5.4 Modeling with Equations
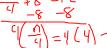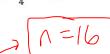
Directions: Circle the equation that best fits the given situation. Then SOLVE the equation.

1) The sum of a number divided by 4 and 8 is 12. What's the number?	2) The sum of a number and 8 divided by 4 is 12. What's the number?

1)
a. $\frac{n}{4} + 8 = 12$ (circled)
c. $\frac{n+4}{8} = 12$

b. $\frac{4}{n} + 8 = 12$
d. $\frac{n+8}{4} = 12$

Solution:
$\frac{n}{4} + 8 = 12$
$\quad -8 \quad -8$
$4\left(\frac{n}{4}\right) = 4(4)$ → $\boxed{n = 16}$

2)
a. $\frac{n}{4} + 8 = 12$
c. $\frac{n+4}{8} = 12$

b. $\frac{4}{n} + 8 = 12$
d. $\frac{n+8}{4} = 12$ (circled) (4)

Solution:
$n + 8 = 48$
$\quad -8 \quad -8$
$\boxed{n = 40}$

3) Seven is the same as the sum of four times a number and 5. What's the number?	4) Mr. Kelly has $60 and steadily loses $2 every hour. How many hours until he has only $12 left in his wallet?

3)
a. $7 = 5h + 4$
c. $7 = 4(h + 5)$

b. $7 = 5(h + 4)$
d. $7 = 4h + 5$ (circled)
$\quad -5 \qquad -5$
$\frac{2}{4} = \frac{4h}{4}$
$\boxed{\frac{1}{2} = h}$

Solution:

4)
a. $2x + 60 = 12$
c. $2x - 60 = 12$

b. $60 - 2x = 12$ (circled)
$\quad -60 \qquad -60$
$\frac{-2x}{-2} = \frac{-48}{-2}$
d. $-60 - 2x = -12$

Solution:
$\boxed{x = 24\ hours}$

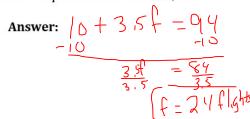|	
5) Mr. Brust needs to rent a car after busting up his on the bumpy Italian roads. He needs to pay $25 for insurance and $40 a day. How many days can he rent the car if he only has $225.	6) Ted Mosby currently has $400. He plans on finding some more money this weekend. On Monday, he is going to give each of his three friends an equal share of his money. How much more money did he gain over the weekend if each friend gets $300 each.

5)
a. $40d + 25 = 225$ (circled)
c. $25d + 40 = 225$

b. $40(d + 25) = 225$
d. $25(d + 40) = 225$
$40d + 25 = 225$
$\quad -25 \qquad -25$
$\frac{40d = 200}{40 \quad 40}$

Solution:
$\boxed{d = 5\ days}$

6)
a. $\frac{m}{3} - 400 = 300$
c. $3m - 400 = 300$

b. $3m + 400 = 300$
d. $\frac{400+m}{3} = 300$ (circled) (3)
3

Solution:
$400 + m = 900$
$\quad -400 \qquad -400$
$\boxed{m = \$500}$

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Directions: For each situation make an equation, define your variables and solve your equation.
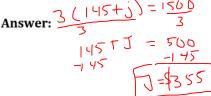
7) Ross Geller starts a moving company to get couches up stairwells. He charges a flat rate of $10 and then $3.50 for each flight of stairs he moves the couch up. How many flights of stairs did he move up a couch if he made $94?

Equation:

f = flights of stairs

$10 + 3.5f = 94$

Answer:

$$10 + 3.5f = 94$$
$$-10 \qquad\qquad -10$$
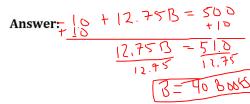$$\frac{3.5f}{3.5} = \frac{84}{3.5}$$
$$\boxed{f = 24 \text{ flights}}$$

8) Michael Scott is a GREAT boss! He agrees to TRIPLE the amount of money that Dwight and Jim raise for their favorite charity. Dwight raised $145 and they are hoping to raise $1500 overall. How much did Jim raise by himself?

Equation: J = Amount of $ Jim raised

$3(145 + j) = 1500$

Answer:
$$\frac{3(145+j)}{3} = \frac{1500}{3}$$
$$145 + J = 500$$
$$-145 \qquad -145$$
$$\boxed{J = \$355}$$

9) Leslie Knope goes to the Pawnee flea market to sell copies of her book. The flea market charges her $20 to open up the table, but she makes $12.75 for every book. How many books does she need to sell to make $500?

Equation: B = books

$-10 + 12.75B = 500$

Answer:
$$-10 + 12.75B = 500$$
$$+10 \qquad\qquad +10$$
$$\frac{12.75B}{12.75} = \frac{510}{12.75}$$
$$\boxed{B = 40 \text{ books}}$$

10) When Michael Jordan retired he spent time as a water boy for the Cleveland Cavaliers. One day he was preparing for their upcoming road trip. He had 8 bottles left over from last trip. He knows he can buy cases of water to save money. Each case has 12 bottles of water. How many cases of water does he need to buy to have 200 bottles of water for the trip?

Equation:

C = cases of water

$8 + 12c = 200$

Answer:
$$8 + 12c = 200$$
$$-8 \qquad\qquad -8$$
$$\frac{12c}{12} = \frac{192}{12}$$
$$\boxed{C = 16 \text{ cases}}$$

11) Natasha Romanov and Clint Barton are running low on arrows and are preparing for the next big Avengers trip. Natasha knows that they will need twice as many as they have currently. If Clint has 14 on him, how many does Natasha have if they need 70 total arrows for the trip?

Equation:

N = # of arrows Natasha has

$2(14 + N) = 70$

Answer:
$$\frac{2(14+n)}{2} = \frac{70}{2}$$
$$14 + n = 35$$
$$-14 \qquad -14$$
$$\boxed{n = 21 \text{ arrows}}$$