

Geometry I

THURSDAY 8-23-12

Solving Multi-Step Linear Equations

Linear $\Rightarrow X' = X'$ First Degree
or
First Power

UNDOS $\Rightarrow$ GOAL = "Variable by itself"

$$X = ?$$

$\uparrow$

$$1X' = ?$$

$\uparrow$

GOAL

GRE = Golden Rule of Equations

Special Cases = • All real numbers
(variable "goes away") (true statement left)
• No Solution
(false statement left)

$$(51) \quad [-3 - (-3 \overset{+}{\Rightarrow} 3)] \quad [-10 \div (2 + 3)]$$

$$[-3 - (-3 \overset{0}{+} 3)] \quad [-10 \div 5]$$

$$[-3] \quad [-2]$$

$$\boxed{6}$$

Equation Math expression with a = sign

coefficient $\rightarrow$ $4X = 12$

LEFT SIDE RIGHT SIDE

GRE - Whatever you do to one side, do to the other

SOLUTION
to
AN EQUATION

VALUE(S) OF THE
VARIABLE which when
substituted into the
equation, make a true
statement

② $\frac{4x = 12}{\frac{4}{4}}$

$\{x = 3\}$
x by itself

$\frac{1x = 3}{\text{or}}$

$x = 3$

OK $4(3) \stackrel{?}{=} 12 \checkmark$

2a

(EX) $5x = 7$
 ↑
 undo

$x = 1x$
coefficient

$$\frac{5x}{5} = \frac{7}{5}$$

$$1x = \frac{7}{5}$$

Solution

$$\text{Better } x = \frac{7}{5}$$

your friend when you substitute is ()

ck $5\left(\frac{7}{5}\right) \stackrel{?}{=} 7 \quad \checkmark$

$$\textcircled{1} \quad 7a - a = 12 \quad \overset{OK}{7(2) - (2) \stackrel{?}{=} 12}$$

$$\frac{6a}{6} = \frac{12}{6} \quad 14 - 2 \stackrel{?}{=} 12 \checkmark$$

$$\boxed{a = 2}$$

$$\textcircled{7} \quad -\frac{1}{8}b + \frac{4}{5}b = \frac{153}{80}$$

$$-\frac{5}{40}b + \frac{32}{40}b = \frac{153}{80}$$

$$\cancel{\frac{40}{27}} \cdot \cancel{\frac{27}{40}}b = \frac{153}{80}$$

$$b = \frac{153}{80} \cdot \frac{40}{27}$$

$$\quad \quad \quad \frac{17}{2} \quad \frac{1}{3}$$

$$\boxed{b = \frac{17}{6}}$$

$$\textcircled{7} \quad \underline{\text{CK}} \quad -\frac{1}{8} \left(\frac{17}{6} \right) + \frac{4}{5} \left(\frac{17}{6} \right) \stackrel{?}{=} \frac{153}{80}$$

$$-\frac{17}{48} + \frac{34}{15} \stackrel{?}{=} \frac{153}{80}$$

$$-\frac{17 \cdot 15}{48 \cdot 15} + \frac{34 \cdot 48}{48 \cdot 15} \stackrel{?}{=} \frac{153}{80}$$

48	17
$\times 15$	$\times 15$
240	85
48	17
720	255

$$-\frac{255}{720} + \frac{1632}{720} \stackrel{?}{=} \frac{153}{80}$$

$$\frac{153}{80} \quad \frac{1377}{720} \stackrel{?}{=} \frac{153}{80} \quad \checkmark$$

48
$\times 34$
192
144
1632

512
1632
$- 255$
1377

$$\textcircled{13} \quad 8 - 3(8 - 5K) = -136$$

$$8 - 24 + 15K = -136$$

$$\begin{array}{rcl} \textcircled{-16} + 15K & = & -136 \\ +16 & & +16 \end{array}$$

$$\frac{15K}{15} = \frac{-120}{15}$$

$$\boxed{K = -8}$$

CK ✓

$$(25) \quad 20 - 7b = 2(2 - 3b) - 5b$$

$$20 - 7b = 4 - \underline{6b} - \underline{5b}$$

$$20 - 7b = 4 - 11b$$

$$+11b \qquad +11b$$

$$20 + 4b = 4$$

$$-20$$

$$-20$$

$$\frac{4b}{4} = \frac{-16}{4}$$

$$b = -4$$

OK



$$\textcircled{51} \quad \begin{array}{c} \overbrace{2 + 8r = 8r + 7} \\ -8r \quad -8r \end{array}$$

