

Algebra
Chapter 3 Practice Test

Name KEY
Date _____ Period _____

Solve each equation. Show work to justify solutions.

1a. $4y + 7 = -5$

$$\begin{array}{r} 4y + 7 = -5 \\ -7 \quad -7 \\ \hline 4y = -12 \\ \hline y = -3 \end{array}$$

1b. $-3x - 15 = 21$

$$\begin{array}{r} -3x - 15 = 21 \\ +15 \quad +15 \\ \hline -3x = 36 \\ \hline x = -12 \end{array}$$

2a. $\frac{w}{2} - 6 = 8$

$$\begin{array}{r} \frac{w}{2} - 6 = 8 \\ +6 \quad +6 \\ \hline \frac{w}{2} = 14 \\ \cdot 2 \quad \cdot 2 \\ \hline w = 28 \end{array}$$

2b. $\frac{-x}{3} - 10 = -13$

$$\begin{array}{r} \frac{-x}{3} - 10 = -13 \\ +10 \quad +10 \\ \hline \frac{-x}{3} = -3 \\ \cdot 3 \quad \cdot 3 \\ \hline -x = -9 \\ \hline x = 9 \end{array}$$

3a. $2y + 4(y - 5) = 10$

$$\begin{array}{r} 2y + 4(y - 5) = 10 \\ 2y + 4y - 20 = 10 \\ 6y - 20 = 10 \\ +20 \quad +20 \\ \hline 6y = 30 \\ \hline y = 5 \end{array}$$

3b. $7 - 2(a - 3) = -5$

$$\begin{array}{r} 7 - 2(a - 3) = -5 \\ 7 - 2a + 6 = -5 \\ 13 - 2a = -5 \\ -13 \quad -13 \\ \hline -2a = -18 \\ \hline a = 9 \end{array}$$

4a. $\frac{x}{2} - \frac{5x}{3} = 4$ LCD: 6

$$\begin{array}{r} \frac{x}{2} - \frac{5x}{3} = 4 \\ \cdot 6 \quad \cdot 6 \\ \hline \frac{3x}{2} - \frac{10x}{3} = 24 \\ \frac{3x}{2} - \frac{10x}{3} = 24 \\ -7x = 24 \\ \hline x = -\frac{24}{7} \text{ or } -3.43 \end{array}$$

4b. $\frac{3y}{4} + \frac{y}{3} = 4 + \frac{1}{2}$ LCD: 12

$$\begin{array}{r} \frac{3y}{4} + \frac{y}{3} = 4 + \frac{1}{2} \\ \cdot 12 \quad \cdot 12 \\ \hline \frac{9y}{4} + \frac{4y}{3} = 48 + \frac{6}{2} \\ \frac{9y}{4} + \frac{4y}{3} = 48 + 3 \\ 9y + 4y = 48 + 6 \\ 13y = 54 \\ \hline y = \frac{54}{13} \text{ or } 4.15 \end{array}$$

$$5a. \quad 3(2x-12) = 4x - 36 + 2x$$

$$\begin{array}{r} 6x - 36 = 6x - 36 \\ -6x \quad -6x \end{array} \quad \text{Same}$$

$$-36 = -36$$

IDENTITY

Infinitely Many Solutions

$$5b. \quad 8x - (2x+5) = 2(3x-11)$$

$$\begin{array}{r} 8x - 2x - 5 = 6x - 22 \\ 6x - 5 = 6x - 22 \\ -6x \quad -6x \end{array}$$

$$-5 \neq -22$$

No REAL SOLUTION

$$6a. \quad \frac{11.3x - 3.4}{-8.2x} = \frac{8.2x + 12.6}{-8.2x}$$

$$\begin{array}{r} 3.1x - 3.4 = 12.6 \\ +3.4 \quad +3.4 \\ \hline 3.1x = 16.0 \\ \frac{3.1x}{3.1} = \frac{16.0}{3.1} \\ x \approx 5.16 \end{array}$$

$$6b. \quad -4.1y + 9.2 = -2.7y + 8.5 + 0.4y$$

$$\begin{array}{r} -4.1y + 9.2 = -2.3y + 8.5 \\ +4.1y \quad +4.1y \\ \hline 9.2 = 1.8y + 8.5 \\ -8.5 \quad -8.5 \\ \hline 0.7 = 1.8y \\ \frac{0.7}{1.8} = \frac{1.8y}{1.8} \\ 0.38 \approx y \end{array}$$

$$7a. \quad \frac{14}{15} = \frac{4}{x}$$

$$14(x) = 15(4)$$

$$\frac{14x}{14} = \frac{60}{14}$$

$$x = \frac{30}{7} \text{ or } 4.29$$

$$7b. \quad \frac{17}{31} = \frac{-p}{23}$$

$$31(-p) = 17(23)$$

$$\frac{-31p}{-31} = \frac{391}{-31}$$

$$p = -12.61$$

$$8a. \quad \frac{2}{x-4} = \frac{3}{x+8}$$

$$\begin{array}{r} 2(x+8) = 3(x-4) \\ 2x + 16 = 3x - 12 \\ -2x \quad -2x \\ \hline 16 = x - 12 \\ +12 \quad +12 \\ \hline 28 = x \end{array}$$

$$8b. \quad \frac{y+3}{3} = \frac{2y-1}{5}$$

$$\begin{array}{r} 5(y+3) = 3(2y-1) \\ 5y + 15 = 6y - 3 \\ -5y \quad -5y \\ \hline 15 = y - 3 \\ +3 \quad +3 \\ \hline 18 = y \end{array}$$

