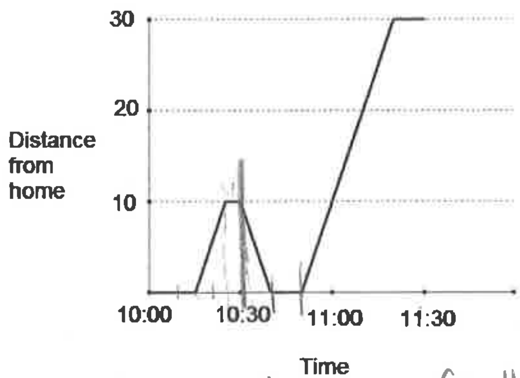
Algebra 2 – Transformations ART Name Key ART Period ______

Tr T-1 1: I can interpret graphs that model real world scenarios.

For 1-3

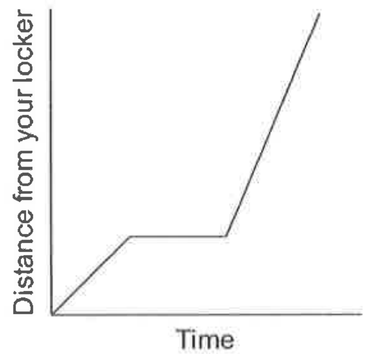
a. Describe the independent and dependant variable
b. Describe the context of the y-intercept
c. Tell a story that accurately reflects all that is happening in the graph.

1.



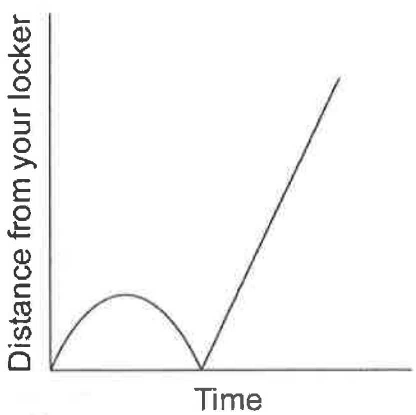
a. Indep. TIME, Depend. Distance frm Home
b. at 10:00, you are home.
c. You are home until 10:15 when leave for work, After ten minutes, you Stop and rest for 5 minutes then head back home. I stay home 10 minutes before heading to work which takes 40 minutes.

2.



a. Ind: time Dep: Distance
b. You are at your locker
c. I get my books and go to class. When class is over I walk home.

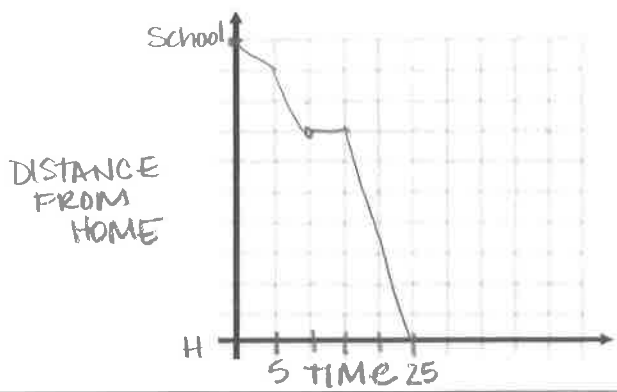
3.



a. Time, Distance
b. You are at your locker.
c. Im at my locker, head to class, go back to my locker, and then head to class accross campus.

4. Draw a graph to go with the following story and label the axes appropriately:

On Tuesday, when Kim walked home from school, she was excited! After beginning her walk home, she sped up to get home faster. After walking for 10 minutes, she stopped and rested on the bench at a bus stop. After a 5-minute rest, she began walking again. To make up for lost time, she ran the rest of the way at a steady, faster pace arriving home 25 minutes after leaving school.



5. The number of gum balls, g, that can be packaged in a box with a volume of v cubic units is given by $g(v) = 40v + 15$. Describe the independent and dependent variables.

The number of gumballs depends on the volume of the box
Independent: Volume
Dependent: gumballs

Tr T-2: I can identify functions and use function notation.

