

1.2 - Applications of Linear Equations: Modeling.

Exercises from page 101:

19. A computer is on sale for \$1,192. If the original price was reduced by 20%, what was the original price of the computer?

Solution: Let x = the original price of the computer.

$$x - .2x = 1192$$

$$.8x = 1192$$

$$\frac{\frac{4}{5}x}{\frac{4}{5}} = \frac{1192}{\frac{4}{5}}$$

$$x = 1192 \cdot \frac{5}{4}$$

$$x = \$1490$$

21 Kylee's first three test scores are 81, 75, & 77. What must Kylee score on the next test to raise the average to 80?

Solution: x = score she needs to get on next test.

$$\frac{81 + 75 + 77 + x}{4} = 80, \text{ so } x = 87$$

$$(mult. \text{ by } 4) \quad (81 + 75 + 77) + x = 320$$

$$(subtract) \quad x = 320 - (81 + 75 + 77)$$

23 The perimeter of a rectangle is 80ft. Find its length & width, assuming that its length is 5ft less than twice its width.

Solution: $l = \text{length}$
 $w = \text{width}$

$$P = l + l + w + w = 2l + 2w$$

$$\textcircled{1} \quad 80 = 2l + 2w$$

$$\textcircled{2} \quad l = \underbrace{2w - 5}_{\substack{\text{length is} \\ \text{"5ft less than twice the width"}}$$

$$80 = 2(2w - 5) + 2w$$

$$80 = 4w - 10 + 2w$$

$$80 = 6w - 10$$

$$\frac{90}{6} = \frac{6w}{6}$$

$$\boxed{w = 15}$$

$$\boxed{l = 2(15) - 5 = 25}$$

25 If P dollars are invested at a simple interest rate r (in decimals), the amount A that will be available after t years is

$$A = P + Prt$$

If \$500 is invested at a rate of 6%, how long until the amount of money available is \$920?

Solution: P = dollars invested

A = amount available after t years

r = interest rate (in decimals)

t = time (in years)

$$6\% = 0.06$$

$$A = P + Prt$$

$$A - P = Prt$$

$$\frac{A - P}{Pr} = t$$

$$t = \frac{920 - 500}{500(0.06)}$$

$$= \frac{420}{500(0.06)}$$

$$= 14$$

27 $M = \frac{m - b}{4}$

M = maximum affordable monthly mortgage "note"

m = gross monthly income

b = total monthly bills

Given $M = 427$, $b = 302$, what is m ?

Solution: $M = \frac{m-b}{4}$

$$4M = m - b$$

$$4M + b = m$$

$$4(427) + 302 = m$$

$$2010 = m.$$