y, y, x, x]}{278691840} + \\
 \frac{853 \text{ AW}_1 [y, y, x, y, y, y, x, y]}{464486400} - \frac{7939 \text{ AW}_1 [y, y, x, y, y, y, y, x]}{464486400} - \\
 \frac{127 \text{ AW}_1 [y, y, x, y, y, y, y, y]}{7372800} + \frac{271 \text{ AW}_1 [y, y, y, x, x, x, x, x]}{58060800} + \\
 \frac{19 \text{ AW}_1 [y, y, y, x, x, x, x, y]}{10321920} + \frac{3709 \text{ AW}_1 [y, y, y, x, x, x, y, x]}{278691840} + \\
 \frac{679 \text{ AW}_1 [y, y, y, x, x, x, y, y]}{66355200} - \frac{5839 \text{ AW}_1 [y, y, y, x, x, y, x, x]}{1393459200} - \\
 \frac{17617 \text{ AW}_1 [y, y, y, x, x, y, x, y]}{1393459200} + \frac{5069 \text{ AW}_1 [y, y, y, x, x, y, y, x]}{464486400} - \\
 \frac{49 \text{ AW}_1 [y, y, y, x, x, y, y, y]}{66355200} + \frac{3889 \text{ AW}_1 [y, y, y, x, y, x, x, x]}{278691840} + \\
 \frac{5003 \text{ AW}_1 [y, y, y, x, y, x, x, y]}{278691840} + \frac{10469 \text{ AW}_1 [y, y, y, x, y, x, y, x]}{464486400} + \\
 \frac{557 \text{ AW}_1 [y, y, y, x, y, x, y, y]}{22118400} + \frac{137 \text{ AW}_1 [y, y, y, x, y, y, x, x]}{51609600} + \\
 \frac{241 \text{ AW}_1 [y, y, y, x, y, y, x, y]}{92897280} + \frac{10301 \text{ AW}_1 [y, y, y, x, y, y, y, x]}{464486400} + \\
 \frac{127 \text{ AW}_1 [y, y, y, x, y, y, y, y]}{4423680} - \frac{2893 \text{ AW}_1 [y, y, y, y, x, x, x, x]}{464486400} -
 \end{array}$$

$$\begin{array}{r}
 \frac{2993 \text{ AW}_1 [y, y, y, y, x, x, x, y]}{464486400} - \frac{11051 \text{ AW}_1 [y, y, y, y, x, x, y, x]}{1393459200} - \\
 \frac{127 \text{ AW}_1 [y, y, y, y, x, x, y, y]}{22118400} - \frac{3191 \text{ AW}_1 [y, y, y, y, x, y, x, x]}{278691840} - \\
 \frac{6451 \text{ AW}_1 [y, y, y, y, x, y, x, y]}{464486400} - \frac{8027 \text{ AW}_1 [y, y, y, y, x, y, y, x]}{464486400} - \\
 \frac{127 \text{ AW}_1 [y, y, y, y, x, y, y, y]}{4423680} + \frac{2399 \text{ AW}_1 [y, y, y, y, y, x, x, x]}{464486400} + \\
 \frac{2357 \text{ AW}_1 [y, y, y, y, y, x, x, y]}{464486400} + \frac{643 \text{ AW}_1 [y, y, y, y, y, x, y, x]}{66355200} + \\
 \frac{127 \text{ AW}_1 [y, y, y, y, y, x, y, y]}{7372800} - \frac{127 \text{ AW}_1 [y, y, y, y, y, y, x, x]}{51609600} - \\
 \frac{127 \text{ AW}_1 [y, y, y, y, y, y, x, y]}{22118400} + \frac{127 \text{ AW}_1 [y, y, y, y, y, y, y, x]}{154828800} \Big] \Big]
 \end{array}$$