Pick up the Warm Up

do 1-4 only

HW QUESTIONS

→

Tomorrow there will be a Quiz on Sequences & Exponential Functions

(1) Last week we learned to create an exponential function in the form $y=ab^x$ using the "Double Substitution Method". Use it now to find the exponential function that passes through the two points (2 , 12) and (5, 187.5)

(2, 12) (5, 187.5)

$y = ab^x$ $y = ab^x$

$12 = ab^2$ $187.5 = ab^5$

I'll solve for a first

$a = \frac{12}{b^2}$

$187.5 = \frac{12}{1b^2} \cdot b^5 b^3$

$187.5 = 12b^3$

so $b^3 = \frac{187.5}{12}$

$b = \sqrt[3]{\frac{187.5}{12}} = 2.5$

$a = \frac{12}{(2.5)^2} = 1.92$

$y = 1.92(2.5)^x$

$12 = ab^2$ $\quad \frac{1875}{12} = \frac{ab^5}{ab^2}$

$b^3 = \frac{187.5}{12}$

(2) Find the future value of an 8 year investment of \$4500 that pays an annual interest of 4.0%.

$100\% + 4\% = 104\%$

$y = ab^x$

$y = 4500(1.04)^x$

$y = 4500(1.04)^8$

$\approx \$6158.56$

(3) Find the future value of an 8 year investment of $4500 that pays an annual interest of 4.0%, compounded once TWICE a year.

For this question, you will need the **compound interest formula** which you will find on your reference sheet. This formula is needed if interest is being compounded more than once a year.

$$FV = 4500\left(1 + \frac{.04}{2}\right)^{2 \cdot 8}$$

$$\approx \$6177.54$$

Compound Interest Formula:

$$\textit{Future Value} = \text{PV}\left(1 + \frac{r}{k}\right)^{kt}$$

(a) (b) kt

where PV = Present Value

r = annual interest (as a decimal)

t = number of years $ is being invested

k = # times per year interest is compounded

(4) Find the future value of a $15,000 investment in an account that earns and annual interest rate of 7.5%, but is compounded 4 times a year (this is called quarterly compounding).

$$FV = 15000\left(1 + \frac{.075}{4}\right)^{4 \cdot 8}$$

$$= \$ \quad \left(1 + \frac{.075}{4}\right)^{4 \cdot 6}$$

(5) $n^{5/4}$

$x^{\frac{n}{5}}$

$\sqrt[4]{17^3}$

$\sqrt[3]{x^2}$

skip for now

(6) Solve

$$(16)^n = 4^{5n+1}$$

HW
LOTTERY

QUESTIONS ON HW

$2x - 3y = 12$

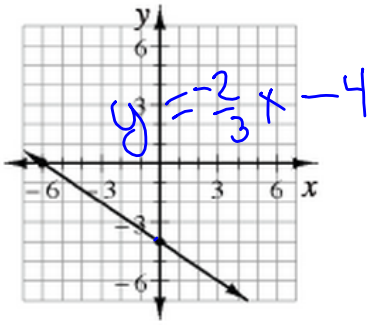
$x + y = -9$

$x = -9 - y$

$2[-9 - y] - 3y = 12$

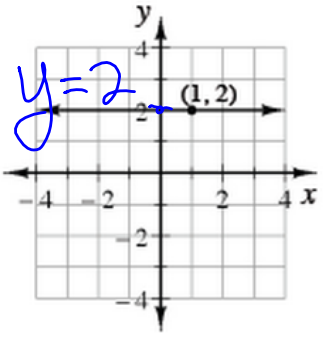
2-9

a.



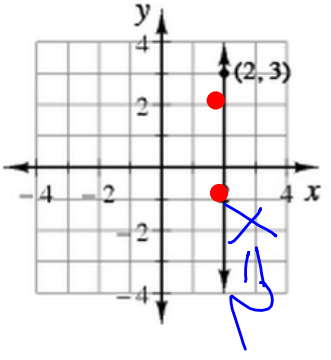
$y = -\frac{2}{3}x - 4$

b.



$y = 2$

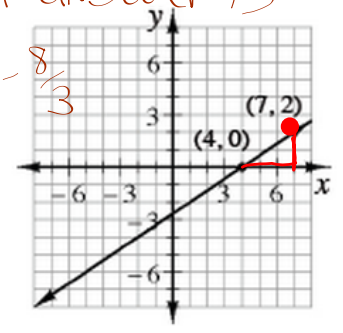
c.



Correct answer is

$y = \frac{2}{3}x - \frac{8}{3}$

d.



