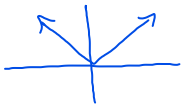
Functions Unit 1

Tentative TEST date Mon. Jan. 12th.

Big idea/Learning Goals

In this unit you will learn about key properties of basic functions studied in grade 11. You will also learn about two new functions: piecewise and absolute value functions. The key characteristics you will study here will enable you to learn about more complex type functions in the next units: polynomial, rational, trigonometric, exponential, and logarithmic functions.

Absolute value functions $f(x)=|x|$ (x always +)



Corrections for the textbook answers:

Section 1.2 #4d $x \in R$

Section 1.3 #10 typo-extra neg in the interval $(-\infty, 2)$

Section 1.4 #3 (-4, -10), ignore the other points

Section 1.6 #6 one part is wrong $0.02x+5$

Review #15 piecewise: 3/2x-1 if x<=2 and -1/2x if x>2

Review #17 piecewise: 30 if 0<=m<=200 and 30 + 0.03(m-200) if m>200

Ch. Test #7a) (-2, 17) #9a) 11500 b) $\begin{cases} 0.05x \\ 0.12x-6000 \end{cases}$

Success Criteria

Specific questions will not be assigned, since it will depend on your knowledge and skill (everyone is at a different level). The goal is to do all types of questions quickly and without reference to notes or back of textbook or another individual. BUT you may not have time to do every single question available… so… If you are a strong student you may just concentrate on harder TIPS or APP questions, while if you are a weak student you may want to use all your time practicing the basic KU or COMM questions. The number of questions done should also be proportional to your mark so far. If you have very low scores, more practice is required.

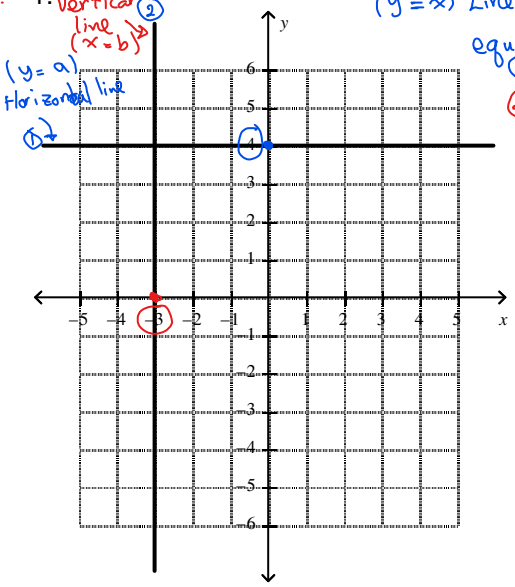
Date	pg	Topics	# of quest. done? You may be asked to show them	Questions I had difficulty with ask teacher before test!
	1-5	Review graphs from previous grades Getting started pg 2 in textbook		
	6-8	Review functions vs. non-functions Section 1.1		
	9-10	Review transformations of functions Section 1.4		
	11-12	Review inverses of functions Section 1.5 & Handout		
	13-15	Piecewise Functions Section 1.6		
	16-17	Absolute value Section 1.2 & Handout		
	18-20	Properties of functions Section 1.3 & TWO Handouts		
		REVIEW		

Reflect – DIAGNOSTIC TEST mark _____.

Functions studied in grade 9-11

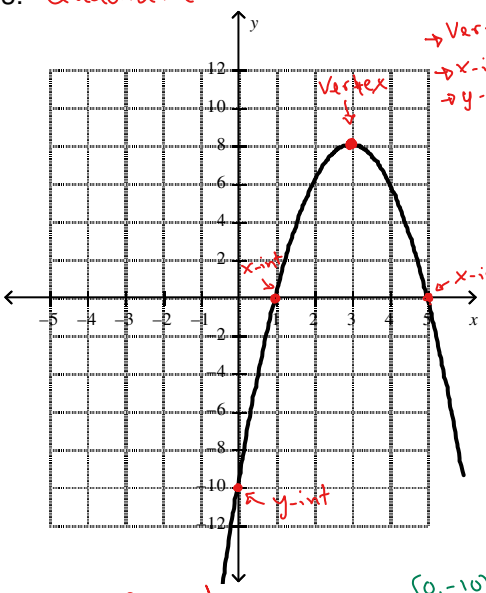
For each of the following state the parent function and the equation of the graphed function. Summarize any key information about this type of relation.

