The following expression for $\mathrm{Var}\mathcal{M}_{\alpha,\gamma}(QI_n)$ has been obtained by processing the formula given in the file `variance_table.txt` with *Mathematica*'s function `FullSimplify`:

$$\mathrm{Var}\mathcal{M}_{\alpha,\gamma}(QI_n) = \binom{n}{4}\frac{N_1+N_2+N_3}{D}$$

where:

$$\begin{aligned}
D =& 840(\alpha-7)(\alpha-6)(\alpha-5)(\alpha-4)(\alpha-3)^2(\alpha-2)^2\\
N_1 =& -35(\alpha-7)(\alpha-6)(\alpha-5)(\alpha-4)(n-3)(n-2)(n-1)n[(-5\alpha+\gamma+5)q_1\\
&+2(\alpha-\gamma)(-\alpha+\gamma+1)q_2-(\alpha-1)(-2\alpha+\gamma+2)q_3+(\alpha-\gamma)(2\alpha-\gamma)q_4]^2,\\
N_2 =& 840(\alpha-7)(\alpha-6)(\alpha-5)(\alpha-4)(\alpha-3)(\alpha-2)[(\alpha-\gamma)(-5\alpha+\gamma+5)q_1^2\\
&+2(\alpha-\gamma)(-\alpha+\gamma+1)q_2^2-(\alpha-1)(-2\alpha+\gamma+2)q_3^2\\
&+(\alpha-\gamma)(2\alpha-\gamma)q_4^2],\\
N_3 =& -(\alpha-3)(\alpha-2)(n-4)(F_1+F_2+F_3+F_4+F_5+F_6+F_7+F_8)
\end{aligned}$$

$$\begin{aligned}
F_1 =& -(\alpha-\gamma)(q_1^4F_{1,1}+4q_2^4F_{1,2}),\\
F_2 =& 2(-1+\alpha)(\alpha-\gamma)q_1^2 1_3^2F_{2,1},\\
F_3 =& (\alpha-1)q_3^4F_{3,1},\\
F_4 =& 4(\gamma-\alpha)q_2^2(q_1^2F_{4,1}+(\alpha-1)q_3^2F_{4,2}),\\
F_5 =& 2(\alpha-\gamma)(2\alpha-\gamma)q_1^2q_4^2F_{5,1},\\
F_6 =& 4(\alpha-\gamma)(2\alpha-\gamma)q_2^2q_4^2F_{6,1},\\
F_7 =& 2(1-\alpha)(\alpha-\gamma)(2\alpha-\gamma)(n-5)q_3^2q_4^2F_{7,1},\\
F_8 =& -(\alpha-\gamma)(2\alpha-\gamma)q_4^4(\alpha^2F_{8,1}+14\alpha^2F_{8,2}+\alpha^3F_{8,3}+16F_{8,4}+\alpha F_{8,5}),
\end{aligned}$$

