Warm Up September 25, 2018

1.) Use the interval $1 \le x \le 4$ to find the average rate of change in parts a - c. $[1, 4]$

The ***average rate of change*** of $f(x)$ over the interval $[a, b]$ is

$$\frac{\text{change in } f}{\text{change in } x} = \frac{\Delta f}{\Delta x} = \frac{f(b) - f(a)}{b - a}$$

Difference Quotient

A.) f(x) = 3x - 2

B.) $f(x) = x^2 + 4x - 2$

C.) $f(x) = 3(2)^x$

a) $\frac{f(4) - f(1)}{4 - 1} = \frac{10 - 1}{3} = \frac{9}{3} = 3$

b) $\frac{f(4) - f(1)}{4 - 1} = \frac{30 - 3}{3} = \frac{27}{3} = 9$

$x^2 + 4x - 2$

$(4)^2 + 4(4) - 2$

$(1)^2 + 4(1) - 2$

c) $\frac{f(4) - f(1)}{4 - 1}$ $\frac{48 - 6}{3} = \frac{42}{3} = 14$

$3(2)^4 = 48$

$3(2)^1 = 6$

VUX

vertical line

undef.

$X = \#$

HOY

horizontal

zero

$Y = \#$

Linear equation WORD PROBLEMS

➢ Slope-intercept: Use when given a rate of change (m) and a starting point (b)

$$Y = mx + b$$

1. ~~You and your friends plan to attend the county fair this weekend.~~ The admission to the fair is $5 and the cost per ride is 50¢. ~~If your parents~~ gave you $20, write and solve a linear equation to find how many rides you can go on.

$y = .50x + 5$

$20 = .5x + 5$

$15 = .5x$

$x = 30$ 30 rides

2. ~~While your family is visiting Deep Creek Lake, you and your mother decide to go boating.~~ The rangers charge $6.50 per hour in addition to a $25.00 deposit to rent a canoe. If you wish to rent the canoe from 12:30 to 3:30 PM, write and solve a linear equation to find the total cost to rent the canoe.

$y = 6.50x + 25$

$y = 6.50(3) + 25$

$y = \$44.50$

x = time

y = cost

The slope represents the cost to rent the canoe per hour.
The y-intercept represents the deposit to rent the canoe.

Ax + By = C

➢ STANDARD FORM: Use when the problem relates two different objects

5. ~~Sam ordered~~ 2 tacos and 3 enchiladas for ~~lunch at the restaurant.~~ His bill came to $7.80. If enchiladas were $2 each, write and solve a linear equation to find the cost of each taco.

x = tacos
y = enchiladas

$2x + 3y = 7.80$

$2x + 3(2) = 7.80$

$2x + 6 = 1.80$

$2x = 1.80$

tacos cost $0.90

6. Tickets at a school play cost $4 in advance or $5 at the door. Total ticket sales for an evening production were $440. If no tickets were sold in advance, write and solve a linear equation to find the how many were sold at the door.

$4x + 5y = 440$

$4(0) + 5y = 440$

$5y = 440$

$y = 88$

x = advance
y = at the door

There were 88 tickets sold at the door.

$$Y - Y_1 = m(X - X_1)$$

➢ **POINT-SLOPE:** **Use when the problem gives a sample point (X_1, Y_1) and a rate of change (m)**

9. At Eagle Bay, it costs $10 per hour to rent a canoe. Nick and his friends rented a canoe for 3 hours and paid $45. Write and solve a linear equation to find the cost to rent the canoe for 8 hours.

$m = 10$ $(3, 45)$

$y - 45 = 10(x - 3)$

$y - 45 = 10x - 30$

$y = 10x + 15$

$y = 10(8) + 15$

$y = 95$

The y-intercept represents the flat fee to rent the canoe.

10. A construction company charges $15 per hour for debris removal, plus a one-time fee for the use of the trash dumpster. The total fee for 9 hours of service was $195. Write and solve a linear equation to find the one-time fee for the trash dumpster.

Slope --> Point Slope

- TWO POINTS: **The problem gives two sample points (x_1, y_1) and (x_2, y_2)**

13. To surf the internet for 25 minutes at an Internet Café, it costs $7.25. For 40 minutes, it costs $9.80. Write and solve a linear equation to find the cost for surfing the web for one hour.

$(25, 7.25)(40\ 9.80)$

$m = \frac{9.80 - 7.25}{40 - 25} = \frac{2.55}{15} = .17$

$y - 7.25 = .17(x - 25)$

$y - 7.25 = .17x - 4.25$

$y = .17x + 3$

$y = .17(60) + 3$

$y = 13.20$

The slope represents the cost per minute.
The y-intercept represents a flat fee to surf the internet.

14. Water boils at 100° Celsius or 212° Fahrenheit. Water freezes at 0° Celsius or 32° Fahrenheit. If the weather forecaster says it will be 25° Celsius today, write and solve a linear equation to find what Fahrenheit temperature this is.

now... you determine which type!

17. You are buying $48 worth of two types of lawn seed. Ryegrass lawn seed sells for $0.70 per pound and Fescue lawn seed sells for $1.15 per pound. If you bought 25 pounds of Fescue lawn seed, write and solve a linear equation to find the amount of Ryegrass lawn seed purchased.

18. Jeff is keeping track of his weight over several weeks. After 2 weeks, he weighs 194 pounds. After 6 weeks, he weighs 186 pounds. Write and solve a linear equation to find Jeff's weight after 12 weeks.