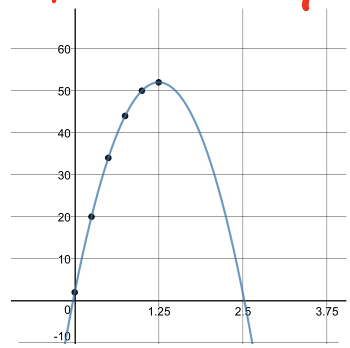
PreCalculus
Cumulative Review 2

HSF-ID.C.8

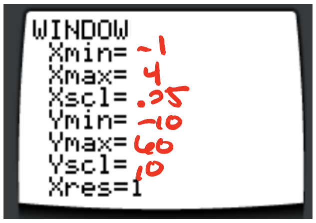
#1) Albert hits a fastball. The table below shows the height from the ground of the baseball over time. Graph the data with a friendly window. Record it below.

Time (sec)	0	0.25	0.5	0.75	1	1.25
Distance (ft)	2	20	34	44	50	52

For reference only



a. Record a friendly window.



b. What type of regression model would be most appropriate?

Quadratic

c. Use regression to write the equation of the model.

$y = -32x^2 + 80x + 2$

d. Predict the height (to 3 decimals) of the baseball at 2.0 seconds.

34 feet

e. Find the times (to 3 decimals) at which the ball will be 10 feet in the air.

0.104 seconds and 2.396 seconds

f. When (to 3 decimals) will the ball hit the ground?

2.525 seconds

g. What does the y-intercept represent? (Sentence answer).

The height of the ball when it's hit.

#5) If $f(x) = -3x + 10$ and $g(x) = 4x^3 + x^2 + 5$, find the following:

$f(g(0)) = -3(g(0)) + 10$

$= -3(4(0)^3 + (0)^2 + 5) + 10$

$= -3(5) + 10$

$= -15 + 10$

$f(g(0)) = -5$

OR

$g(0) = 4(0)^3 + (0)^2 + 5$

$g(0) = 5$

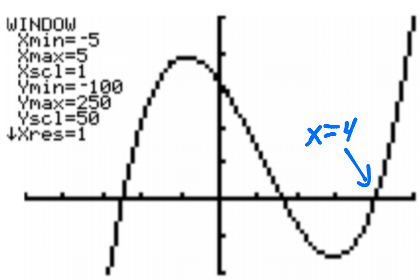
$f(g(0)) = -3(5) + 10$

$= -15 + 10$

$f(g(0)) = -5$

#6) Use the graph of the function to determine at least one zero, then find the exact values of all the zeros using the Factor Theorem.

$f(x) = 10x^3 - 31x^2 - 76x + 160$



$\boxed{4}$	10	-31	-76	160
		40	36	-160
	10	9	-40	R 0

$f(x) = (x-4)(10x^2 + 9x - 40)$

$f(x) = (x-4)[(10x^2 + 25x) + (-16x - 40)]$

$f(x) = (x-4)[5x(2x+5) - 8(2x+5)]$

$0 = (x-4)(2x+5)(5x-8)$

$0 = x-4$, $4 = x$

$0 = 2x+5$, $-5 = 2x$, $-\frac{5}{2} = x$

$0 = 5x-8$, $8 = 5x$, $\frac{8}{5} = x$

$\therefore$ x-int: $\frac{8}{5}, -\frac{5}{2}, 4$

Answer the following questions about the given function.

$y = 3|-5x - 10| - 1$

$y = 3|-5(x+2)| - 1$

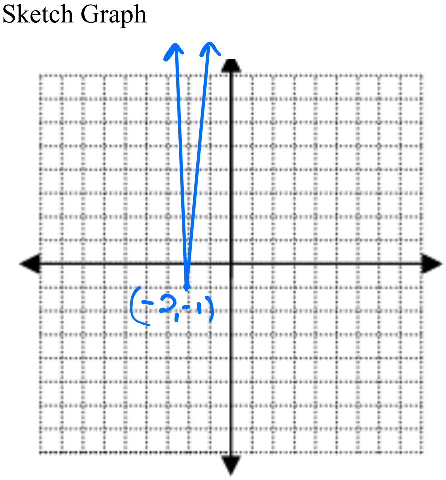
#7) Name Function: ABSOLUTE VALUE

#8) Translation: Left 2
Down 1

#9) Scale: Stretch vertically by 3
Shrink horizontally by $\frac{1}{5}$

#10) Reflection: Horizontal Reflection

#11) Sketch Graph



#12) Solve.

$$\cancel{(x+2)(x-5)}\,\frac{3x}{\cancel{x+2}} = \frac{(-7-8x)}{\cancel{x^2-3x-10}} + \frac{1\cancel{(x+2)(x-5)}}{\cancel{x-5}}$$

$3x(x-5) = (-7-8x) + (x+2)$

$3x^2 - 15x = -7x - 5$

$3x^2 - 8x + 5 = 0$

$(3x^2 - 3x) + (-5x + 5) = 0$

$3x(x-1) - 5(x-1) = 0$

$(x-1)(3x-5) = 0$

$x - 1 = 0$ | $3x - 5 = 0$
$x = 1$ | $3x = 5$
 | $x = 5/3$

$\therefore x = 5/3,\ 1$

Denom $\neq 0$

$\boxed{x+2 \neq 0,\ x \neq -2 \quad x+5 \neq 0,\ x \neq 5}$

#13) Simplify.

$$\frac{(x-3)}{(\sqrt{x}-\sqrt{x-7})}\cdot\frac{(\sqrt{x}+\sqrt{x-7})}{(\sqrt{x}+\sqrt{x-7})}$$

$$= \frac{(x-3)(\sqrt{x}+\sqrt{x-7})}{(\sqrt{x})^2-(\sqrt{x-7})^2}$$

$$= \frac{(x-3)(\sqrt{x}+\sqrt{x-7})}{x-(x-7)}$$

$$= \frac{(x-3)(\sqrt{x}+\sqrt{x-7})}{7}$$

#14) Evaluate

$\log_5 125 = \log_5 5^3$

$= 3$

Use $f(x) = \frac{5x}{x^3-12x^2+35x}$ to answer the following questions.

