Math 9 Name KEY

Solving Equations with Distribution & Like Terms

DEVELOP: **Solve each equation by first distributing.**

1) $5(1+5x)=55$

$5+25x=55$
$-5 \quad -5$

$\frac{25x}{25}=\frac{50}{25}$

$x=2$

2) $4(2n+5)=52$

$8n+20=52$
$-20 \quad -20$

$\frac{8n}{8}=\frac{32}{8}$

$n=4$

3) $3(-1+5r)=72$

$-3+15r=72$
$+3 \quad +3$

$\frac{15r}{15}=\frac{75}{15}$

$r=5$

4) $3(4m+2)=54$

$12m+6=54$
$-6 \quad -6$

$\frac{12m}{12}=\frac{48}{12}$

$m=4$

5) $5(5b-5)=75$

$25b-25=75$
$+25 \quad +25$

$\frac{25b}{25}=\frac{100}{25}$

$b=4$

6) $5(3x+1)=80$

$15x+5=80$
$-5 \quad -5$

$\frac{15x}{15}=\frac{75}{15}$

$x=5$

7) $-72=4(2+4x)$

$-72=8+16x$
$-8 \quad -8$

$\frac{-80}{16}=\frac{16x}{16}$

$-5=x$

8) $-52=-2(1-5n)$

$-52=-2+10n$
$+2 \quad +2$

$\frac{-50}{10}=\frac{10n}{10}$

$-5=n$

9) $51=3(-4v+5)$

$51=-12v+15$
$-15 \quad -15$

$\frac{36}{-12}=\frac{-12v}{-12}$

$-3=v$

10) $96=4(4-5n)$

$96=16-20n$
$-16 \quad -16$

$\frac{80}{-20}=\frac{-20n}{-20}$

$-4=n$

11) $-60=3(-3n-5)$

$-60=-9n-15$
$+15 \quad +15$

$\frac{-45}{-9}=\frac{-9n}{-9}$

$5=n$

12) $-90=-5(3+5v)$

$-90=-15-25v$
$+15 \quad +15$

$\frac{-75}{-25}=\frac{-25v}{-25}$

$3=v$

DEVELOP: **Solve each equation by first collecting like terms.**

13) $-4n + n = -6$

$\frac{-3n}{-3} = \frac{-6}{-3}$

$n = 2$

14) $3x - 5x = 4$

$\frac{-2x}{-2} = \frac{4}{-2}$

$x = -2$

15) $5n + 4 + 1 = -10$

$5n + 5 = -10$

$-5 \quad -5$

$\frac{5n}{5} = \frac{-15}{5}$

$n = -3$

16) $6 = 2m - 4m$

$\frac{6}{-2} = \frac{-2m}{-2}$

$-3 = m$

17) $5 = x + 2 + 2$

$5 = x + 4$

$-4 \quad -4$

$1 = x$

18) $-1 = n + 3 - 3n$

$-1 = -2n + 3$

$-3 \quad -3$

$\frac{-4}{-2} = \frac{-2n}{-2}$

$2 = n$

19) $4x + 4x = 5x - 6$

$8x = 5x - 6$

$-5x \quad -5x$

$\frac{3x}{3} = \frac{-6}{3}$

$x = -2$

20) $3p + 1 = p - 7$

$-p \quad -p$

$2p + 1 = -7$

$-1 \quad -1$

$\frac{2p}{2} = \frac{-8}{2}$

$p = -4$

21) $1 - 4n = -5n + 3$

$+5n \quad +5n$

$1 + n = 3$

$-1 \quad -1$

$n = 2$

22) $7 + 2x = 1 - 4x$

$+4x \quad +4x$

$7 + 6x = 1$

$-7 \quad -7$

$\frac{6x}{6} = \frac{-6}{6}$

$x = -1$

23) $5p - 5 = 3p + 5$

$-3p \quad -3p$

$2p - 5 = 5$

$+5 \quad +5$

$\frac{2p}{2} = \frac{10}{2}$

$p = 5$

24) $x - 3 = -4x + 7$

$+4x \quad +4x$

$5x - 3 = 7$

$+3 \quad +3$

$\frac{5x}{5} = \frac{10}{5}$

$x = 2$

PROFICIENT

CRYPTIC QUIZ

1. Why does Beethoven now spend all his time erasing music?

H	E	I	S	D	E	C	O	M	P	O	S	I	N	G
16	6	−4	10	−3	6	−9	7	20	−5	7	10	−4	3	21

2. What is it called when a sea bird lands on a channel marker?

B	U	O	Y	M	E	E	T	S	G	U	L	L
−36	9	7	−8	20	6	6	−2	10	21	9	11	11

3. How does a tree feel after a hard day at work?

B	U	S	H	E	D
−36	9	10	16	6	−3

TO DECODE THE ANSWERS TO THESE QUESTIONS:

Solve each equation below and find your answer in the code. Each time the solution appears, write the letter of that exercise above it.