B-119 line (−5, 4) (3, −2)

B-94 b

$(-1, 1.25)$ $(3, .032)$

$1.25 = ab^{-1}$ $0.032 = ab^3$

$a = \frac{1.25}{b^{-1}}$

$0.032 = \frac{1.25}{b^{-1}} \cdot b^3$

$.032 = 1.25b^3 \cdot b^1$

B-94 b

(b) $(-1, 1.25)$ $(3, 0.032)$

$y = ab^x$ $y = ab^x$

$1.25 = ab^{-1}$ $0.032 = ab^3$

Using method 2 from class

Divide 2nd equation by the first

$\frac{.032}{1.25} = \frac{ab^3}{ab^{-1}}$

$.0256 = b^3 \cdot b^1$

$b^4 = .0256$

$\sqrt[4]{\ } \quad \sqrt[4]{\ }$

$b = 0.4$

$ab^3 = .032$

$a(.4)^3 = .032$

$a = \frac{.032}{.4^3}$

$a = 0.5$

$y = 0.5(0.4)^x$

2-6 A negative coefficient ●● ....●●.

$y = x^2$

$y = -3x^2$

$y = -0.25x^2$

Aim How can I translate (shift) a parabola?

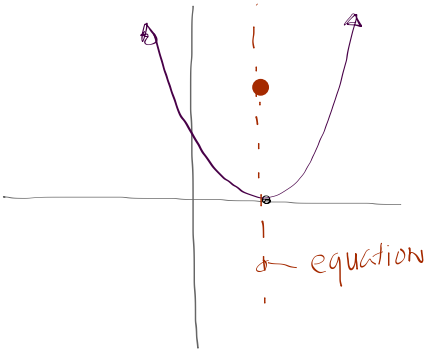
Use your GDC to graph

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

Use your GDC to graph

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

NOW sketch it



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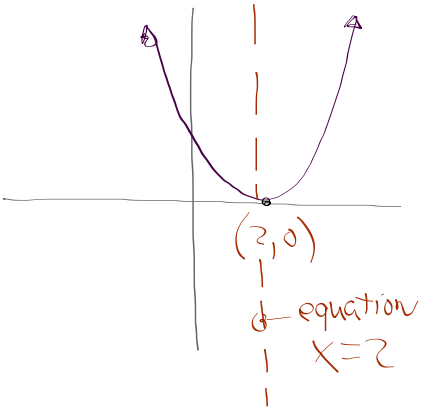
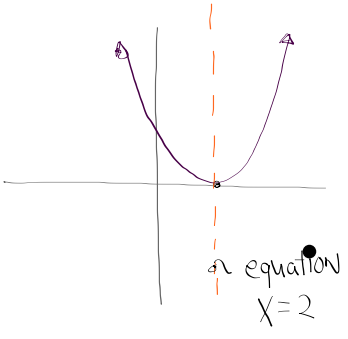


sketch & label the line of symmetry and write its equation.