1. Vertical line ($x=b$) ② (y = x) Linear function



equation: ① $y = 4$ ② $x = -3$

3. Quadratic function ↶ ↷ $(y = x^2)$



→ Vertex $(3, 8)$ (h, k)
→ x-int : $(1, 0)$ and $(5, 0)$ (r, t)
→ y-int : $(0, -10)$

open down ↳ $a < 0$

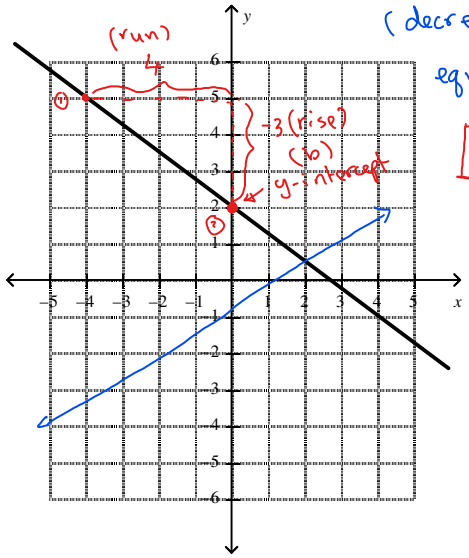
3 forms for equation

① Vertex form
$y = a(x-h)^2 + k$
$y = a(x-3)^2 + 8$
$(1,0)$ $0 = a(1-3)^2 + 8$
$0 = 4a + 8$
$-8 = 4a$
$-2 = a$
$\therefore y = -2(x-3)^2 + 8$

② Factored Form
$y = a(x-r)(x-t)$
$y = a(x-1)(x-5)$
$\therefore y = -2(x-1)(x-5)$

③ Standard Form
$y = ax^2 + bx + c$ (y-int.)
$y = -2(x-1)(x-5)$
$y = -2(x^2 - 6x + 5)$
$y = -2x^2 + 12x - 10$ (y-int.)

2. Linear function (decreasing graph)



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

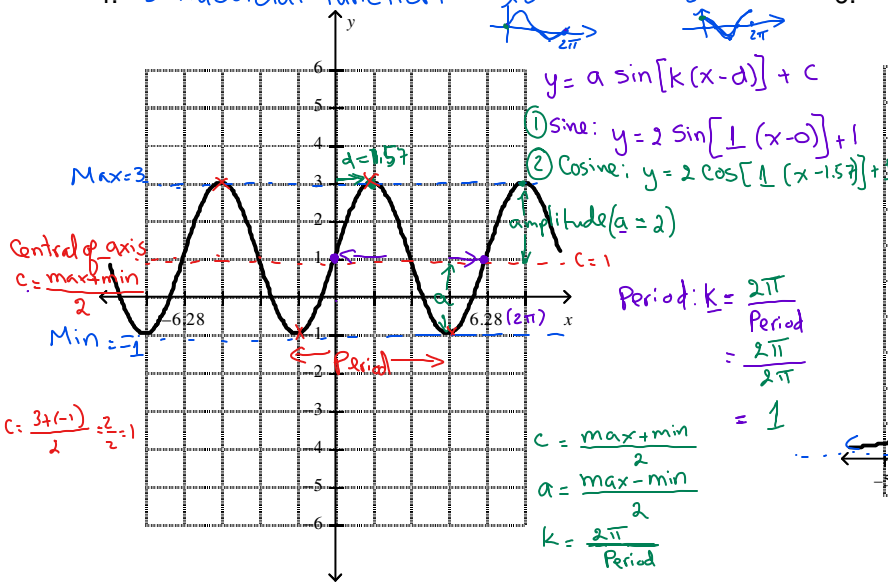
$y = mx + b$ $m = -\frac{3}{4}$ (slope) $b = 2$ (y-intercept)

↳ steepness of the line.

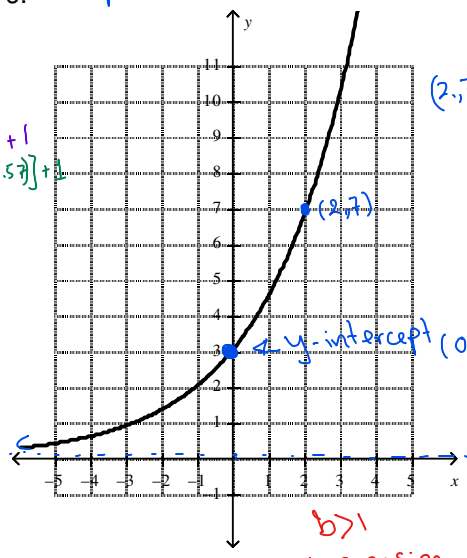
$m = \frac{\text{rise}}{\text{run}}$

For each of the following state the parent function and the equation of the graphed function. Summarize any key information about this type of relation.

