

## Number of perfect matchings in $P_{12} \times P_n$ graphs

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$$\begin{aligned}
 & (1-x)(1+x)(1-832x^2-1438x^3+205869x^4+281154x^5-23747232x^6-16901472x^7 \\
 & + 1517701841x^8+191166760x^9-58706205472x^{10}+18049824824x^{11} \\
 & + 1450332386836x^{12}-844980223452x^{13}-23789962024384x^{14}+17103849688616x^{15} \\
 & + 267477504080796x^{16}-199095801966564x^{17}-2115939924509544x^{18} \\
 & + 1455525030052096x^{19}+12008848168375732x^{20}-6934699343273244x^{21} \\
 & - 49505609449165520x^{22}+21724045650870928x^{23}+149123293000147972x^{24} \\
 & - 43843378994239200x^{25}-328583140865890270x^{26}+52493836306639288x^{27} \\
 & + 528695277945805188x^{28}-24716465709581036x^{29}-619743576833758166x^{30} \\
 & - 24716465709581036x^{31}+528695277945805188x^{32}+52493836306639288x^{33} \\
 & - 328583140865890270x^{34}-43843378994239200x^{35}+149123293000147972x^{36} \\
 & + 21724045650870928x^{37}-49505609449165520x^{38}-6934699343273244x^{39} \\
 & + 12008848168375732x^{40}+1455525030052096x^{41}-2115939924509544x^{42} \\
 & - 199095801966564x^{43}+267477504080796x^{44}+17103849688616x^{45} \\
 & - 23789962024384x^{46}-844980223452x^{47}+1450332386836x^{48}+18049824824x^{49} \\
 & - 58706205472x^{50}+191166760x^{51}+1517701841x^{52}-16901472x^{53}-23747232x^{54} \\
 & + 281154x^{55}+205869x^{56}-1438x^{57}-832x^{58}+x^{60}) / (1-x-1065x^2-2271x^3 \\
 & + 313647x^4+581107x^5-42290089x^6-46394373x^7+3142067439x^8+1204065921x^9 \\
 & - 141122117137x^{10}+23552838575x^{11}+4048343500561x^{12}-2177821303792x^{13} \\
 & - 77145898134992x^{14}+57692927620568x^{15}+1009771490156144x^{16} \\
 & - 834602390555152x^{17}-9348345877875672x^{18}+7534201668856784x^{19} \\
 & + 62671184060029400x^{20}-44881022619918032x^{21}-309385807529385808x^{22} \\
 & + 180904763263594728x^{23}+1136378367751634480x^{24}-495365037290693552x^{25} \\
 & - 3121850377815899650x^{26}+901764108815772034x^{27}+6426469969210271370x^{28} \\
 & - 1005943422942920850x^{29}-9913854106266511726x^{30}+456766693621948514x^{31} \\
 & + 11455967606609256194x^{32}+456766693621948514x^{33}-9913854106266511726x^{34} \\
 & - 1005943422942920850x^{35}+6426469969210271370x^{36}+901764108815772034x^{37} \\
 & - 3121850377815899650x^{38}-495365037290693552x^{39}+1136378367751634480x^{40} \\
 & + 180904763263594728x^{41}-309385807529385808x^{42}-44881022619918032x^{43} \\
 & + 62671184060029400x^{44}+7534201668856784x^{45}-9348345877875672x^{46} \\
 & - 834602390555152x^{47}+1009771490156144x^{48}+57692927620568x^{49} \\
 & - 77145898134992x^{50}-2177821303792x^{51}+4048343500561x^{52}+23552838575x^{53} \\
 & - 141122117137x^{54}+1204065921x^{55}+3142067439x^{56}-46394373x^{57}-42290089x^{58} \\
 & + 581107x^{59}+313647x^{60}-2271x^{61}-1065x^{62}-x^{63}+x^{64})
 \end{aligned}$$