$$2 = 7 \quad \text{False} \therefore$$

No SOLUTION

$$\begin{array}{l}
 \textcircled{3} \quad -9 = -7V + 4V \\
 \frac{-9}{-3} = \frac{-3V}{-3} \\
 3 = V \\
 \boxed{V = 3}
 \end{array}
 \quad
 \begin{array}{l}
 \text{CK} \\
 -9 \stackrel{?}{=} -7(3) + 4(3) \\
 -9 \stackrel{?}{=} -21 + 12 \\
 -9 = -9 \quad \checkmark
 \end{array}$$

$$\textcircled{9.} \quad \frac{1}{1} \times -\frac{1}{8} - \frac{17}{8} \times = \frac{37}{28}$$

$$\left(\frac{8}{8} \times\right) - \frac{1}{8} \left(-\frac{17}{8} \times\right) = \frac{37}{28}$$

$$-\frac{9}{8} \times -\frac{1}{8} = \frac{37}{28}$$

$$\left(-\frac{8}{9}\right) \cdot -\frac{9}{8} \times = \frac{81}{56} \cdot -\frac{8}{9}$$

$$X = -\frac{9}{7}$$

NEGATIVE!
THANKS
SWANA

$$\underline{\text{CK}} \quad \left(-\frac{9}{7}\right) - \frac{1}{8} - \frac{17}{8} \left(-\frac{9}{7}\right) \stackrel{?}{=} \frac{37}{28}$$

$$\frac{-72}{56} - \frac{7}{56} + \frac{153}{56} \stackrel{?}{=} \frac{37}{28}$$

$$\begin{array}{r} 9 \overline{) 141} \\ 9 \overline{) 53} \\ - 79 \\ \hline 74 \end{array}$$

$$-\frac{79}{56} + \frac{153}{56} \stackrel{?}{=} \frac{37}{28}$$

$$\frac{74}{56} \stackrel{?}{=} \frac{37}{28} \checkmark$$

$$\textcircled{54} \quad 6 + 3 \overset{+}{\textcircled{-3}} - [(-4)(6) + 6]$$

$$6 + 3 + 3 - [-24 + 6]$$

$$6 + 3 + 3 \overset{+}{\textcircled{+18}}$$

$$6 + 3 + 3 + 18$$

$$\begin{array}{r} \text{---} \\ 9 + 3 + 18 \end{array}$$

$$\begin{array}{r} \text{---} \\ 12 + 18 = \boxed{30} \end{array}$$

$$\textcircled{38} \quad \left(-\frac{3}{2}\right) \left(\frac{3}{5}\right) \left(-\frac{7}{6}\right)$$

$$\left(\frac{3}{10}\right) \left(\frac{7}{2}\right) = \boxed{\frac{21}{20}}$$

11

⑤ $22 = 3x + 8x$ CK

$22 = 11x$ $\checkmark 22 = 3(2) + 8(2)$

$\frac{22}{11} \quad \frac{11x}{11}$

$\boxed{2 = x}$

②③ $-96 = 8(3N + 3)$ CK $-96 = 8(3(-5) + 3)$

$-96 = 24N + 24$ $-96 = 8(-12)$

$-24 \quad -24$ $-96 = -96 \checkmark$

$\frac{-120}{24} = \frac{24N}{24}$

$\frac{-10}{2} = N$

$-5 = N$

$\boxed{N = -5}$

$$(47) \quad \underline{1+N-7} = -4(N-4) + 4(3N+5)$$

$$N-6 = \underline{-4N} + 16 + \underline{12N} + 20$$

$$\begin{array}{r} \downarrow \qquad \qquad \downarrow \\ N-6 = 8N+36 \\ -N \qquad \qquad -N \end{array}$$

$$\begin{array}{r} \downarrow \\ -6 = 7N+36 \\ -36 \qquad \qquad -36 \end{array}$$

$$\begin{array}{r} -42 = 7N \\ \hline 7 \qquad 7 \end{array}$$

$$\boxed{-6 = N}$$

$$\underline{\text{OK}} \quad 1 + (-6) - 7 \stackrel{?}{=} -4[(-6)-4] + 4[3(-6)+5]$$

$$-12 \stackrel{?}{=} 40 - 52$$

$$-12 \stackrel{?}{=} -12 \quad \checkmark$$

$$(55) \quad 7N - 6 = \underline{2} + 7N - \underline{3} - \underline{5}$$

$$\begin{array}{c} \swarrow \quad \searrow \\ \cancel{7N} - 6 = \cancel{7N} - 6 \\ \cancel{7N} \qquad \quad \cancel{7N} \end{array}$$

$$-6 = -6 \quad \text{True}$$

ALL REAL NUMBERS

(53)

$$\begin{array}{c} \swarrow \quad \searrow \\ \cancel{6r} + 1 = \cancel{6r} + 8 \\ \cancel{6r} \qquad \quad \cancel{6r} \end{array}$$

$$1 = 8 \quad \text{False}$$

No Solution