Name Key

Unit 3 Review
No Calculators Allowed

DIRECTIONS: Complete each problem below and provide the final answer on the line provided or the grid provided. Show all your work. Colored pencils or pens are allowed for shading.

#1-2 Multiply.

1. $(x+4)(2x-5)$

$2x^2+8x-5x-20$

$2x^2+3x-20$

2. $(x-3)(x^2+2x-4)$

x^3+2x^2-4x
$-3x^2-6x+12$
$x^3-x^2-10x+12$

$x^3-x^2-10x+12$

#3 Expand the following and simplify.

3. $(2x+2)^4$

1 4 6 4 1

$(2x)^4+4(2x)^3(2)+6(2x)^2(2^2)+4(2x)(2^3)+2^4$

$16x^4+64x^3+96x^2+64x+16$

$16x^4+64x^3+96x^2+64x+16$

#4-7 Factor completely.

4. $x^3 + 3x^2 - 4x - 12$

$x^2(x+3) - 4(x+3)$

$(x+3)(x^2-4)$

$(x+3)(x+2)(x-2)$

$(x+3)(x+2)(x-2)$

5. $24 + 81x^3$

$3(8 + 27x^3)$

$3(2+3x)(4-6x+9x^2)$

$3(2+3x)(4-6x+9x^2)$

6. $5a^4 - 40a^2 + 60$

$5(a^4 - 8a^2 + 12)$

$5(a^2-6)(a^2-2)$

$5(a^2-6)(a^2-2)$

7. $3n^2 - 7n - 6$

$-18 \quad -7$

$-9 \quad 2$

$3n^2 - 9n + (2n-6)$

$3n(n-3) + 2(n-3)$

$(n-3)(3n+2)$

$(n-3)(3n+2)$

#8-10 Factor completely.

8. $12x^3y+8x^2y+20y$

$4y(3y^3+2x^2+5)$

$4y(3x^3+2x^2+5)$

9. $16x^6-2z^3$

$2(8x^6-z^3)$

$2(2x^2-z)(4x^4+2x^2z+z^2)$

$2(2x^2-z)(4x^4+2x^2z+z^2)$

10. $6x^2-14x-20$

$-30 \mid -7$

$-10, 3$

$2(3x^2-7x-10)$

$2(3x^2-10x+3x-10)$

$2[x(3x-10)+(3x-10)]$

$2(3x-10)(x+1)$

$2(3x-10)(x+1)$

#11 Solve for value of x.

11. $5x^2-2x+12=3x^2-5x+21$

$-3x^2 \quad -3x^2$

$2x^2-2x+12=-5x+21$

$+5x \quad +5x$

$2x^2+3x+12=21$

$-21 \quad -21$

$2x^2+3x-9=0$

$(2x^2+6x)+-3x-9=0$

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

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

$x=-3 \quad x=\frac{3}{2}$

$\leftarrow x=-3, \frac{3}{2}$

$x=-3, \frac{3}{2}$

#12 Solve by completing the square.

12. $4x^2 - 10x = 15$

$4(x^2 - \frac{5}{2}x \quad) = 15$

$4(x^2 - \frac{5}{2}x + \frac{25}{16}) = 15 + \frac{25}{4}$

$4(x - \frac{5}{4})^2 = \frac{85}{4}$

$(x - \frac{5}{4})^2 = \frac{85}{16}$

$(\frac{1}{2}(5))^2$

$(\frac{5}{4})^2$

$x - \frac{5}{4} = \pm\frac{\sqrt{85}}{4}$

$x = \frac{5}{4} \pm \frac{\sqrt{85}}{4}$

3.55Y, -1.05Y

$x = \frac{5}{4} \pm \frac{\sqrt{85}}{4}$

#13 Find the solution set for the following problem. Graph the solution on the number line provided.