(O) $8u = 3u + 35$ $\quad -3u \quad -3u$ $\quad \frac{5u}{5} = \frac{35}{5}$ $\quad u = 7$

(N) $7y = 33 - 4y$ $\quad +4y \quad +4y$ $\quad \frac{11y}{11} = \frac{33}{11}$ $\quad y = 3$

(E) $2x + 48 = 10x$ $\quad -2x \quad -2x$ $\quad \frac{48}{8} = \frac{8x}{8}$ $\quad x = 6$

(T) $5t - 26 = 18t$ $\quad -5t \quad -5t$ $\quad \frac{-26}{13} = \frac{13t}{13}$ $\quad t = -2$

(I) $k = 8k + 28$ $\quad -8k \quad -8k$ $\quad \frac{-7k}{-7} = \frac{28}{-7}$ $\quad k = -4$

(G) $-30n = -27n - 63$ $\quad +27n \quad +27n$ $\quad \frac{-3n}{-3} = \frac{-63}{-3}$ $\quad n = 21$

(H) $4x + 4 = 2x + 36$ $\quad -2x \quad -4 \quad -2x \quad -4$ $\quad \frac{2x}{2} = \frac{32}{2}$ $\quad x = 16$

(D) $9y - 1 = y - 25$ $\quad -y \quad +1 \quad -y \quad +1$ $\quad \frac{8y}{8} = \frac{-24}{8}$ $\quad y = -3$

(P) $14p - 8 = 22 + 20p$ $\quad -20p \quad +8 \quad +8 \quad -20p$ $\quad \frac{-6p}{-6} = \frac{30}{-6}$ $\quad p = -5$

(L) $z + 81 = 9z - 7$ $\quad -9z \quad -81 \quad -9z \quad -81$ $\quad \frac{-8z}{-8} = \frac{-88}{-8}$ $\quad z = 11$

(Y) $39 - 12w = 7 - 16w$ $\quad -39 \quad +16w \quad -39 \quad +16w$ $\quad \frac{4w}{4} = \frac{-32}{4}$ $\quad w = -8$

(C) $-15v - 40 = 23 - 8v$ $\quad +8v \quad +40 \quad +40 \quad +8v$ $\quad \frac{-7v}{-7} = \frac{63}{-7}$ $\quad v = -9$

(M) $63 - x = 2x + 3$ $\quad -63 \quad -2x \quad -2x \quad -63$ $\quad \frac{-3x}{-3} = \frac{-60}{-3}$ $\quad x = 20$

(U) $3n + 46 = 1 + 8n$ $\quad -8n \quad -46 \quad -46 \quad -8n$ $\quad \frac{-5n}{-5} = \frac{-45}{-5}$ $\quad n = 9$

(B) $12r - 18 = 13r + 18$ $\quad -13r \quad +18 \quad -13r \quad +18$ $\quad \frac{-1r}{-1} = \frac{36}{-1}$ $\quad r = -36$

(S) $-x - 1 = x - 21$ $\quad -x \quad +1 \quad -x \quad +1$ $\quad \frac{-2x}{-2} = \frac{-20}{-2}$ $\quad x = 10$

What Were the Headlines After a Midget Fortuneteller Escaped From Jail?

Solve each equation and find your solution below. Cross out the box containing that solution. When you finish, write the letters from the remaining boxes in the spaces at the bottom of the page.

1. $3(2x + 5) = 39$ → $6x = 24$ → $x = 4$
2. $2(6k - 1) = -38$ → $12k = -36$ → $k = -3$
3. $8(7 - y) = -24$ → $-8y = -80$ → $y = 10$
4. $-4(8 + 5n) = 8$ → $-20n = 40$ → $n = -2$
5. $6(3x - 5) - 7x = 25$ → $11x = 55$ → $x = 5$
6. $-2(5 + 6m) + 16 = -90$ → $-12m = -96$ → $m = 8$
7. $15(t + 2) + 9t = 6$ → $24t = -24$ → $t = -1$
8. $7w - 3(4w + 8) = 11$ → $-5w = 35$ → $w = -7$
9. $22 - 5(6v - 1) = -63$ → $-30v = -90$ → $v = 3$
10. $18x - (8x - 7) = 67$ → $10x = 60$ → $x = 6$
11. $8(-2x - 4) + 12 = -52$ → $-16x = -32$ → $x = 2$
12. $2(9n - 1) + 7(n + 6) = -60$ → $25n = -100$ → $n = -4$
13. $-3(3x + 15) - (10 + x) = 35$ → $-10x = 90$ → $x = -9$
14. $11(4 - 6y) + 5(13y + 1) = 9$ → $1y = -40$ → $y = 40$

