

Homework Qs

Note Title

10/5/2015

Example: Graph the equation $y = -2x$

$$x=0 \Rightarrow y = -2(0) \\ y = 0$$

$(0, 0)$

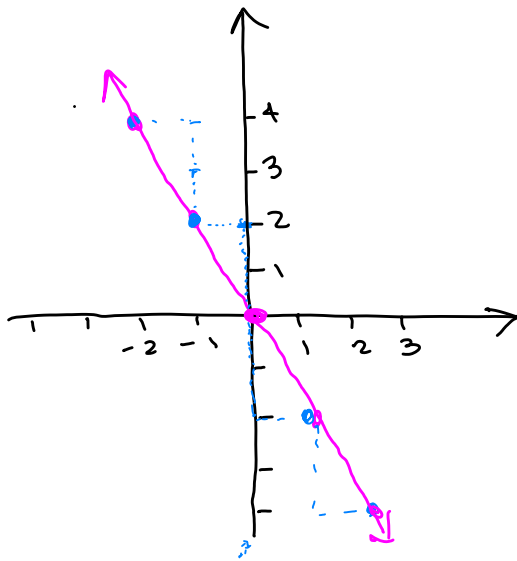
y-intercept: 0

write eqn as $y = mx + b$:

$$y = -2x + 0$$

$$\text{Slope: } m = -2 = -\frac{2}{1}$$

$$\text{y-intercept: } 0 \leftarrow b = 0$$



Recall:

Horizontal Lines:

Equation has the form $y = k$ (k is a number)

Slope is 0.

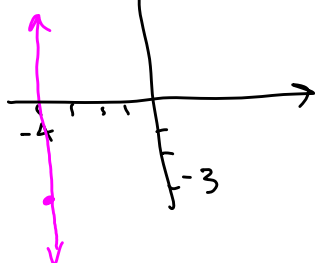
Vertical Lines

Equation has the form $x = k$ (k is a number)

Slope is undefined.

3.5 #31) Write the eqn of the line through $(-4, -3)$ (2)
with undefined slope.

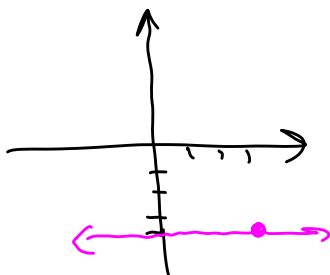
m undefined $\Rightarrow$ vertical line



Eqn of line: $x = -4$

#29) Write the eqn of line through $(3, -4)$
with $m = 0$

$m = 0 \Rightarrow$ horizontal line

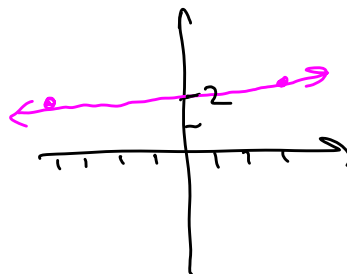


Eqn: $y = -4$

3.5 #41) Write the eqn of the line through $(-4, 2), (3, 2)$.

Note: $m = \frac{2-2}{3-(-4)} = \frac{0}{7} = 0 \Rightarrow$ horizontal line

Eqn of line: $y = 2$

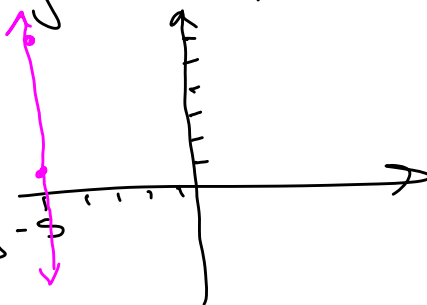


#43) Write eqn of line through $(-5, 1)$ and $(-5, 6)$.

Note: x -values match

Eqn of line:

$x = -5$



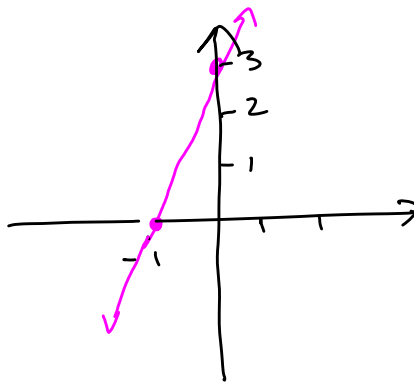
3.S #45) Graph is given:

Slope: $\nearrow$
+

$$m = + \frac{3}{1} = 3$$

y-intercept: 3 $\leftarrow$ so $b=3$

$$y = mx + b$$
$$y = 3x + 3$$



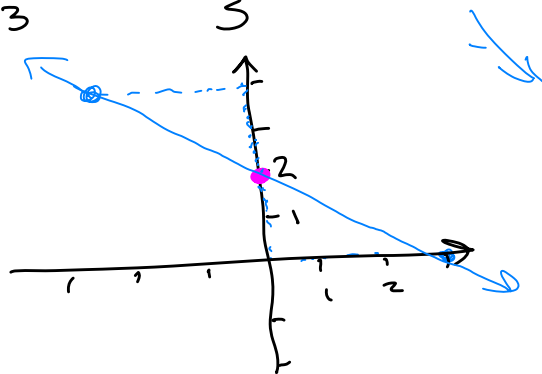
3

#51) Find eqn of line with x-intercept 3 and y-intercept 2.

