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Topic 1: Additive property of equality with signed fractions

1. Solve for x: $x + (-2/5) = 3/10$: **x = 7/10.**

$$\begin{array}{rcl}
 10x - \frac{2}{5} & = & \frac{3}{10} \\
 10x - 4 & = & 3 \\
 +4 & +4 & \\
 \hline
 10x & = & 7 \\
 \frac{10x}{10} & = & \frac{7}{10} \\
 \boxed{x = \frac{7}{10}}
 \end{array}
 \qquad
 \begin{array}{c}
 \text{LCD} \\
 10
 \end{array}$$

1. If $y + 1/3 = -5/6$, find y: **y = -7/6.**

Topic 2: Multiplicative property of equality with signed fractions

1. Solve for x: $(-3/4)x = 9/8$: **x = -3/2.**

$$\begin{array}{rcl}
 -\frac{3}{4}x & = & \frac{9}{8} \\
 -6x & = & 9 \\
 \frac{-6x}{-6} & = & \frac{9}{-6} \\
 \boxed{x = -\frac{3}{2}}
 \end{array}
 \qquad
 \begin{array}{c}
 \text{LCD} \\
 8
 \end{array}
 \qquad
 \frac{9}{-6} = -\frac{9}{6} = -\frac{3}{2}$$

1. If $(2/5)y = -4/15$, find y: **y = -2/3.**

Topic 3: Solving a multi-step equation given in fractional form

1. Solve for x: $(2x + 1)/3 = 5$: **x = 7.**

$$\begin{array}{rcl}
 \frac{2x+1}{3} & = & 5 \\
 2x+1 & = & 15 \\
 -1 & -1 & \\
 \hline
 2x & = & 14 \\
 \div 2 & \div 2 & \\
 \hline
 x & = & 7
 \end{array}$$

$$\frac{1x}{2} = \frac{14}{2}$$

$$x = 7$$

1. If $(3y - 2)/4 = 2$, find y : $y = 10/3$.

**Topic 4: Solving a linear equation with several occurrences of the variable:
Variables on the same side and distribution**

1. Solve for x : $3(x + 2) + 2x = 16$: $x = 2$.

$$3(x+2) + 2x = 16$$

$$3x + 6 + 2x = 16$$

$$5x + 6 = 16$$

$$\begin{array}{r} -6 \quad -6 \\ 5x = 10 \end{array}$$

$$x = 2$$

1. If $2(y - 3) + 4y = 12$, find y : $y = 3$.

**Topic 5: Solving a linear equation with several occurrences of the variable:
Variables on both sides and two distributions**

1. Solve for x : $2(x + 1) = 3(x - 2)$: $x = 8$.

$$2(x+1) = 3(x-2)$$

$$2x + 2 = 3x - 6$$

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

1. If $4(y - 1) = 2(2y + 3)$, find y : $y = 5$.

**Topic 6: Solving for a variable in terms of other variables using multiplication or
division: Basic**

1. Solve for x in terms of y : $5x = 2y$: $x = (2/5)y$.

$$\frac{5x}{5} = \frac{2y}{5}$$

$$x = \frac{2y}{5}$$

Solve for x

1. If $3z = w$, solve for z in terms of w : $z = w/3$.

**Topic 7: Solving for a variable in terms of other variables using multiplication or
division: Advanced**

1. Solve for x in terms of y and z : $2x = 3y - z$: $x = (3y - z)/2$.

$$\frac{2x}{2} = \frac{3y - z}{2} \quad \text{Solve for } x$$

$$x = \frac{3y - z}{2}$$

1. If $4a = 2b + c$, solve for a in terms of b and c : $a = (2b + c)/4$.

Topic 8: Solving for a variable in terms of other variables using addition or subtraction with division

1. Solve for x in terms of y : $(x + 2y)/3 = 4$: $x = 12 - 2y$.

$$\frac{x + 2y}{3} = 4 \quad \text{Solve for } x$$

$$x + 2y = 12$$

$$-2y \quad -2y$$

$$x = 12 - 2y$$

1. If $(z - w)/2 = 5$, solve for z in terms of w : $z = 10 + w$.

Topic 9: Solving a decimal word problem using a linear equation of the form $Ax + B = C$

1. A phone plan costs \$0.15 per minute plus a \$5 base fee. If the total bill is \$12.50, how many minutes were used: **50 minutes**.

$$0.15x + 5 = 12.50$$

$$-5 \quad -5$$

$$0.15x = 7.50$$

$$\frac{0.15x}{0.15} = \frac{7.50}{0.15}$$

$$x = 50$$

1. A taxi ride costs \$2.25 per mile plus a \$3.50 base fare. If the total cost is \$10.25, how many miles were traveled: **3 miles**.

Topic 10: Solving a one-step word problem using the formula $d = rt$

1. A car travels at 60 mph for 2 hours. Find the distance traveled using $d = rt$: **d = 120 miles**.

$$d = rt$$

$$d = \text{distance} = ?$$

$$r = \text{rate} = 60$$

$$t = \text{time} = 2$$

$$d = 60(2)$$

$$d = 120 \text{ miles}$$

$$\frac{60 \text{ miles}}{\text{hour}} \cdot 2 \frac{\text{hours}}{1} = 120 \text{ miles}$$

1. A cyclist rides at 15 mph for 3 hours. Calculate the distance using $d = rt$: **d = 45 miles.**

Topic 11: Finding the sale price given the original price and percent discount

1. A shirt originally costs \$40 and is discounted by 20%. Find the sale price: **\$32.**

$$40(0.20) = 8 \quad \text{OR} \quad 100 - 20 = 80$$

$$40 - 8 = \boxed{32} \quad 40(0.80) = 32$$

1. A laptop priced at \$800 has a 15% discount. Calculate the sale price: **\$680.**

Topic 12: Finding the total cost including tax or markup

1. A \$50 item has a 6% sales tax. Find the total cost including tax: **\$53.**

$$50(0.06) = 3 \quad \text{OR} \quad 50(1.06) = 53$$

$$50 + 3 = \boxed{53}$$

$$\begin{array}{r} 100\% \text{ of price} \\ 6\% \text{ of tax} \\ \hline 106\% \\ 1.06 \end{array}$$

1. A store marks up a \$30 item by 25%. Calculate the total cost including markup: **\$37.50.**

Topic 13: Finding the original price given the sale price and percent discount

1. A jacket's sale price is \$48 after a 20% discount. Find the original price: **\$60.**

$$100 - 20 = 80\%$$

$$\frac{48}{0.8} = \boxed{\$60}$$

1. A phone's sale price is \$170 after a 15% discount. Calculate the original price: **\$200.**