1. Given $f(x) = \dfrac{x+3}{x-2}$

   Find $f(-2)$

   $f(-2) = \dfrac{-2+3}{-2-2} = \boxed{\dfrac{1}{-4}}$

2. Given $h(x) = -3x^2 + 5x + 17$

   Find $h(6)$

   $h(6) = -3(6)^2 + 5(6) + 17$

   $h(6) = -61$

3. Given $g(x) = (x+4)^2 - 29$

   Find x when $g(x) = 20$

   $20 = (x+4)^2 - 29$

   $+29 \qquad +29$

   $49 = (x+4)^2$

   $\pm 7 = x + 4$

   $\boxed{\begin{array}{l} x = 3 \\ x = -11 \end{array}}$

4. Given $k(x) = -\sqrt{9x - 2}$

   Find $k(3)$

   $k(3) = -\sqrt{27-2}$

   $= -\sqrt{25}$

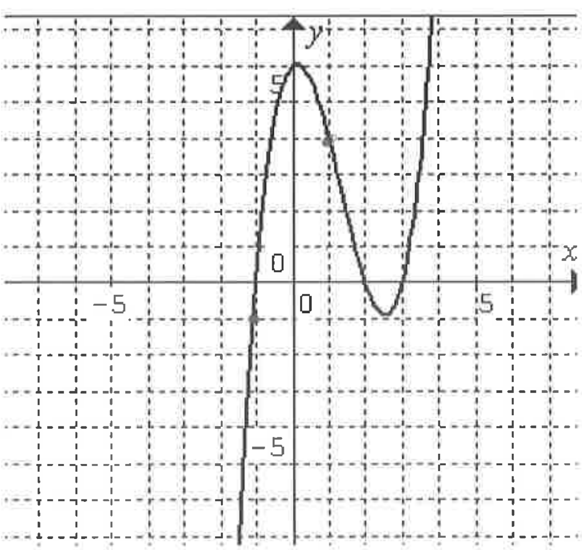
   $= -5$

5. Use the graph below.

   Find $f(1) = 4$

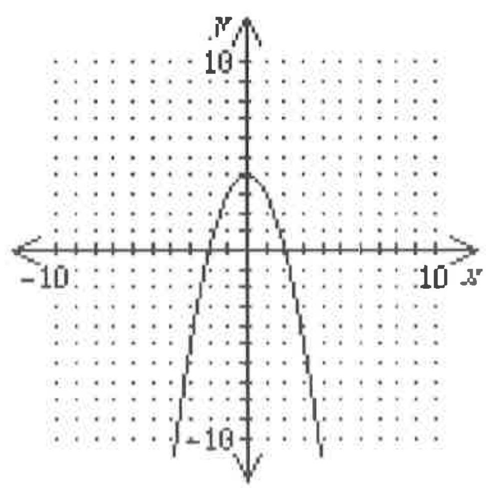
   Find x when $f(x) = -1$

   $x \approx -1.1$



6. Is this graph a function? How do you know?

   yes. VLT



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Tr T- 3: I can transform linear, quadratic, square root, and absolute value equations and explain the motion.

Corrected

1. If the line $y = -3(x) + 7$ is translated 4 units right and 2 units downward, **find the new equation, domain, and range.**

inside — outside

$y = -3(x-4) + 7 - 2$ $\quad$ $y = -3(x-4) + 5$ $\quad$ D: all $\mathbb{R}$, R: all $\mathbb{R}$ — true for all lines

2. If the graph of the function $y = \sqrt{x}$ is translated down 5 units and shrunk vertically by 2, **find the new equation, domain, and range.**

$y = \frac{1}{2}\sqrt{x} - 5$

$(0,-5)$ D: $x \geq 0$ R: $y \geq -5$

3. If the graph of the function $y = |x|$ is flipped over the y-axis and stretched vertically by 8, **find the new equation, domain, and range.**

$y = 8|-x|$

$(0,0)$ D: x all $\mathbb{R}$ R: $y \geq 0$

4. If the graph of the function $y = x^2$ is translated left 3 units and up 5 units, flipped vertically and stretched horizontally by 2, **find the new equation, domain, and range.**

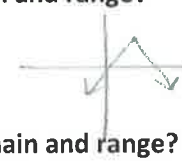
$y = -\left(\frac{x+3}{2}\right)^2 + 5$

$(-3,5)$ D: x all $\mathbb{R}$ R: $y \leq 5$

5. How does the graph of $y = -|x-2| + 3$ **compare** with the graph of $y = |x|$? **What is the new domain and range?**

It is moved right 2, up 3, and flipped vertically over x-axis.

