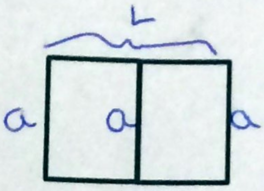
Name: Answer Key Teacher: ____________ Period: ______

Unit 2 Quiz 2 Review

U2LT4 - I can construct a model to represent and or investigate by finding max/mins and intervals of inc/dec/

1. a. You have some fencing (60 feet) to build the shape below. How can you maximize the area?



$3a + 2L = 60$ ← Condition

$aL = \text{Area}$ ← maximize

$L = (60 - 3a) \div 2$ ← Rewrite condition

$\text{Area} = a \cdot \left(\frac{60-3a}{2}\right)$ ← Rewrite max

Calculator

Max of 150 at $x = 10$

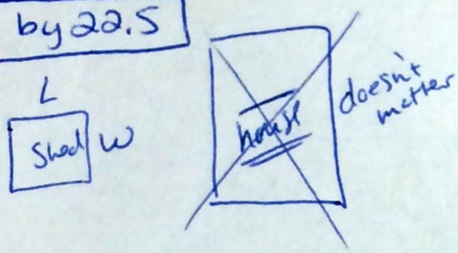
Max area of 150 with dimensions 10 by 20

b. What was the domain you looked at? Why?

D: $(0, 20)$ because if $a = 0$, there would be no width, and if $a = 20$, there would be no length (because $a + a + a = 60$).

2. You have 90 yards of material to build walls. You are going to build a shed next to your house. What should the dimensions of room be to **maximize the area?**

$\boxed{22.5 \text{ by } 22.5}$



$2L + 2w = 90$ ← Condition

$Lw = \text{Area}$ ← maximize

$w = \frac{90 - 2L}{2}$

$w = 45 - L$ ← Rewrite Condition

Maximize

$L(45 - L) =$

Calculator

Max of 506.25 at $x = 22$

U2LT5 - I can find a function's inverse and verify if given functions are inverses or not.

Find the inverse of the following. State the domain and range of both.

3. $f(x) = \frac{x-4}{3x}$

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

$3yx = y - 4$

$3yx - y = -4$

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

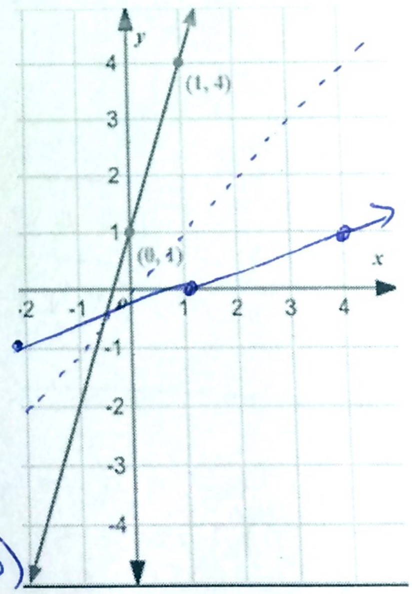
$y = \frac{-4}{3x-1}$

Domain $(-\infty, 0) \cup (0, \infty)$ Range $\left(-\infty, \frac{1}{3}\right) \cup \left(\frac{1}{3}, \infty\right)$

$\boxed{f^{-1}(x) = \frac{-4}{3x-1}}$

Domain: $\left(-\infty, \frac{1}{3}\right) \cup \left(\frac{1}{3}, \infty\right)$ Range: $(-\infty, 0) \cup (0, \infty)$

4.



Domain $(-\infty, \infty$

Range $(-\infty, \infty$

$f^{-1}(x) = \frac{1}{3}x -$

Verify the following are inverses algebraically. Show all work.

7. $f(x) = \sqrt{\frac{5x-6}{4}}$ $g(x) = \frac{4x^2+6}{5}$

Because $f^{-1}(x) = g(x)$, the functions are inverses.

$f^{-1}(x) = \frac{4x^2+6}{5}$

Also consider $f(g(x)) = \sqrt{\frac{5\left(\frac{4x^2+6}{5}\right)}{4}}$

ther
nd the
inverse of
(x)

$x = \sqrt{\frac{5y-6}{4}}$ $y = \frac{4x^2+6}{5}$

$= \sqrt{\frac{4x^2+6-6}{4}} = \sqrt{\frac{4x^2}{4}} = \sqrt{x^2}$

U2LT6 - I can find the average rate of change of a functin between two given values.

8. Find the average rate of change of the function from x= 1 to x = 4: $f(x) = 3x^2 - 13x + 10$

$$\frac{f(4)-f(1)}{4-1} = \frac{[3(4)^2-13(4)+10]-[3(1)^2-13+10]}{3} = \frac{[48-52+10]-[3-13+10]}{3}$$

$$= \boxed{2}$$

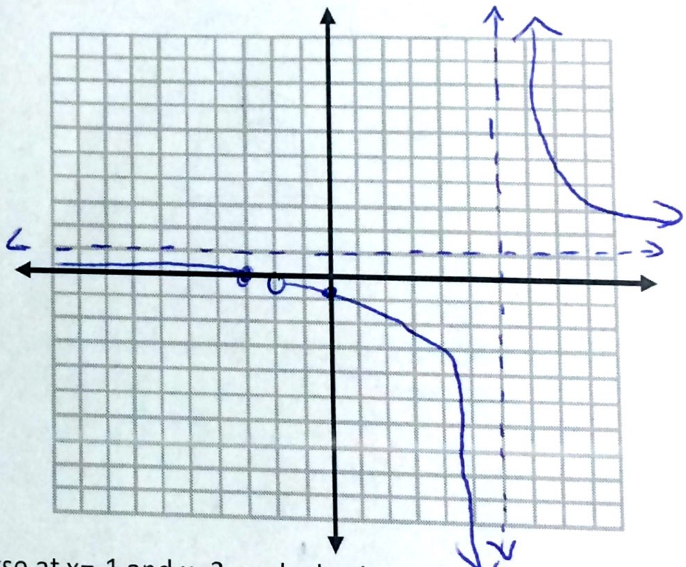
9. A ball is thrown in the air. The function $h(t) = -\frac{1}{5}(t-2)^2 + 5$ models it's height off the ground after t seconds. Find the average rate of change of the ball's height from time 2 to 4 seconds.

$$\frac{h(4)-h(2)}{4-2} = \frac{\left[-\frac{1}{5}(4-2)^2+5\right]-\left[-\frac{1}{5}(2-2)^2+5\right]}{2}$$

$$= \frac{(-\frac{4}{5}+5)-5}{2} = \frac{-\frac{4}{5}}{2} = \frac{-4}{10} = \boxed{-\frac{2}{5}}$$

U2LT7- I can graph/ write rational graphs.

10. Graph and identify: $f(x) = \frac{x^2+5x+6}{x^2-4x-12} = \frac{(x+3)(x+2)}{(x-6)(x+2)}$



Hor. Asym: $y=1$

Vert. Asym: $x=6$

Holes: $x=-2$

Y-int: $(0, -\frac{1}{2})$ X-int: $(-3, 0)$

11) Write the equation of a graph with a hole at x=4, vertical asymptotse at x=-1 and x=3, and a horizontal asymptote at y=0.

denom > top

$$\frac{(x-4)}{(x-4)}$$

$(x+1)$ $(x-3)$ in bottom

$$\boxed{f(x) = \frac{(x-4)}{(x+1)(x-3)}}$$