9a. Solve for R: $Y = \frac{ER - UT}{+UT + UT}$

$$\frac{Y + UT}{E} = \frac{ER}{E}$$

$$\frac{Y + UT}{E} = R$$

9b. Solve for Z: $W = \frac{1}{2}KZ + G$

$$2 \cdot (W - G) = \frac{1}{2}KZ$$

$$\frac{2(W - G)}{K} = \frac{KZ}{K}$$

$$\frac{2(W - G)}{K} = Z$$

10. 40 rolls of Charmin toilet paper is selling for \$54.00. 32 rolls of Quilted Northern toilet paper is selling for \$42.24.

price per roll \$
/ roll

What is the unit rate of each brand?

Charmin = $\frac{\$54}{40 \text{ rolls}} = \1.35 per roll

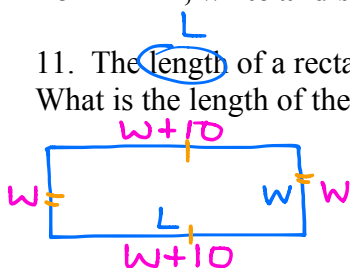
Quilted Northern = $\frac{\$42.24}{32 \text{ rolls}} = \1.32 per roll

Which brand of toilet paper has the lower unit cost?

Quilted Northern is lower. Cheaper by \$.03 per roll

For #11-14, write and solve an equation for each situation.

11. The length of a rectangle is 10 feet longer than its width. The perimeter of the rectangle is 240 feet. What is the length of the rectangle? Hint: DRAW A PICTURE.



$L = W + 10$
W = width
L = length

$P = W + (W + 10) + W + (W + 10)$

$P = 4W + 20$

$$\begin{array}{r} 240 = 4W + 20 \\ -20 \quad -20 \\ \hline 220 = 4W \\ \frac{220}{4} = \frac{4W}{4} \end{array}$$

$W = 55 \text{ ft.}$

Equation: $4W + 20 = 240$

Solution: $\text{Length} = 65 \text{ ft.}$

$L = W + 10$
 $L = (55) + 10$
 $L = 65 \text{ ft.}$

12. Mary is raising money for a local charity. Her goal is to raise \$2,000. She has already raised \$860 and she predicts that she will raise \$80 per day. How many days will it take her to reach her goal?

rate of change total

$d = \text{days}$

$$\begin{array}{r} 860 + 80d = 2,000 \\ -860 \quad -860 \\ \hline 80d = 1,140 \\ \frac{80d}{80} = \frac{1,140}{80} \end{array}$$

$d = 14.25 \text{ days}$

Equation: $860 + 80d = 2,000$

Solution: 15 days

*If she fundraises for 14 days, she will fall short of her goal of \$2,000.

13. A shower faucet delivers 17.2 gallons of water in 8.2 minutes. How much water is used if the average household showers for 30 minutes?

$$\frac{\text{gallons}}{\text{min.}} = \frac{\text{gallons}}{\text{min.}}$$

PROPORTION

$$\frac{g}{m} \frac{17.2}{8.2} = \frac{x}{30} \frac{g}{m}$$

$$\frac{8.2x}{8.2} = \frac{516}{8.2}$$

$$x \approx 62.93 \text{ gallons}$$

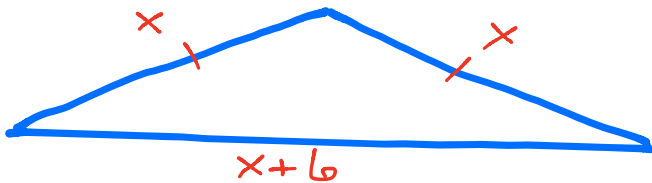
Equation: $\frac{17.2}{8.2} = \frac{x}{30}$

Solution: $\approx 62.93 \text{ gallons}$

14. A triangle has 2 sides that are the same length. The 3rd side is 6 feet longer than the other two sides. The perimeter of the triangle is 57 feet. What is the length of the longest side?

Hint: DRAW A PICTURE.

$x = \text{length of short sides}$



Equation: $3x + 6 = 57$

Solution: 23 feet

$$\begin{aligned}
 P &= x + x + (x+6) \\
 P &= 3x + 6 \\
 57 &= 3x + 6 \\
 \underline{-6} & \quad \underline{-6} \\
 \hline
 51 &= 3x \\
 \frac{51}{3} &= \frac{3x}{3} \\
 17 &= x
 \end{aligned}$$

$$\begin{aligned}
 \text{Longest Side} &= x + 6 \\
 &= (17) + 6 \\
 &= 23
 \end{aligned}$$