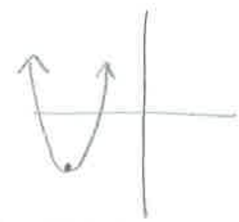
$(2,3)$ D: x all $\mathbb{R}$ R: $y \leq 3$



6. How does the graph of $y = \left(\frac{x+5}{4}\right)^2 - 3$ **compare** with the graph of $y = x^2$? **What is the new domain and range?**

It went left 5, down 3, with horizontal stretch by 4

$(-5,-3)$ D: x all $\mathbb{R}$ R: $y \geq -3$



7. The average profit p in dollars for a computer company is modeled by $p(c) = -5(c-100)^2 + 55{,}000$, where c is the number of computers sold. When the company updates to the newest software the average profit p is modeled by $p(c) = -5(c-100)^2 + 75{,}000$. What kind of transformation describes this change and what does this transformation mean in the context of this problem?

$(100, 55{,}000)$ For every 100 computers \$55,000 max profit

$(100, 75{,}000)$ For every 100 computers \$75,000 max profit.

Vertical shift upwards. With the newest software they can make more money (\$20,000 more) for the same number of computers.

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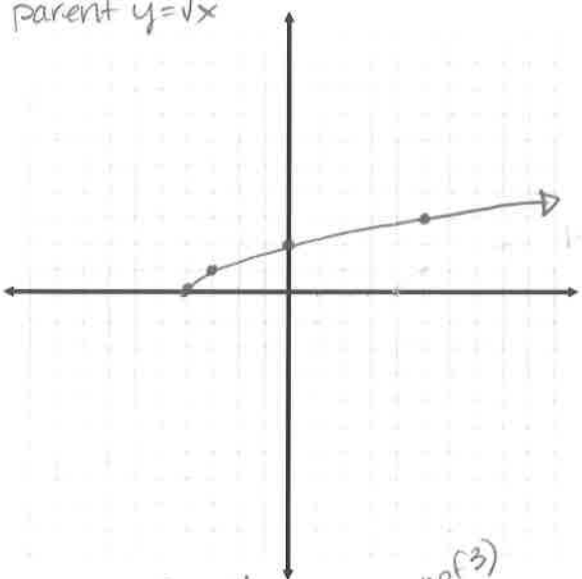
Tr T-4: I can graph linear, quadratic, square root, and absolute value equations that have been transformed.

In problems 1-4, graph the equation given and state the new domain and range.

1. $y=\sqrt{x+4}$ (-4,0) vertex

parent $y=\sqrt{x}$



Domain: $x \geq 4$

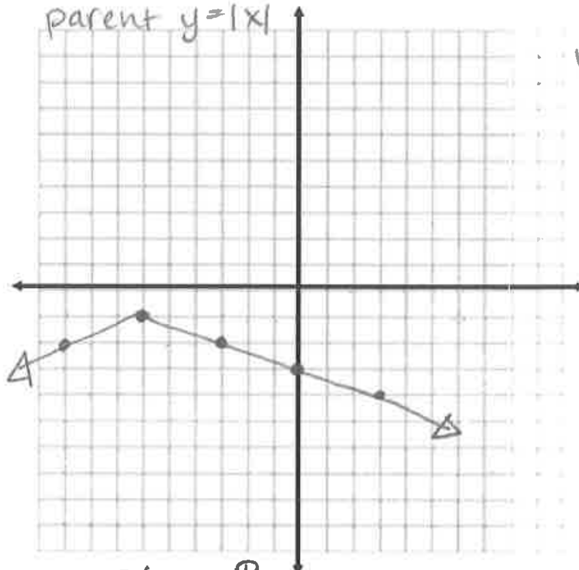
Range: $y \geq 0$

2. $y+1=-\left|\frac{x+6}{3}\right|$ $y=-\left|\frac{x+6}{3}\right|-1$

-1 -1

parent $y=|x|$

vertex (-6,-1)