4. Sinusoidal function $y = \sin x$ or $y = \cos x$



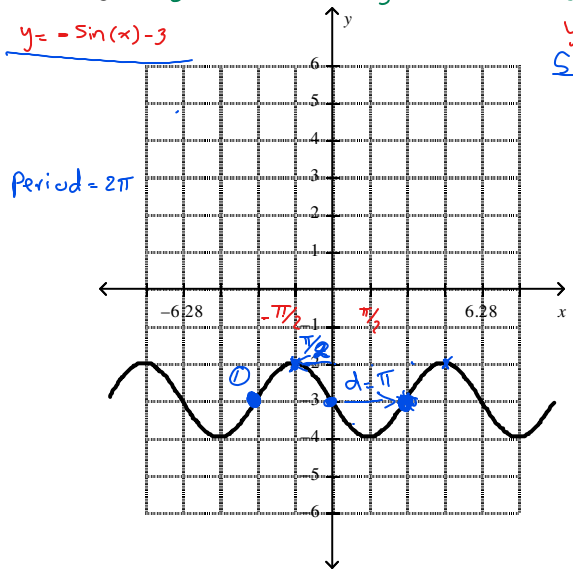
6. Exponential function $y = b^x$ $y = ab^x + c$



$y = 3b^x + 0$
$7 = 3b^2$
$\frac{7}{3} = b^2$
$\sqrt{\frac{7}{3}} = b$
$b \approx 1.5$
$\therefore y = 3(1.5)^x$

a = distance between H.A. and y-int.
a = 3

5. $y = a\sin[k(x-d)] + c$ or $y = a\cos[k(x-d)] + c$



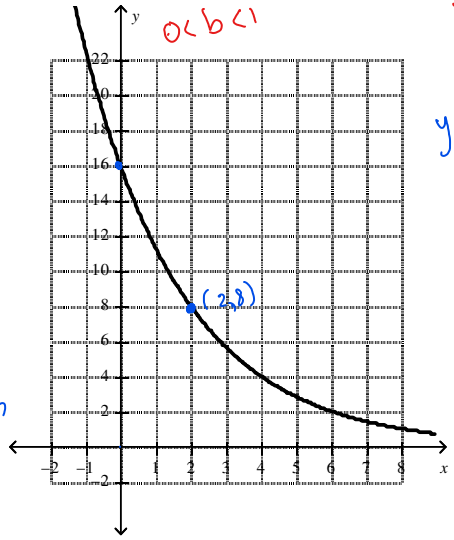
$y = \cos(x + 1.57) - 3$

Sine	Cosine
a = -1	a = 1
k = 1	
d = 0	d = -π/2
c = -3	

$y = \sin(x - \pi) - 3$

move down

7. decreasing $0 < b < 1$ $y = ab^x + c$



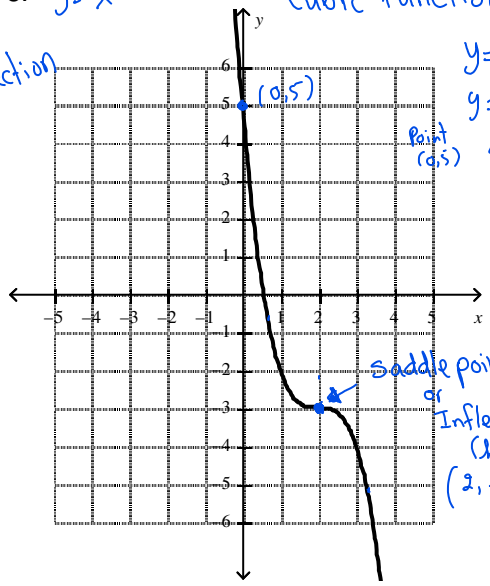
$y = 16(0.71)^x$

Linear x → Quadratic x^2 → Cubic x^3 → Quartic x^4 x^5

√ → Radical

For each of the following state the parent function and the equation of the graphed function. Summarize any key information about this type of relation.