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

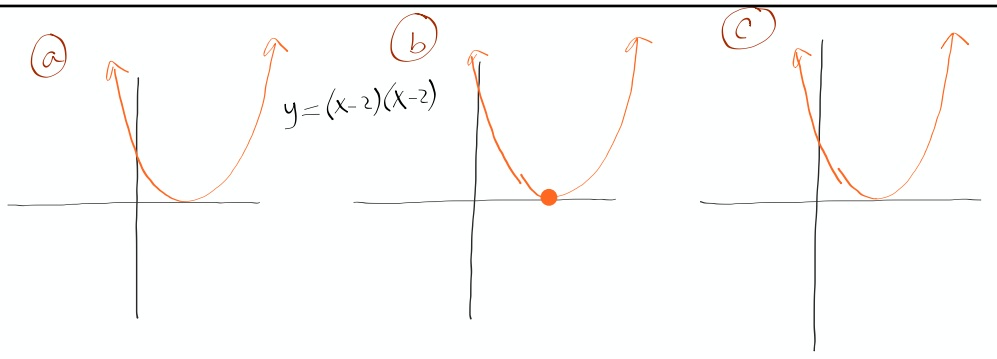
ow ketch it



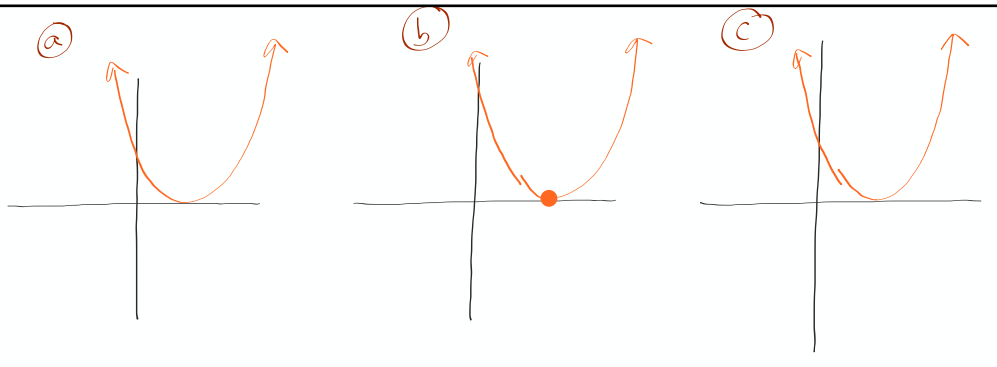
sketch & label the line of symmetry and write its equation.

How do we know for sure that there is only one x-intercept? and that (2,0) is the vertex for sure?

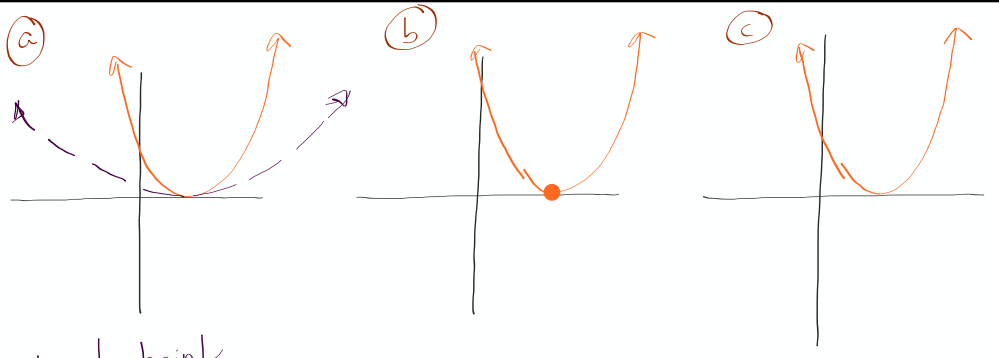
because $x=2$ is the only value that makes $y=(x-2)(x-2)$ calculate to 0.



Make 3 identical sketches of $y = (x-2)(x-2)$



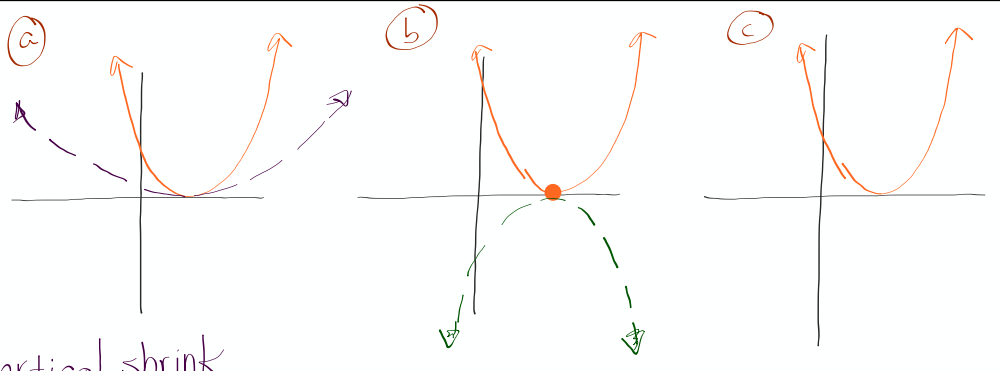
You'll be attempting to create functions of transformations



vertical shrink
(vertex doesn't change)

$y = \frac{1}{8}(x-2)(x-2)$

$y = 0.5(x-2)(x-2)$



vertical shrink
(vertex doesn't change)

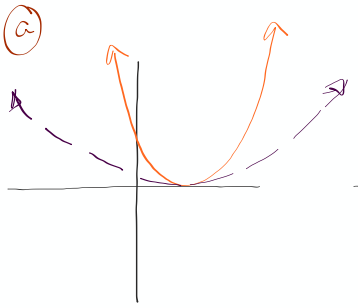
$y = \frac{1}{8}(x-2)(x-2)$

$y = 0.5(x-2)(x-2)$

Vertical reflection over the x-axis

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

a

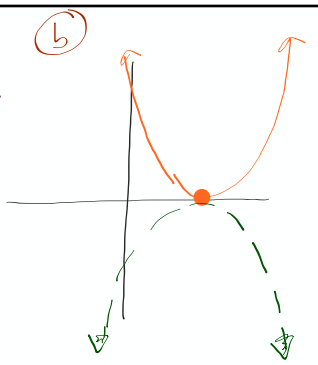


vertical shrink (vertex doesn't change)