Domain: x all $\mathbb{R}$

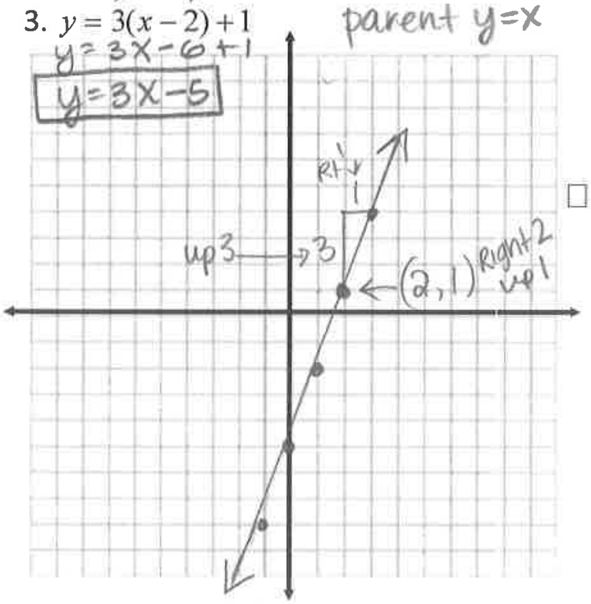
Range: $y \leq -1$

slope (vertical stretch of 3) Right 2, up 1

3. $y=3(x-2)+1$ parent $y=x$

$y=3x-6+1$

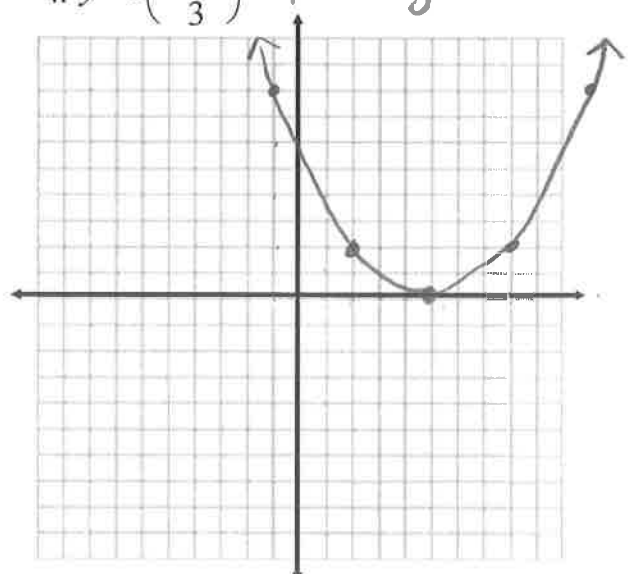
$\boxed{y=3x-5}$



Domain: x all $\mathbb{R}$ } always for lines ☺

Range: y all $\mathbb{R}$

4. $y=2\left(\frac{x-5}{3}\right)^2$ parent $y=x^2$ (5,0) vertex



Domain: x all $\mathbb{R}$

Range: $y \geq 0$

Extra practice on to do on above graphs or separate paper:

1. $y=2x-7$ 2. $y=2x^2$ 3. $y=-\frac{1}{3}|x+2|-1$ 4. $y-2=-\sqrt{-x}$

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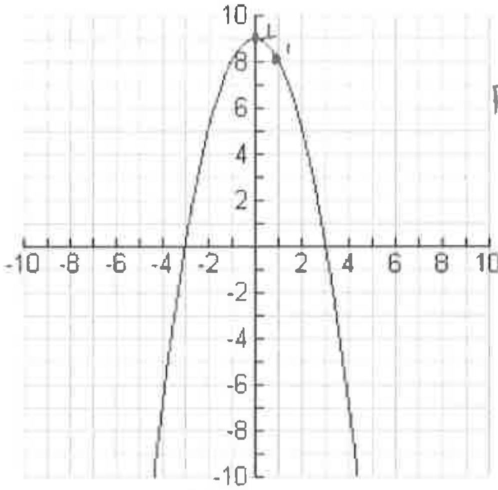
Tr-T5: I can write the equation of linear, quadratic, square root, and absolute value graphs.

Write the equations of the graphs below and state the domain and range. Verify a few points to be sure!

1.



