Learning Plan 4

Chapter 4

Basic Rules for Solving Linear Equations (pages 124-126)

If you see addition, you need to subtract. $x + 5 = 7$ $-5 \quad -5$ $x = 2$	If you see subtraction, you need to add. $x - 4 = 6$ $+4 \quad +4$ $x = 10$
If you see multiplication, you need to divide. $3x = 15$ $\frac{3x}{3} = \frac{15}{3}$ $x = 5$	If you see division, you need to multiply. $\frac{x}{6} = 5$ $6 \cdot \frac{x}{6} = 5 \cdot 6$ $x = 30$

Question 5

Solve:

$$\frac{4}{5}x = 20$$

Solution

The reciprocal of $\frac{4}{5}$ is $\frac{5}{4}$.

When you multiply $\frac{4}{5} \cdot \frac{5}{4}$, you get 1.

$\frac{4}{5}x = 20$	
$\frac{5}{4} \cdot \frac{4}{5}x = 20 \cdot \frac{5}{4}$	Multiply both sides by $\frac{5}{4}$.
$x = 25$	Because $20 \cdot 5 \div 4 = 25$

Question 6

Solve the equation:

$$8x + 3 = 27$$

Solution

$$8x + 3 = 27$$
$$-3 \quad -3$$

$$8x = 24$$

$$\frac{8x}{8} = \frac{24}{8}$$

$$x = 3$$

Question 7

(page 127)

Solve the equation:

$$8x + 5x - 4x - 7 = 11$$

Solution

$$8x + 5x - 4x - 7 = 11$$

$$9x - 7 = 11$$ Combine like terms: $8x + 5x - 4x = 9x$

$$9x - 7 = 11$$
$$+7 \quad +7$$ Add 7 to both sides.

$$9x = 18$$

$$\frac{9x}{9} = \frac{18}{9}$$ Divide both sides by 9.

$$x = 2$$

Question 8

$$5x + 11 = 3(x + 5)$$

Solution

$$\begin{array}{r} 5x + 11 = 3(x + 5) \\ 5x + 11 = 3x + 15 \\ -3x \qquad -3x \end{array}$$

$$\begin{array}{r} 2x + 11 = 15 \\ -11 \quad -11 \end{array}$$

$$2x = 4$$

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

$$x = 2$$

Question 10

(page 132-133)

Translate into an equation and solve.

$$If\ 7\ times\ a\ number\ is\ added\ to\ twice\ the\ number, the\ result\ is\ 18.$$

Solution

$$\begin{array}{r} 7x + 2x = 18 \\ 9x = 18 \end{array}$$

$$\frac{9x}{9} = \frac{18}{9}$$

$$x = 2$$

Question 11

(page 136)

1874 concert tickets were sold for a total of $\$21{,}356$. If the students paid $\$9$ and nonstudents paid $\$14$, how many student tickets were sold?

Solution

Let x be the number of student tickets.
Let $1874 - x$ be the number of nonstudent tickets.

$9x$ is the cost of all the student tickets.
$14(1874 - x)$ is the cost of all the nonstudent tickets.

$$9x + 14(1874 - x) = 21356$$

$9x + 26236 - 14x = 21356$ Use distributive property to remove the parentheses.

$-5x + 26236 = 21356$ Combine $9x - 14x = -5x$

$-5x + 26236 = 21356$ Subtract 26236 on both sides.
$\quad -26236 \quad -26236$

$-5x = -4880$

$\frac{-5x}{-5} = \frac{-4880}{-5}$ Divide both sides by -5.

$x = 976$

976 student tickets were sold.

Question 12

(pages 141-143)

Given the formula:

$$I = prt$$

$$p = 500, r = 0.12, t = 5$$

Find I

Solution:

$$I = 500 \cdot 0.12 \cdot 5 = 300$$

Question 13

(pages 141-143)

Given the formula:

$$s = \frac{1}{2}at^2$$

$$s = 1080 \quad \text{and} \quad t = 12$$

Find a.

Solution:

$$s = \frac{1}{2}at^2$$

$$1080 = \frac{1}{2}a \cdot 12^2$$ Replace s and t with the given numbers.

$$1080 = \frac{1}{2}a \cdot 144$$ Do the exponent first.

$$1080 = a \cdot 72$$ Divide 144 by 2 to get 72.

$$\frac{1080}{72} = \frac{a \cdot 72}{72}$$ Divide both sides by 72.

$$15 = a$$

Question 14

(pages 141-143)

Solve the formula

$$S = AQ$$

for Q.

Solution:

$$\frac{S}{A} = \frac{AQ}{A}$$

$$\frac{S}{A} = Q$$

Question 15

(pages 141-143)

Solve the formula

$$S = \frac{P}{1+i}$$

for i.

Solution:

$$\frac{S}{1} = \frac{P}{1+i}$$

$S(1+i) = P \cdot 1$ Use cross-multiplying.

$S + Si = P$ Use distributive property to remove the parentheses.

$$\begin{array}{rr} S + Si = P & \text{Subtract } S \text{ on both sides.} \\ -S \quad\quad - S & \end{array}$$

$$Si = P - S$$

$$\frac{Si}{S} = \frac{P-S}{S}$$ Divide both sides by S.

$$\frac{Si}{S} = \frac{P-S}{S}$$ Cancel S on the left side.

$$i = \frac{P-S}{S}$$

Questions 18 &19

(page 152)

Solve:

$$\frac{x}{4} = \frac{7}{5}$$

Solution

Use cross multiplying:

$$5x = 4 \cdot 7$$

$$5x = 28$$

$$\frac{5x}{5} = \frac{28}{5}$$

$$x = \frac{28}{5}$$

Question 20

Estimate sales for advertising of \$500 and \$2300 if

$$Sales = \$6400 + \$3.25 \cdot Advertising$$

Solution

$$\begin{aligned} Sales &= \$6400 + \$3.25 \cdot Advertising \\ &= 6400 + 3.25 \cdot 500 \\ &= \$8{,}025 \end{aligned}$$

$$\begin{aligned} Sales &= \$6400 + \$3.25 \cdot Advertising \\ &= 6400 + 3.25 \cdot 2300 \\ &= \$13{,}875 \end{aligned}$$