8. $y = x^3$ Cubic function



$y = a(x-h)^3 + k$

$y = a(x-2)^3 - 3$

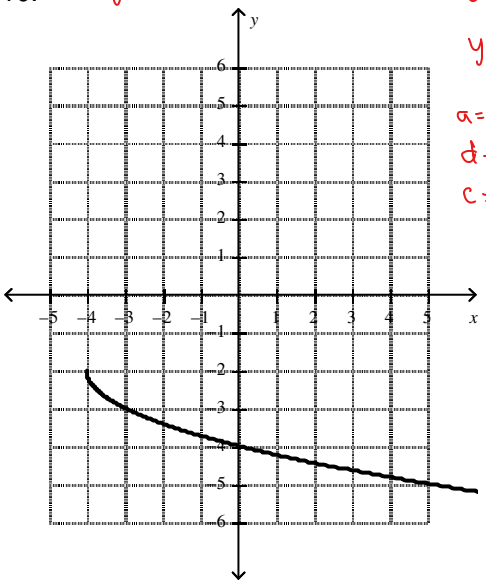
$5 = a(0-2)^3 - 3$

$8 = -8a$

$-1 = a$

$\therefore y = -(x-2)^3 - 3$

10. Square Root Function $y = \sqrt{x}$



$y = a\sqrt{x-d} + c$

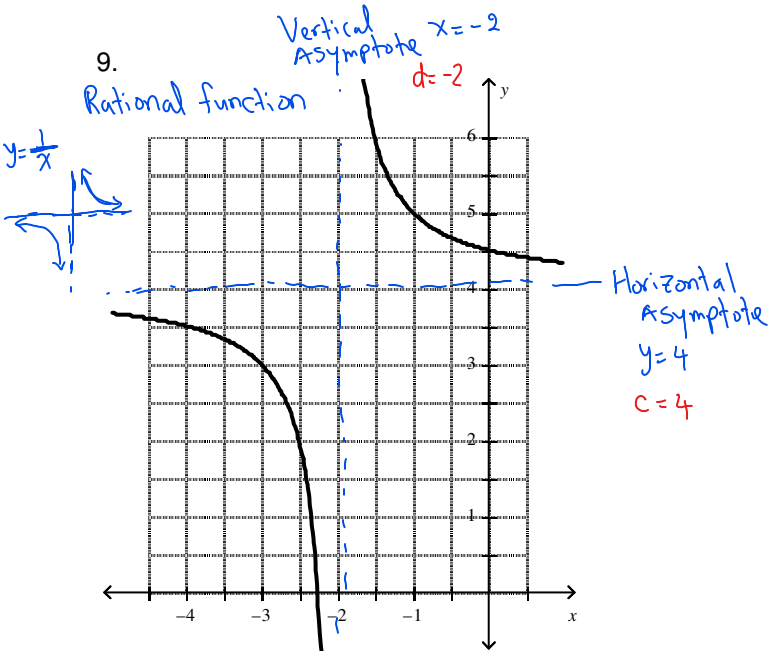
$a = -1$

$d = -4$

$c = -2$

$\therefore y = -\sqrt{x+4} - 2$

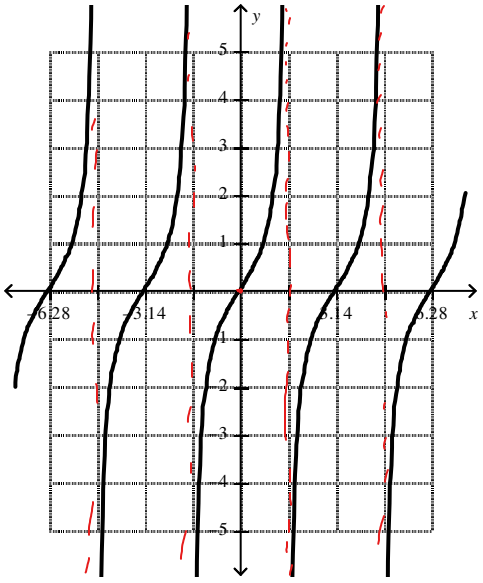
9.



$y = \frac{a}{k(x-d)} + c$

$y = \frac{1}{x+2} + 4$

11. Tangent function $y = \tan x$



Homework: Journal Unit 1 #1a