#15) Vertical Asymptotes/Holes:

$f(x) = \frac{5x}{x(x-7)(x-5)}$

Holes (cancel): $x = 0$

VA (stays): $x - 7 = 0$, $x = 7$ | $x - 5 = 0$, $x = 5$

$\therefore$ Hole @ $x = 0$, VA @ $x = 5, 7$

#16) x-intercepts:

$0 = 5x$

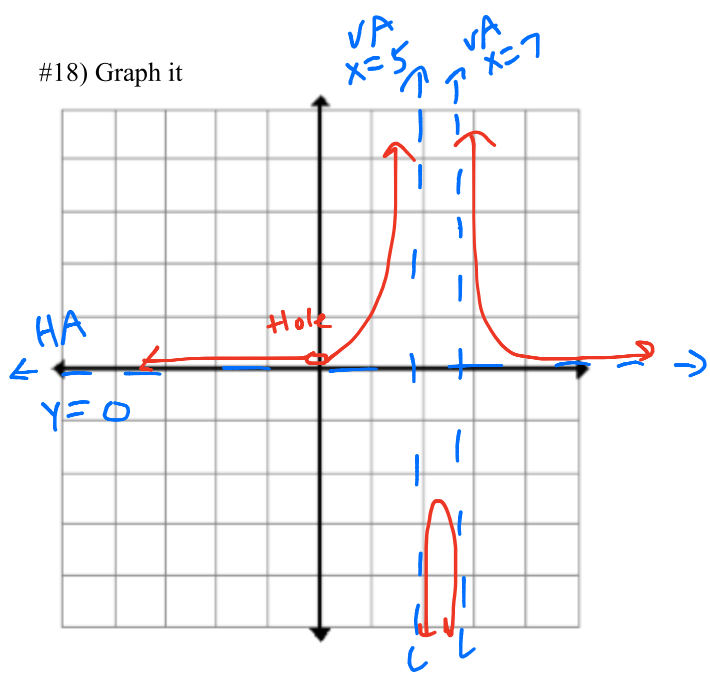
$0 = x$ (There is a hole @ 0, so No x-int)

#17) Horizontal/Slant Asymptotes:

$n \overset{?}{=} d$

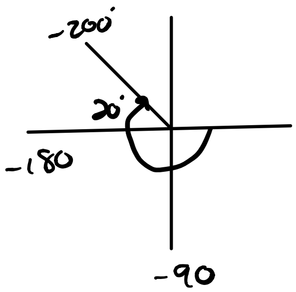
$0 < 2$, so HA $y = 0$

#18) Graph it



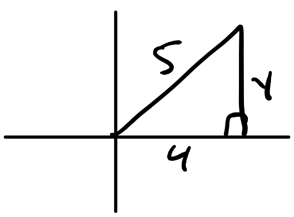
+ acute

#19) Find the reference angle for the angle -200º.



Reference angle = 20°

#20) Suppose $\cos(B) = \frac{4}{5}$ and the terminal side of the angle lies in quadrant I.



$x^2 + y^2 = r^2$

$(4)^2 + y^2 = (5)^2$

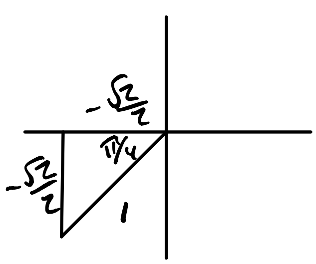
$16 + y^2 = 25$

$y^2 = 9$

$y = \pm 3$

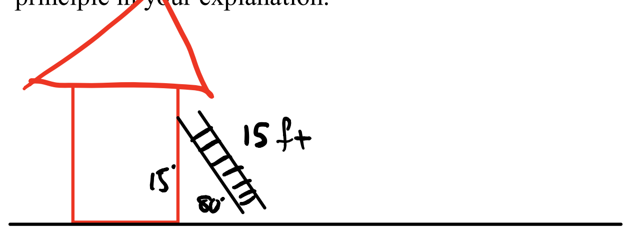
tan (B) = $\frac{3}{4}$

#21) Find the exact value of each function using the unit circle. Do not use a calculator.



$\cos\left(\frac{5}{4}\pi\right) =$ $\frac{-\sqrt{2}}{2}$

#22) Alyssa was assigned the following problem to do in math class "A 15-foot ladder is leaning on the outside of a house. If the angle formed by the ladder and the level ground is 80º, to the nearest hundredth how far up the side of the house does the ladder reach?"
After finishing the problem, Alyssa immediately knew her answer, 15 feet, was unreasonable. What makes her answer impossible? Include at least one mathematical principle in your explanation.



If the ladder reaches 15 feet high, that makes the leg of the right triangle the same length as the hypotenuse. But, we know the hypotenuse is always the largest side of a right triangle.