Linear Equations

Slope Intercept

$y = mx + b$

m = slope

b = y-int

$y = \frac{1}{2}x + 2$

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

$b = 2$

Point Slope

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

m = slope

(x_1, y_1) = point

$(7, 2)$ $m = 3$

x_1 y_1

$y - 2 = 3(x - 7)$

Standard form

$Ax + By = C$

We can easily find x and y intercepts by doing the Cover Up

$9x + 4y = 36$

x-intercept

$\frac{9x}{9} = \frac{36}{9}$

$x = 4$

$(4, 0)$

y-intercept

$\frac{4y}{4} = \frac{36}{4}$

$y = 9$

$(0, 9)$

SLOPE – circle the correct answer

~~$\frac{run}{rise}$~~ or $\frac{rise}{run}$

$\frac{y_2 - y_1}{x_2 - x_1}$

Given two points, how do you find slope?

1) (4, 5) (-4, 3) $\frac{3-5}{-4-4} = \frac{1}{4}$ Visually →

2) (0, 5) (1, 2) $\frac{2-5}{1-0} = -3$ Visually →

3) (1, 2) (3, 2) $\frac{2-2}{3-1} = 0$ (origin) Visually →

4) (-3, 3) (-3, -2) $\frac{-2-3}{-3-3} =$ Undefined Visually →

What if you are given an equation and told to find the slope?

Equation of a line $y = mx + b$ slope intercept

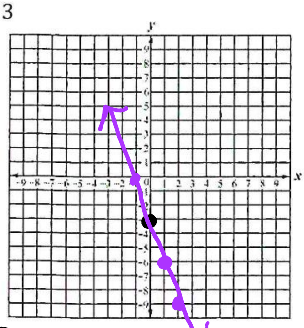
Which letter represents slope? m

Find the slope for the following.
Then let's graph the line.

1) $y = -3x - 3$

m = -3 ↓3 →1

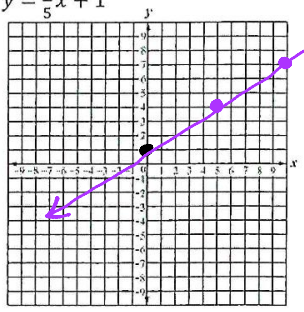
b = -3



2) $y = \frac{3}{5}x + 1$

$m = \frac{3}{5}$ ↑3 →5

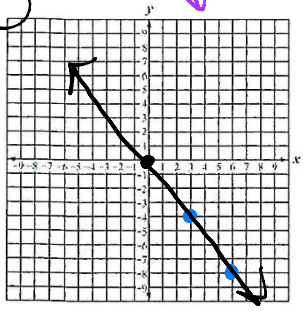
b = 1



2) $y = -\frac{4}{3}x$

$m = -\frac{4}{3}$ ↓4 →3

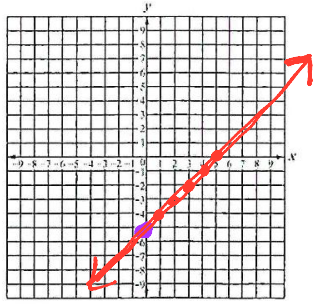
b = 0



4) $y = x - 5$

m = 1 ↑1 →1

b = -5



Module 2.3

Compare the two functions below. Determine which function has a "greater rate of change."

Function 1

x	y
1	2
2	4
3	6
4	8

+2, +2, +2

Slope: +2

Ignore signs

Function 2

$y = 3x - 4$

Slope: 3

Greater Rate of change → Slope

Function 1

(3, 8) and (4, 2)

$\frac{y_2 - y_1}{x_2 - x_1}$

Greater Rate of change $\frac{2-8}{4-3} = -6 = m$

Function 2

$y = -3x + 7$

$m = -3$

Function 1

x	y
2	0
4	6
6	12
8	18

+2, +6; +2, +6; +2, +6

$\frac{\Delta y}{\Delta x} = \frac{6}{2}$

3 = slope

Function 2

$y = -10x - 4$

Slope: −10

Greater Rate of change

3 vs 10

Function 1

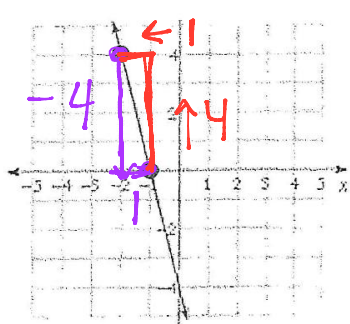
(4, 0) and (2, 10)

$\frac{10-0}{2-4} = -5$

m

Greater ROC

Function 2



$\frac{-4}{1} = -4$

Convert the following from point-slope form into slope-intercept form:

