WORKSHEET 3.7A

1. If $f(x) = -8x - 3$, find each value.

a) $f(3)$

$f(3) = -8(3) - 3$
$f(3) = -24 - 3$
$f(3) = -27$

b) $f(-7)$

$f(-7) = -8(-7) - 3$
$f(-7) = 56 - 3$
$f(-7) = 53$

c) $f\left(\frac{1}{2}\right)$

$f\left(\frac{1}{2}\right) = -8\left(\frac{1}{2}\right) - 3$
$f\left(\frac{1}{2}\right) = -4 - 3$
$f\left(\frac{1}{2}\right) = -7$

2. If $g(x) = 1 - \frac{3}{4}x$, find each value.

a) $g(-12)$

$g(-12) = 1 - \frac{3}{4}(-12)$
$g(-12) = 1 + 9$
$g(-12) = 10$

b) $g(0)$

$g(0) = 1 - \frac{3}{4}(0)$
$g(0) = 1 - 0$
$g(0) = 1$

c) $g(5)$

$g(5) = 1 - \frac{3}{4}(5)$
$g(5) = 1 - \frac{15}{4}$
$g(5) = \frac{4}{4} - \frac{15}{4}$
$g(5) = -\frac{11}{4}$ or -2.75

3. Given $h(x) = 2x - 9$, find x if $h(x) = -33$.

y-value

$-33 = 2x - 9$

$+9 \qquad +9$

$\frac{-24}{2} = \frac{2x}{2}$

$-12 = x$

4. Given $p(x) = -\frac{2}{3}x + 8$, find x if $p(x) = 48$.

y-value

$48 = -\frac{2}{3}x + 8$

$-8 \qquad -8$

$-\frac{3}{2} \cdot 40 = -\frac{2}{3}x \cdot -\frac{3}{2}$

$-60 = x$

5. It is 76°F at the 6000-foot elevation of a mountain and 49°F at the 12,000-foot elevation. The temperature can be determined by the elevation using the function $t(x) = -\frac{9}{2000}x + 103$, where x is the elevation. Find the temperature if the elevation of a mountain climber is 20,000 feet.

solving for t

x-value

$$t(20{,}000) = -\frac{9}{2000}(20{,}000) + 103$$

$$t(20{,}000) = -90 + 103$$

$$t(20{,}000) = 13\,^{\circ}F$$

year 0

6. The median age of men who got married for the first time in 1970 was 23.2, but by 1998 the median age had increased to 26.7.

a) If the median age of a man getting married for the first time today can be found by the equation $m(x) = 0.125x + 23.2$, what is this man's age?

2024

$x = 54$

$$m(54) = 0.125(54) + 23.2$$

$$m(54) = 6.75 + 23.2$$

$$\boxed{m(54) = 29.95}$$

b) If $m(x) = 27.575$, find the value of x and explain what this means.

y-value

$$27.575 = 0.125x + 23.2$$

$$-23.2 \qquad -23.2$$

$$\frac{4.375}{0.125} = \frac{0.125x}{0.125}$$

$$35 = x$$

years after 1970

$m(35) = 27.575$

In 2005, the median age of a man getting married for the first time is 27.575.

WORKSHEET 3.7B

1. The U.S. Bureau of the Census predicted that the population of Florida would be about 17.4 million in 2010 and then would increase by about 0.22 million per year until 2015. If $p(x) = 0.22x + 17.4$ represents a linear model for Florida's population, where x is the number of years since 2010, find the population in 2014.

$x = 4$ $(2014 - 2010)$

$p(4) = 0.22(4) + 17.4$

$p(4) = 0.88 + 17.4$

$p(4) = 18.28$ million people

2. The population of a small town in 1995 is 2400. By 2000, the population had grown to 4000.

a) If the town's population since 1995 can be found by the equation $p(x) = 320x + 2400$, find p(17) and explain what this means.

$p(17) = 320(17) + 2400$

$p(17) = 5440 + 2400$

$p(17) = 7840$

$1995 + 17 = 2012$

In 2012, the population of this town was 7840.

b) If $p(x) = 13,920$, find the value of x and explain what this means.

y-value

$13,920 = 320x + 2400$

$-2400 \quad -2400$

$11,520 = 320x$

$\frac{11,520}{320} = \frac{320x}{320}$

$36 = x$

$1995 + 36 = 2031$

$p(36) = 13,920$

In 2031, the population is predicted to be 13,920.