$$
\begin{aligned}
F_{1,1} =& 7\alpha^5(n(125(n-2)n+1911)-20802)+\alpha^4(7\gamma(n(243-175(n-2)n)\\
&+11622)+n(5(3578-3325n)n+248781)+674250)+\alpha^3(5(7\gamma(11\gamma+655)\\
&+22677)n^3-10(\gamma(77\gamma+5353)+47301)n^2-3(\gamma(1183\gamma+88691)+220023)n\\
&-6(\gamma(1687\gamma+27291)+235551))+\alpha^2(-5(\gamma(7\gamma(\gamma+197)+28299)+33271)n^3\\
&+10(\gamma(7\gamma(\gamma+293)+64011)+96919)n^2+3\gamma(7\gamma(27\gamma+3655)+95433)n\\
&-42\gamma(\gamma(5\gamma+1257)-2175)+704103n+1986078)+\alpha(\gamma^3(n-5)\\
&(595n^2+825n-2346)+14\gamma^2(n(5n(533n-2746)+1587)+9894)\\
&+\gamma(n(5n(40223n-201118)+39969)-99678)+80n^2(535n-7628)\\
&-816(713n+2548))+16(-5(\gamma(\gamma(34\gamma+385)+976)-324)n^3\\
&+10(\gamma(\gamma(103\gamma+1015)+2617)+612)n^2-3(\gamma(\gamma(237\gamma+1463)+997)-5742)n\\
&-315(\gamma(\gamma(3\gamma+14)-33)-194)),\\
F_{1,2} =& 7\alpha^5(5n((n-2)n+15)-618)-7\alpha^4(3\gamma(n(5(n-2)n+43)-482)\\
&+n(n(95n-118)-591)-3702)+\alpha^3(7(5\gamma(3\gamma+55)+639)n^3\\
&-2(35\gamma(3\gamma+43)+6897)n^2-3(7\gamma(\gamma+877)+3371)n-6(7\gamma(161\gamma+797)+13355))\\
&+\alpha^2(-7\gamma^3(n-5)(5n(n+3)-6)+\gamma^2(n((4094-1855n)n+21795)+2406)\\
&+3\gamma(n((15082-3989n)n+5381)+19826)+7(n((3970-1181n)n+2685)+23106))\\
&+\alpha(\gamma^3(n-5)(595n^2+825n-2346)+2\gamma^2(n(n(5155n-24326)+2601)+4698)\\
&+3\gamma(n(n(5217n-19306)-3325)-30042)+8(n(n(505n-2324)-4368)-25500))\\
&+8(-3\gamma(474\gamma^2+374\gamma-893)n-1890\gamma(\gamma^2-6)-(\gamma(10\gamma(34\gamma+89)+463)-48)n^3\\
&+4(\gamma(\gamma(515\gamma+904)+596)+120)n^2+900(3n+14)),\\
F_{2,1} =& 14\alpha^4(n(25(n-2)n+267)-2634)+\alpha^3(7\gamma(n(183-35(n-2)n)+1422)\\
&+2n(5(946-665n)n+29961)+141924)+\alpha^2(7\gamma^2(n-5)(5n(n+3)-6)\\
&+6\gamma(n(15n(49n-130)-7747)+1658)+6(n(5n(1483n-5206)-14411)-36070))\\
&+\alpha(-5(\gamma(119\gamma+4929)+15526)n^3+50(\gamma(43\gamma+2349)+5678)n^2+9\gamma(719\gamma-519)n\\
&-6\gamma(1955\gamma+7997)-20346n+151692)+16(5(34\gamma^2+292\gamma+493)n^3\\
&-10(\gamma(103\gamma+682)+853)n^2+3(\gamma(237\gamma+859)+899)n+315(\gamma-1)(3\gamma+8)),
\end{aligned}
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\begin{aligned}
F_{3,1} =& 5n^3((\alpha-1)(7(\alpha-17)\alpha+544)\gamma^2-4(\alpha(7\alpha((\alpha-19)\alpha+123)-1549)+868)\gamma \\
&+4(\alpha-1)(\alpha(\alpha(7(\alpha-19)\alpha+879)-1693)+1012)) \\
&-10n^2((\alpha-16)(\alpha-1)(7\alpha-103)\gamma^2-4(\alpha(\alpha(7(\alpha-19)\alpha+1569)-2641)+1036)\gamma \\
&+4(\alpha-1)(\alpha(\alpha(\alpha(7\alpha-109)+1359)-2293)+820)) \\
&+3n(-3(\alpha-1)(\alpha(63\alpha-719)-1264)\gamma^2-4(\alpha(\alpha(7\alpha(5\alpha+241)-451)-5741) \\
&+6300)\gamma+4\alpha(\alpha(\alpha(\alpha(91\alpha+1132)-988)-7076)+15133)) \\
&+6(5(\alpha-1)(\alpha(7\alpha-391)+504)\gamma^2 \\
&+4\alpha(\alpha(21\alpha(17\alpha-35)-839)+5567)\gamma-4\alpha(\alpha(\alpha(\alpha(413\alpha-1628)+704)+9444) \\
&-22793))-144(1260\gamma+691n+2310), \\
F_{4,1} =& 7\alpha^5(n(25(n-2)n+363)-3426)-7\alpha^4(\gamma(n(55(n-2)n+333)-5478) \\
&+n(n(475n-566)-4791)-16494)+\alpha^3(5(49\gamma(\gamma+29)+4497)n^3 \\
&-2(\gamma(245\gamma+6193)+39981)n^2-3(\gamma(595\gamma+28479)+24963)n \\
&-6(\gamma(1407\gamma+18551)+39675))+\alpha^2(9\gamma(63\gamma^2+5475\gamma+9979)n-5(\gamma(7\gamma(\gamma+125) \\
&+8859)+7595)n^3+2(\gamma(\gamma(35\gamma+6151)+94191)+77143)n^2-6\gamma(\gamma(35\gamma+4199) \\
&-22081)+53043n+248694)+\alpha(\gamma^3(n-5)(595n^2+825n-2346) \\
&+2\gamma^2(n(n(11905n-60218)+6855)+36978)+\gamma(n(n(55615n-254654)+6381) \\
&-86886)+8(n(34n(65n-307)-3489)-15915))+16(-5(\gamma(\gamma+1)(34\gamma+203) \\
&-12)n^3+(\gamma(\gamma(1030\gamma+5979)+4823)+348)n^2-9(\gamma(\gamma(79\gamma+275)+91)-95)n \\
&-315(\gamma-1)(\gamma(3\gamma+10)+5)), \\
F_{4,2} =& 6(966\alpha^4-7\alpha^3(197\gamma+542)+\alpha^2((2942-35\gamma)\gamma+6010)+\alpha(\gamma(1955\gamma-2763)-4022) \\
&-840(\gamma-1)(3\gamma+1))-5n^3((7(\alpha-17)\alpha+544)\gamma^2+3(\alpha(-7(\alpha-18)\alpha-743)+768)\gamma \\
&+2(\alpha-1)(\alpha(7(\alpha-18)\alpha+759)-928))+2n^2(5(\alpha-16)(7\alpha-103)\gamma^2 \\
&-3(\alpha(35\alpha-547)+7064)(\alpha-1)\gamma+2(7\alpha(5\alpha-61)+5864)(\alpha-1)^2) \\
&-3n(3((719-63\alpha)\alpha+1264)\gamma^2+(\alpha(1279-\alpha(161\alpha+6334))+3536)\gamma \\
&+2(7\alpha(17\alpha+207)+2216)(\alpha-1)^2), \\
F_{5,1} =& 7\alpha^4(n(25(n-2)n+459)-5466)+6\alpha^3(7\gamma(n(33-5(n-2)n)+234)+n(5(82-105n)n \\
&+11849)+24858)+\alpha^2(7\gamma^2(n-5)(5n(n+3)-6)+\gamma(5n(n(749n-2074)-9561) \\
&+12006)+3(n(5n(1321n-7154)-46473)-77010))+\alpha(\gamma^2(-(n-5))(595n^2+825n \\
&-2346)-\gamma(n(5n(4075n-21686)+357)+54234)+16(n(-535n^2+8180n+6354) \\
&+10344))+8(5(\gamma(68\gamma+349)-207)n^3-10(\gamma(206\gamma+1069)+321)n^2 \\
&+3(\gamma(474\gamma+1259)-1523)n+1890(\gamma-1)(\gamma+3)),
\end{aligned}
$$

