Writing Point-Slope Equations

Homework

Name KEY

Date _____ Period _____

I. Complete the following:

1. Suppose you own a car that is presently 40 months old. According to statistics, it loses $240 in value each month. A dealer's "blue book" shows its current value is $6400.

   a. Identify the point from this situation. (40, 6400)

   b. Identify the slope. What does it represent in this situation?
   $m = -240$ The car is losing 240 each month in value

   c. Write the equation of the line in point-slope form. (convert to slope-intercept form) $y - 6400 = -240(x - 40)$ → $y = -240x + 16000$

   d. Identify the y-intercept. What does it represent in this situation?
   (0, 16,000) $b = 16{,}000$ The initial value of the car was $16,000

   e. How much was the car worth when it was 20 months old?
   $y = -240x + 16000$ $y = -240(20) + 16000$ $y = \$11{,}200$

   f. When will the car be worth $5000?
   $y = -240x + 16000$ $5000 = -240x + 16000$ $-11000 = -240x$ $45.83 = x$ → 246 months

2. When Larry became president of STAND, he signed up 4 new members each week. After 10 weeks, there were 115 members.
   $m = 4$ (10, 115) $y - 115 = 4(x - 10)$ $y - 118 = 4x - 40$ $y = 4x + 75$

   a. How many members were there after 24 weeks?
   $y = 4x + 75$ $y = 4(24) + 75$ $y = 171$ members

   b. How long will it take Larry to build the membership to 235?
   $y = 4x + 75$ $235 = 4x + 75$ $160 = 4x$ $40 = x$ 40 weeks

3. Marty received a check for his birthday. He spends $8 per day. After 10 days, he has $120 left.
   $m = -8$ (10, 120) $y - 120 = -8(x - 10)$ $y - 120 = -8x + 80$ $y = -8x + 200$

   a. How much will he have left 15 days after his birthday?
   $y = -8x + 200$ $y = -8(15) + 200$ $y = \$80$ $80 left

   b. When will he run out of money? $y = 0$
   $y = -8x + 200$ $0 = -8x + 200$ $-200 = -8x$ $x = 25$ days

   c. What was the amount of the check?
   $200 → the y-intercept

4. A plane loses altitude at the rate of 5 meters per second. It begins at an altitude of 8500 meters. $m = -5$ $b = 8500$ $y = -5x + 8500$ OR $y = 8500 - 5x$ (y-intercept)

   2 min × 60 = 120 sec

   a. What will the altitude of the plane be in 2 minutes?
   $y = 8500 - 5x$ $y = 8500 - 5(120)$ $y = 7900$ meters

   b. When will the plane be 2000 meters above ground?
   $y = 8500 - 5x$ $2000 = 8500 - 5x$ $-6500 = -5x$ $x = 1300$ seconds

   c. When will the plane land?
   $y = 8500 - 5x$ $0 = 8500 - 5x$ $-8500 = -5x$ $1700 = x$ 1700 seconds

3) if $x=6$
$y=\frac{2}{3}(6)+1$
$y=4+1$
$y=5$
$(6,5)$

II. Complete the following.

plug in x, answer for y

5. Find three more points with integer coordinates that lie on the line through (6, 5) with slope $\frac{2}{3}$.

$y-5=\frac{2}{3}(x-6)$
$y-5=\frac{2}{3}x-4$
$+5 \quad +5$
$y=\frac{2}{3}x+1$

1) if $x=0$
$y=\frac{2}{3}(0)+1$
$y=1$
$(0,1)$

2) if $x=1$
$y=\frac{2}{3}(1)+1$
$y=\frac{2}{3}+1$
$y=1\frac{2}{3}$
$(1, 1\frac{2}{3})$

3) if $x=3$
$y=\frac{2}{3}(3)+1$
$y=2+1$
$y=3$
$(3,3)$

6. What is the equation of the line with a slope of –2 that goes through the origin?

$y=-2x$

means y-intercept
or $b=0$

III. Write the point–slope form of an equation of the line that passes through the given point and has the given slope. Convert to slope–intercept form and identify the y–intercept.

7. (3, 8); slope = 2

$y-8=2(x-3)$
$y-8=2x-6$
$+8 \quad +8$
$y=2x+2$

$(0,2)$

9. (9, 1); slope = $\frac{2}{3}$

$y-1=\frac{2}{3}(x-9)$
$y-1=\frac{2}{3}x-6$
$+1 \quad +1$
$y=\frac{2}{3}x-5$

$(0,-5)$

8. (–3, 6); slope = 0 means horizontal

$y=6$

$(0,6)$

$m=0$
$y=6$

$y-6=0(x+3)$

10. (–2, –4); slope = –5

$y+4=-5(x+2)$
$y+4=-5x-10$
$-4 \quad -4$
$y=-5x-14$

$(0,-14)$

11. (8, 7); slope = undefined

$x=8$

no y-int

means
Vertical
Undef = m
x = x-value
intercept

12. (7, 0); slope = $\frac{4}{7}$

$y-0=\frac{4}{7}(x-7)$
$y=\frac{4}{7}x-4$

$(0,-4)$