$y = \frac{1}{8}(x-2)(x-2)$

$y = 0.5(x-2)(x-2)$

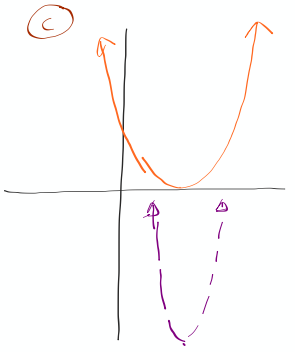
b



Vertical reflection over the x-axis

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

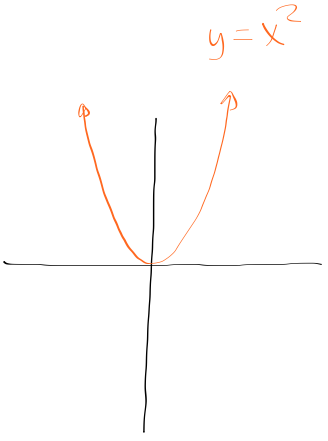
c

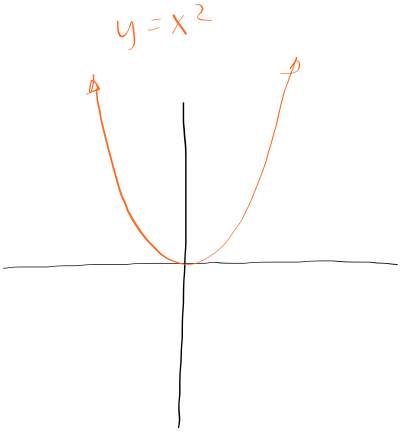


- translate down 5
- vertical stretch

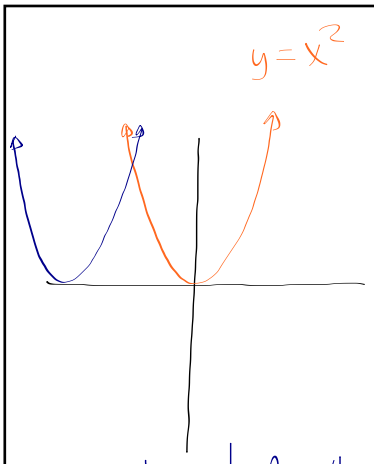
$y = 3(x-2)(x-2)-5$

$y = 8(x-2)(x-2)-5$





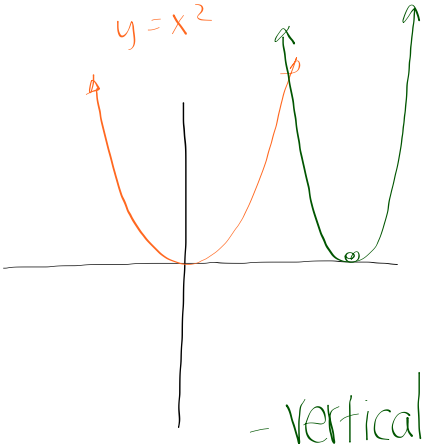
Add 2 more



translate left 4 units

$y = (x+4)^2$

$y = (x+4)(x+4)$



- Vertical ~~shrink~~ stretch
- translate right 5 units

$y = 5(x-5)^2$

Backwards

Write an equation of a parabola that has been translated

8 units to the left and vertically shrunk by $\frac{1}{2}$

$y = \frac{1}{2}(x+8)^2$ $y = \frac{1}{2}(x+8)(x+8)$

We'll add a few more assignments on the current recording sheet, including a few in Ch. 2, and then turn it in.

2nd half of class tomorrow:

Quiz on

- Sequences
- Writing Exponential Functions
- some exponents to simplify
- Create expon. function given 2 pts

Summary

Creating Expon Functions through 2 given points

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Use $f(x) = ab^x$ format if horiz asymptote is $y = 0$

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If given values are simple

Given values not simple or the asymptote is not $y = 0$

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Creating Expon Functions through 2 given points

Use $f(x) = ab^x$ format if horiz asymptote is $y = 0$

If given values are simple

determine the multiplier by writing a simple equation

1	
2	
3	
4	

or from $-, \frac{4}{-}, -, \frac{16}{-}$

Given values not simple or the asymptote is not $y = 0$

Summary

Creating Expon Functions through 2 given points

Use $f(x) = ab^x$ format if horiz asymptote is $y = 0$

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or from $-, \frac{4}{-}, -, \frac{16}{-}$

Given values not simple or the asymptote is not $y = 0$

Use double substitution method.

(x, y) (x, y)

$y = ab^x$ $y = ab^x$

Assignment

2- ... 16, 17, 18ab, 19-20, 21c