$$
\begin{aligned}
F_{6,1} =& 7\alpha^4(n(5(n-2)n+87)-906)-14\alpha^3(\gamma(n(5(n-2)n+27)-582)+3n(n(15n-14)\\
&-239)-1902)+\alpha^2(5(7\gamma(\gamma+35)+783)n^3-2(\gamma(35\gamma+1081)+8811)n^2\\
&-3(\gamma(189\gamma+6775)+5757)n+6(\gamma(35\gamma-2599)-7745))+\alpha(\gamma^2(-(n-5))(595n^2\\
&+825n-2346)+\gamma(n((36646-6875n)n+8151)+10326)+8(n(10(242-37n)n\\
&+1569)+4533))+8(5(\gamma(68\gamma+53)-9)n^3-2(2\gamma(515\gamma+587)+141)n^2\\
&+3(\gamma(474\gamma-17)-247)n+630(\gamma-1)(3\gamma+2)),\\
F_{7,1} =& 5n^2(\alpha(14\alpha^2-7\alpha(\gamma+36)+119\gamma+1542)-8(68\gamma+163))+15n(\alpha(\alpha(14\alpha-7\gamma-316)\\
&+55\gamma+326)+192\gamma)+6\alpha(\alpha(322\alpha+7\gamma-1028)-391\gamma+1210)+72(42\gamma-5n-42),\\
F_{8,1} =& 5(7\gamma(\gamma+51)+1376)n^3-10(\gamma(7\gamma+453)+5072)n^2-9\gamma(63\gamma+3533)n\\
&+6\gamma(35\gamma-887)-48(1021n+990),\\
F_{8,2} =& n(5(n-2)n+111)-1434,\\
F_{8,3} =& 21\gamma(n(17-5(n-2)n)+434)+2n(5(46-119n)n+19863)+62604,\\
F_{8,4} =& \gamma^2(n-5)(10n(17n-18)-189)-18\gamma(2n(5n(n+3)+17)+35)\\
&+9(n(5n(n+10)+269)+1190),\\
F_{8,5} =& \gamma^2(-(n-5))(595n^2+825n-2346)-48\gamma(n(5n(37n-240)+26)+4)\\
&+24(n(15n(17n+50)+283)-3782),
\end{aligned}
$$