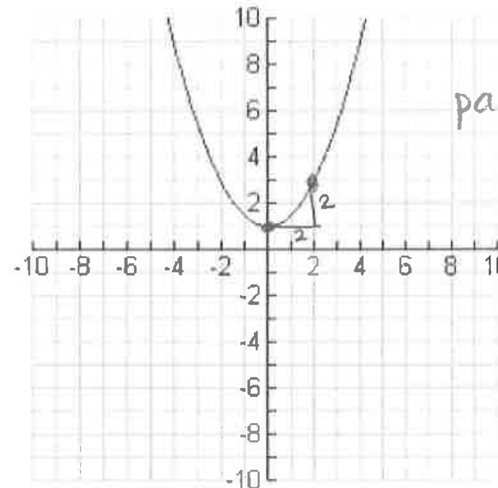
parent $y=x^2$

Equation $y=-(x)^2+9$

Domain x all $\mathbb{R}$

Range $y \le 9$

2.



parent $y=x^2$

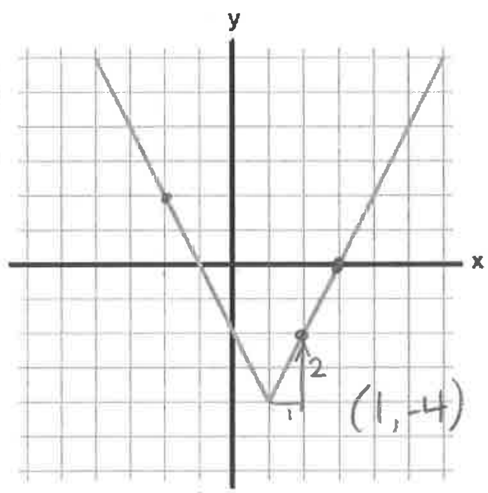
Equation $y=2\left(\frac{x}{2}\right)^2+1$

Domain x all $\mathbb{R}$

Range $y \ge 1$

3.

parent $y=|x|$

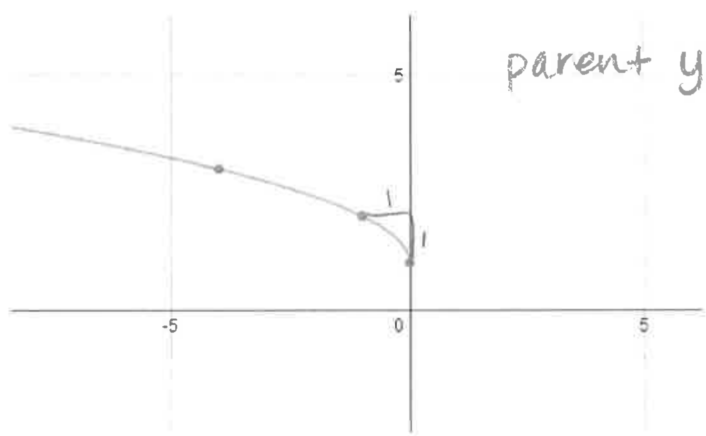


Equation $y=2|x-1|-4$

Domain x all $\mathbb{R}$

Range $y \ge -4$

4.



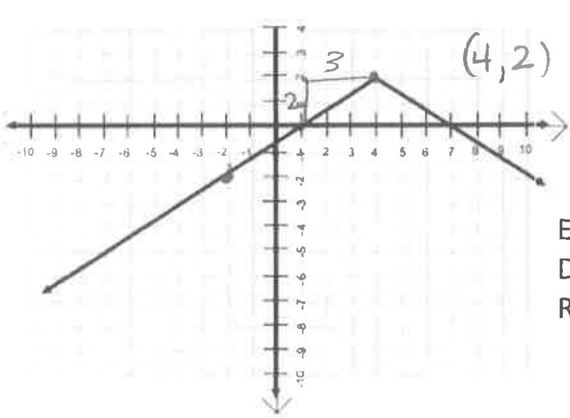
parent $y=\sqrt{x}$

Equation $y=\sqrt{-x}+1$

Domain $x \le 0$

Range $y \ge 1$

5.



(4,2) parent $y=|x|$

Equation $y=-2\left|\frac{x-4}{3}\right|+2$

Domain x all $\mathbb{R}$

Range $y \le 2$