$y - y_1 = m(x - x_1)$ ⟶ $y = mx + b$

* Distribute
* Solve for y

1. $y - 3 = 2(x - 4)$

$y - 3 = 2x - 8$

$+3 \quad +3$

$y = 2x - 5$

$m = 2 \quad b = -5$

2. $y + 6 = -3(x + 2)$

$y + 6 = -3x - 6$

$-6 \quad -6$

$y = -3x - 12$

$m = -3 \quad B = -12$

3. $y - 5 = -4(x + 6)$

$y - 5 = -4x - 24$

$+5 \quad +5$

$y = -4x - 19$

$m = -4 \quad b = -19$

4. $y + 0 = -2(x + 0)$

$y = -2x$

$m = -2$

$b = 0$

5. $y - (-2) = 5(x + 5)$

$y + 2 = 5x + 25$

$-2 \quad -2$

$y = 5x + 23$

$m = 5$

$b = 23$

6. $y + 3 = -(x - 4)$

$y + 3 = -x + 4$

$-3 \quad -3$

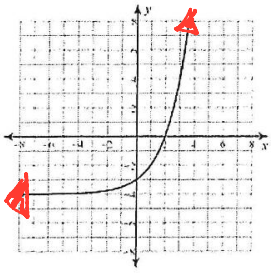
$y = -x + 1$

$m = -1$

$b = 1$

2.3 Name: _____

1.



go on forever

Circle One: Linear **Exponential** Neither

Circle One: Discrete **Continuous**

Domain? $(-\infty, \infty)$ X-values

2.

$y = 2x + 4$

X=0.5 2(0.5)+4=5

Circle One: **Linear** Exponential Neither

Circle One: Discrete **Continuous**

Domain? $(-\infty, \infty)$

3.

x	y
0	5
2	11
4	17
6	23

+2 +2 +2 → +6 +6 +6

$\frac{\Delta y}{\Delta x} = \frac{6}{2}$ (+3)

Equation: An = 5+3n

Circle One: **Linear** Exponential Neither

Circle One: **Discrete** Continuous

Domain? [0, 1, 2, 3 ... ∞)

4. You invest $4,000 in a company and earn a 5% profit at the end of each year.

100 + 5 = 105 / 100 = 1.05 * more $

Equation: $y = 4000(1.05)^x$

Circle One: Linear **Exponential** Neither

Circle One: Discrete **Continuous**

Domain? years [0, ∞)

years ↓ X | $ ↓ Y

5. Joe has a jar of 300 Reece's pieces. Every hour he reaches in the jar and gets ten pieces and eats them quickly.

Equation: An = 300 − 10n

30 hrs empty

Circle One: **Linear** Exponential Neither

Circle One: **Discrete** Continuous

Domain? HRS [0, 1, 2, ... 30]

HRS ↓ X | Candy ↓ Y

6.

x	y
0	4
1	12
2	36
3	108

×3 ×3 ×3

Equation: $An = 4(3)^n$

Circle One: Linear **Exponential** Neither

Circle One: **Discrete** Continuous

Domain? $\{0,1,2,3\}$ → set notation

7.

Cashiers	Items scanned
1	20
2	40
3	60
4	80

+1 +1 +1 → +20 +20 +20

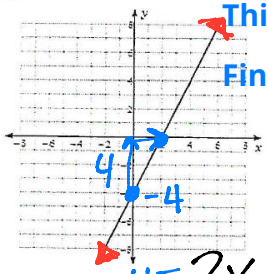
Equation: $An = 20n$

Circle One: **Linear** Exponential Neither

Circle One: **Discrete** Continuous

Domain? Cashiers $\{1,2,3,4\}$

8.



This is from Friday

Find it :) 2.3

$\frac{4}{2} = 2 = m$

$b = -4$

Equation: $y = 2x - 4$

(hint: make a table from the points on the graph)

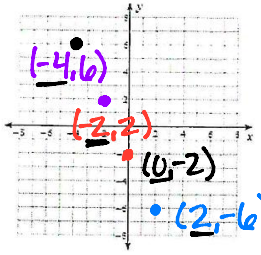
Circle One: **Linear** Exponential Neither

Circle One: Discrete **Continuous**

Connected

Domain? $(-\infty, \infty)$

9.



Equation:

(hint: make a table from the points on the graph)

Circle One: **Linear** Exponential Neither

Circle One: **Discrete** Continuous

Domain? X-values $\{-4,-2,0,2\}$ → set notation

10.

Year	Profit
0	100
1	200
2	400
3	800

×2 ×2 ×2 → $200(2)^{x-1}$

Equation: $y = 100(2)^x$

0 term

Circle One: Linear **Exponential** Neither

Circle One: **Discrete** Continuous

Domain? years $\{0,1,2,3\}$