1. For f(x) = 4x - 7, what is the average rate of change for $-3 \le x \le 2$

$f(-3) = 4(-3) - 7 = -19 \quad (-3, -19)$

$f(2) = 4(2) - 7 = 1 \quad (2, 1)$

$$m = \frac{1+19}{2+3} = \frac{20}{5} = \boxed{4}$$

2. Compare the slope of $f(x) = -1/4(8x - 10)$ to the table below what kind of slope do each have?

$f(x) = \boxed{-2}x + \frac{10}{4} \quad f(x) = -2x + \frac{5}{2}$

x	-3	-1	1	3	5
g(x)	10	9	8	7	6

+2 +2 +2 +2

-1 -1 -1 -1

$m = \boxed{\frac{-1}{2}}$

3. Write the equation of the line that passes through (5, 2) and (13, 18)

$$m = \frac{18-2}{13-5} = \frac{16}{8} = \boxed{2}$$

$y - y_1 = m(x - x_1)$

$y - 2 = 2(x - 5)$ ✓(5, 2) ✓(13, 18)

$y - 2 = 2x - 10$

$+2 \qquad +2$

$\boxed{y = 2x - 8}$

$2 = 2(5) - 8$

$18 = 2(13) - 8$


Slope
Application
Problems

Finding Slope Application:

1. If 3 movie tickets cost $26.25 and 5 cost $43.75, what would one movie ticket cost?

(3, 26.25)
(5, 43.75)

$\frac{43.75 - 26.25}{5 - 3} = \frac{17.50}{2}$

$8.75 per ticket

2. If I paid $17,500 in 2005 for my car brand new and in 2010 it is worth $5000. What is the yearly depreciation?

(0, 17500)
(5, 5000)

$\frac{5000 - 17500}{5 - 0} = \frac{-12500}{5}$

-2500

$2500 lost yearly

Application with writing linear equations

0 $y = mx + b$

3. In ~~1990~~, the average cost of a new house was $123,000. By the year ~~2000~~ 10, the average cost of new house was $134, 150. Write a linear equation to represent this situation.

$(0, 123000)$
$(10, 134150)$

$m = \frac{134150 - 123000}{10 - 0} = \frac{11150}{10}$

$y = 1{,}115x + 123{,}000$

$1,115 per yr

4. In ~~1995~~ 0 the average price of movie ticket was ~~$5.00~~. In ~~2010~~ 15 the average cost a movie ticket is $10.00. Write an equation to represent this situation.

$(0, 5)$
$(15, 10)$

$m = \frac{10-5}{15-0} = \frac{5}{15} = \frac{1}{3}$

$y = \frac{1}{3}x + 5$ $y = 0.\overline{33}x + 5$

Application with solving linear equations

5. A company has monthly expenses represented by the function $c(x) = 2x + 1{,}200$, where x represents the number of items produced. If the company spent $2000 last month, how many items were produced? d?

$2000 = 2x + 1200$

$-1200 \quad -1200$

$800 = 2x$

$\frac{800}{2} = \frac{2x}{2}$

$x = 400$ items

6. The average price of a movie ticket in the year ~~2000~~ 8 was $5.39. The average price of a movie ticket in the year ~~2004~~ 4 was $6.21. Assuming the increase is linear, what would be the *approximate* price of a movie ticket in the year ~~2009~~ 9?

$(0, 5.39)$

$(4, 6.21)$

$m = \frac{6.21 - 5.39}{4 - 0} = \frac{.82}{4} = \$0.205$ per yr

$y = 0.205x + 5.39$

$y = 0.205(9) + 5.39$

$y = \$7.235$

$\$7.24$

Identifying the meaning of slope and y-intercept

7. The equation $y = 461.19x + 3,492$ represents the value of a work of art from 1964 to 2005. What does the number 461.19 represent?

SLOPE

A. value of the work of art in 1964 y-intercept

B. value of the work of art in 2005

C. yearly decrease in value

D. yearly increase in value Slope

Identifying the meaning of slope and y-intercept

8.

Mr. Hanson recorded the typing speeds (in words per minute) of 25 students and their weeks of experience. The line of best fit for the data is $y = 4.4x + 18.9$, where x is the number of weeks of experience of a student and y is the student's typing speed. What is the meaning of the y-intercept for this set of data?

(0, 18.9)

A. the average typing speed of the students SLOPE

B. the highest typing speed recorded

C. the improvement in typing speed per week for the average student

D. the typing speed of a student with no experience y-incpt

Identifying the linear equation:

9. A computer is purchased for $1,200 and depreciates at $140 per year. Which linear equation represents the value, V, of the computer after t years?

   A. $V = 1{,}200 - 140t$
   ~~B. $V = 140t$~~
   ~~C. $V = 140t - 1{,}200$~~
   ~~D. $V = 140(1{,}200 - t)$~~

$m = -140$
$b = 1200$

10. Martha has $180. She needs a total of $2,000 to start an account. She earns $60 per day working, of which she saves $50. Which equation can she use to determine the number of days, d, she needs to work to reach her goal of $2,000?

   ~~A. $2{,}000 = 60d + 180$~~
   ~~B. $2{,}000 = 60d - 180$~~
   C. $2{,}000 = 50d + 180$
   D. $2{,}000 = 50d - 180$

$m = 50$
$b = 180$