Write the ordered pairs: $(3, 0)$
 $(0, 2)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - 0}{0 - 3} = \frac{2}{-3} = -\frac{2}{3}$$

$$y = mx + b$$
$$m = -\frac{2}{3} \Rightarrow y = -\frac{2}{3}x + b$$
$$b = 2 \Rightarrow y = -\frac{2}{3}x + 2$$



4.1: Multiplication with exponents

④

Properties (laws) of Exponents

1) $x^a x^b = x^{a+b}$

Ex: $x^2 x^3 = (xx)(xxx) = x^5$

2) $(x^a)^b = x^{ab}$

Ex: $(x^2)^3 = x^2 x^2 x^2 = (xx)(xx)(xx) = x^6$

3) $\frac{x^a}{x^b} = x^{a-b}$
as long as $x \neq 0$

Ex: $\frac{x^6}{x^4} = \frac{\cancel{xxx} \cancel{xx} x}{\cancel{xxx} \cancel{x}} = \frac{xx}{1} = x^2$

Note: $\frac{x}{x} = 1$ for $x \neq 0$

4) $(xy)^a = x^a y^a$

Ex: $(xy)^3 = x^3 y^3$
 $(xy)^3 = (xy)(xy)(xy) = xxx yyy = x^3 y^3$

5) $\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$

Ex: $\left(\frac{x}{y}\right)^3 = \left(\frac{x}{y}\right)\left(\frac{x}{y}\right)\left(\frac{x}{y}\right) = \frac{x^3}{y^3}$

6) $x^0 = 1$ as long as $x \neq 0$

Why?

$$\frac{2^3}{2^3} = \frac{8}{8} = 1$$

$$\frac{2^3}{2^3} = 2^{3-3}$$

$$= 2^0$$

Property #3

must be equal
So, $2^0 = 1$

Also $5^0 = 1$

$$6^0 = 1$$

$$(-4)^0 = 1$$

$$\left(-\frac{1}{2}\right)^0 = 1$$

Note: 0^0 is indeterminate (think of it as undefined)

Know these Powers:
(memorize these)

Note: $4^3 = (2^2)^3 = 2^6$

$$\begin{array}{r} 3 \\ 36 \\ \hline 216 \\ 6 \\ \hline 1296 \\ \times 4 \\ \hline 5184 \\ 3 \\ \hline 15552 \\ 8 \\ \hline 124416 \\ 51 \\ \hline 6355200 \\ 81 \\ \hline 515904000 \\ 729 \end{array}$$

$$2^2 = 4$$

$$2^3 = 8$$

$$2^4 = 16$$

$$2^5 = 32$$

$$2^6 = 64$$

$$2^7 = 128$$

$$2^8 = 256$$

$$2^9 = 512$$

$$2^{10} = 1024$$

$$7^2 = 49$$

$$7^3 = 343$$

$$8^2 = 64$$

$$8^3 = 512$$

$$9^2 = 81$$

$$9^3 = 729$$

$$10^7 = 10,000,000$$

$$3^2 = 9$$

$$3^3 = 27$$

$$3^4 = 81$$

$$3^5 = 243$$

$$3^6 = 729$$

$$4^2 = 16$$

$$4^3 = 64$$

$$4^4 = 256$$

$$5^2 = 25$$

$$5^3 = 125$$

$$5^4 = 625$$

$$6^2 = 36$$

$$6^3 = 216$$

$$10^2 = 100$$

$$10^3 = 1000$$

$$10^4 = 10000$$

(5)

Powers of positive and negative numbers

$$(-3)^2 = (-3)(-3) = \boxed{9}$$

$$-3^2 = -(3)(3) = \boxed{-9}$$

Ex: $(-2)^6 = \underbrace{(-2)(-2)}_{+} \underbrace{(-2)(-2)}_{+} \underbrace{(-2)(-2)}_{+} = \boxed{64}$

$$(-2)^5 = \underbrace{(-2)(-2)}_{+} \underbrace{(-2)(-2)}_{+} \underbrace{(-2)}_{-} = \boxed{-32}$$

Important: * If you raise a negative number to an even power, you get a positive answer. (6)

* If you raise a negative number to an odd power, you get a negative answer.

Ex: $2x^3x^5 = \boxed{2x^8}$ ← Prop. #1

Ex: $6y^4(-3y^7) = \boxed{-18y^{11}}$

Ex: $(-3y^7)^4 = (-3)^4(y^7)^4$
 $= \boxed{81y^{28}}$ ← Prop #2

Ex: $(2x^3y^4z^5)^5 = (2)^5(x^3)^5(y^4)^5(z^5)^5$
 $= \boxed{32x^{15}y^{20}z^{25}}$

Ex:
$$\frac{(2x^2yz)(-x^4y^2z^3)^4}{(3xy)^2}$$

$$= \frac{2x^2yz(-1)^4x^{16}y^8z^{12}}{(3)^2x^2y^2} = \frac{2(1)x^{18}y^9z^{13}}{9x^2y^2}$$

$$= \boxed{\frac{2x^{16}y^7z^{13}}{9}} = \boxed{\frac{2}{9}x^{16}y^7z^{13}}$$