MID 5	THE −9	GET −1	SMA 12	SHA 2	RTE 40	AWA −3	LLM 35	AKE −7	EDI 15
TOR −2	UMA −14	PRI 6	UNJ 4	TLA −20	SON 3	AIL 10	CHA −4	RGE −12	TLE 8

S M A L L M E D I U M A T L A R G E

Math 9 Name_______________________________

Solving Equations with Distribution & Like Terms

EXTENDING: **Solve each equation by first collecting like terms.**

1) $-8 - 5n - 7 = -17 + 1 - 4n - 8$

$-15 - 5n = -4n - 24$

$+5n \quad +5n$

$-15 = n - 24$

$+24 \quad +24$

$\boxed{9 = n}$

2) $-1 + 8a = 8 - 7 - 6a - 2$

$-1 + 8a = -6a - 1$

$+6a \quad +6a$

$-1 + 14a = -1$

$+1 \quad +1$

$\frac{14a}{14} = \frac{0}{14}$

$\boxed{a = 0}$

3) $\frac{1343}{120} - x = \frac{7}{6}x + \frac{15}{4} + \frac{2}{5}$

$\frac{1343}{120} - x = \frac{7}{6}x + \frac{83}{20}$

$+x \quad +x$

$\frac{1343}{120} = \frac{13}{6}x + \frac{83}{20}$

$-\frac{83}{20} \quad -\frac{83}{20}$

$\frac{845}{120} = \frac{13}{6}x$

$\frac{65}{20} = \frac{13}{4}$

$\boxed{x = 3\frac{1}{4}}$

4) $\frac{3}{2}b - \frac{5}{2} = -\frac{43}{6} - \frac{5}{2}b$

$+\frac{5}{2}b \quad +\frac{5}{2}b$

$4b - \frac{5}{2} = -\frac{43}{6}$

$+\frac{5}{2} \quad +\frac{5}{2}$

$4b = -\frac{28}{6}$

$-\frac{28}{6} \times \frac{1}{4} = -\frac{7}{6}$

$\boxed{b = -1\frac{1}{6}}$

5) $\frac{5}{6}n + \frac{8}{5} = \frac{23}{5} + \frac{9}{5}n$

$-\frac{9}{5}n \quad -\frac{9}{5}n$

$-\frac{4}{5}n + \frac{8}{5} = \frac{23}{5}$

$-\frac{8}{5} \quad -\frac{8}{5}$

$-\frac{4}{5}n = \frac{15}{5} = 3$

$\frac{3}{1} \times -\frac{5}{4} = -\frac{15}{4}$

$\boxed{n = -3\frac{3}{4}}$

6) $1.1x + 1 = -4.59 - 0.2x$

$+0.2x \quad +0.2x$

$1.3x + 1 = -4.59$

$-1 \quad -1$

$\frac{1.3x}{1.3} = \frac{-5.59}{1.3}$

$\boxed{x = -4.3}$

7) $-5.6x + 4.2x = 12.76 - 3.6x$

$-1.4x = 12.76 - 3.6x$

$+3.6x \quad +3.6x$

$\frac{2.2x}{2.2} = \frac{12.76}{2.2}$

$\boxed{x = 5.8}$

8) $1.48 - 4.2v = 1 - 4.8v$

$+4.8v \quad +4.8v$

$1.48 + 0.6v = 1$

$-1.48 \quad -1.48$

$\frac{0.6v}{0.6} = \frac{-0.48}{0.6}$

$\boxed{v = -0.8}$

EXTENDING: Solve each equation by first distributing.

9) $-(1-3b)=8(b+8)$

$-1+3b=8b+64$

$-3b \quad -3b$

$-1=5b+64$

$-64 \quad -64$

$\frac{-65}{5}=\frac{5b}{5}$

$\boxed{-13=b}$

10) $3(-1-6r)=-3(-2+3r)$

$-3-18r=6-9r$

$+18r \quad +18r$

$-3=6+9r$

$-6 \quad -6$

$\frac{-9}{9}=\frac{9r}{9}$

$\boxed{-1=r}$

11) $\frac{157}{3}=-4\left(\frac{9}{4}x-\frac{1}{3}\right)$

$\frac{157}{3}=-9x+\frac{4}{3}$

$-\frac{4}{3} \quad -\frac{4}{3}$

$\frac{153}{3}=\frac{-9x}{-9}$

$\boxed{-5\frac{2}{3}=x}$

$\frac{153}{3}\times\frac{-1}{9}=\frac{-17}{3}$

12) $\frac{105}{2}=-\frac{7}{2}\left(-\frac{13}{5}n-2\right)$

$\frac{105}{2}=\frac{91}{10}n+7$

$-7 \quad -7$

$\frac{91}{2}=\frac{91}{10}n$

$\frac{91}{10} \quad \frac{91}{10}$

$\boxed{5=n}$

$\frac{105}{2}-\frac{14}{2}=\frac{91}{2}$

$\frac{91}{2}\times\frac{10}{91}=5$

13) $\frac{329}{200}+\frac{1}{3}b=\frac{7}{4}b+\frac{12}{5}\left(\frac{6}{5}b-2\right)$

$\frac{329}{200}+\frac{1}{3}b=\frac{7}{4}b+\frac{72}{25}b-\frac{24}{5}$

$-\frac{1}{3}b \quad -\frac{1}{3}b$

$\frac{329}{200}=\frac{1289}{300}b-\frac{24}{5}$

$+\frac{24}{5}\times\frac{40}{40} \quad +\frac{24}{5}$

$\frac{1289}{200}\div\frac{1289}{300}=\frac{1289}{300}b\div\frac{1289}{300}$

$\boxed{b=\frac{3}{2}}$

$\frac{72}{25}+\frac{7}{4}-\frac{1}{3}$

$=\frac{864}{300}+\frac{525}{300}-\frac{100}{300}$

$=\frac{1289}{300}$

$\frac{1289}{200}\times\frac{300}{1289}=\frac{3}{2}$

14) $\frac{175}{48}-\frac{5}{3}p=\frac{5}{4}\left(-\frac{13}{4}p+1\right)$

$\frac{175}{48}-\frac{5}{3}p=-\frac{65}{16}p+\frac{5}{4}$

$-\frac{175}{48} \quad +\frac{65}{16}p \quad +\frac{65}{16}p \quad -\frac{175}{48}$

$\frac{115}{48}p=\frac{-115}{48}$

$\frac{115}{48} \quad \frac{115}{48}$

$\boxed{p=-1}$

$-\frac{5}{3}+\frac{65}{16}=\frac{-80}{48}+\frac{195}{48}=\frac{115}{48}$

$\frac{5}{4}-\frac{175}{48}=\frac{60}{48}-\frac{175}{48}=\frac{-115}{48}$

15) $-124=5(5n-4.3)$

$-124=25n-21.5$

$+21.5 \quad +21.5$

$\frac{-102.5}{25}=\frac{25n}{25}$

$\boxed{-4.1=n}$

$12400-21.5=102.5$

$25\overline{)102.5}\ 4.1$

16) $54.02=3.7(2.9-3.9n)$

$54.02=10.73-14.43n$

$-10.73 \quad -10.73$

$\frac{43.29}{-14.43}=\frac{-14.43n}{-14.43}$

$\boxed{-3=n}$

$3.7\times2.9=333+740=10.73$

$3.7\times3.9=333+1110=14.43$

$54.02-10.73=43.29$

$14.43\overline{)43.29}\ 3.$

-4329

0

17) $-6.68-3r=1.6(r-1.3)$

$-6.68-3r=1.6r-2.08$

$+2.08 \quad +3r \quad +3r \quad +2.08$

$\frac{-4.6}{-4.6}=\frac{4.6r}{4.6}$

$\boxed{-1=r}$

$1.6\times1.3=48+160=2.08$

$6.68-2.08=4.60$

18) $-9.27+2.8k=3.9(k-1.7)$

$-9.27+2.8k=3.9k-6.63$

$+6.63 \quad -2.8k \quad -2.8k \quad +6.63$

$\frac{-2.64}{1.1}=\frac{1.1k}{1.1}$

$\boxed{-2.4=k}$

$3.9\times1.7=273+390=6.63$

$9.27-6.63=2.64$

$1.1\overline{)2.64}\ 2.4$

-22

44

-44

0