13. $-2x^2 + 8x - 5 > x - 2$

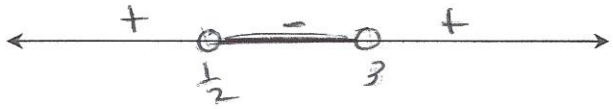
$-x+2 \quad -x+2$

$-2x^2 + 7x - 3 > 0$

$2x^2 - 7x + 3 < 0$

$(2x - 1)(x - 3) < 0$

$x = \frac{1}{2} \quad x = 3$



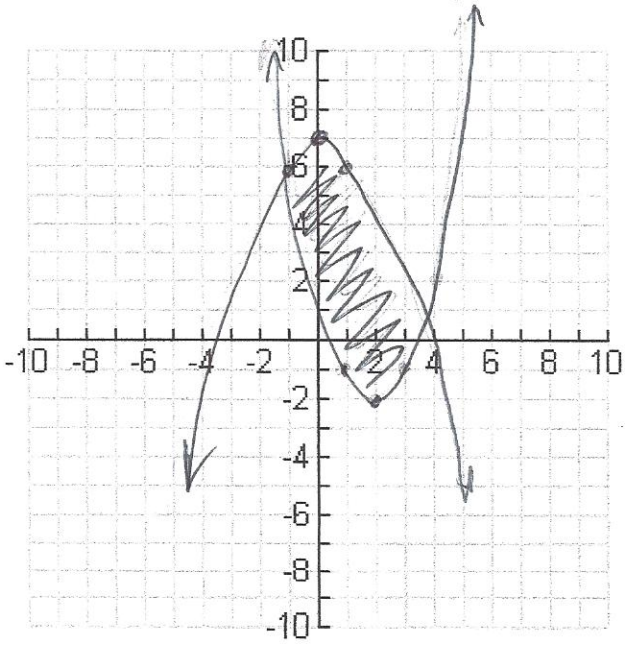
$(\frac{1}{2}, 3)$

#14 Graph the two inequalities and find the solution set. Shade where necessary.

14. $(x-2)^2 - 1 < y < -x^2 + 7$

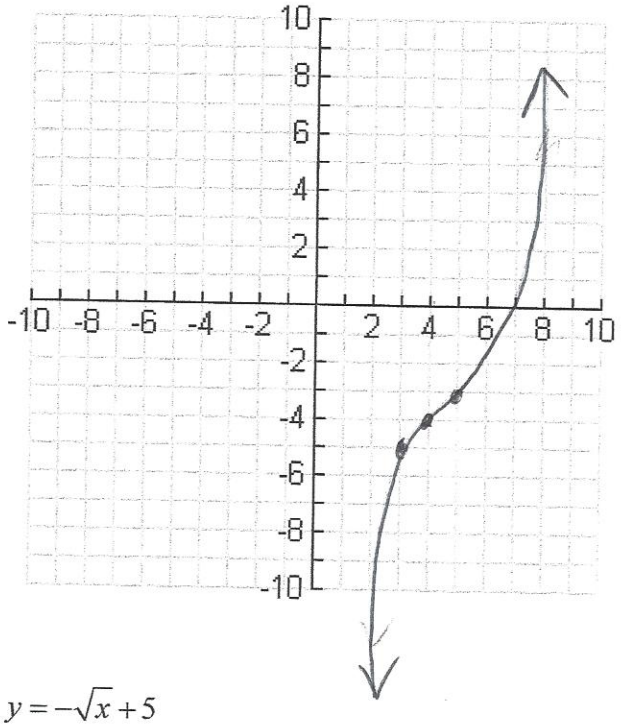
→ ↓ ↑

x axis reflect

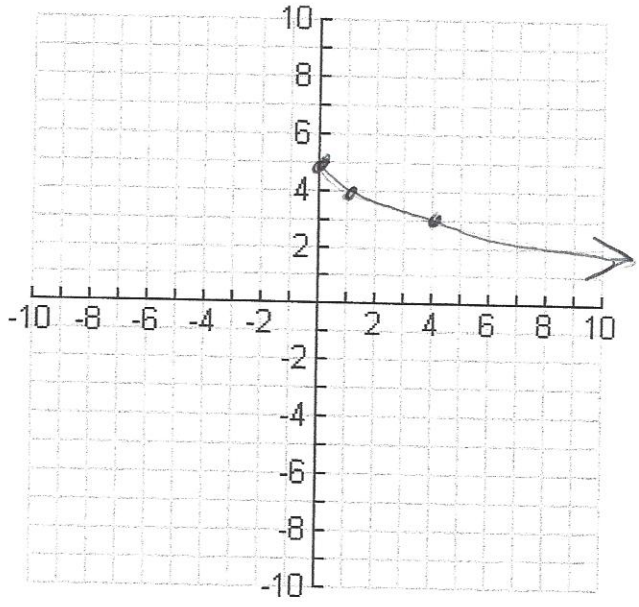


#17-18 Graph the given function on the coordinate plane.

17. $y=(x-4)^3-4$

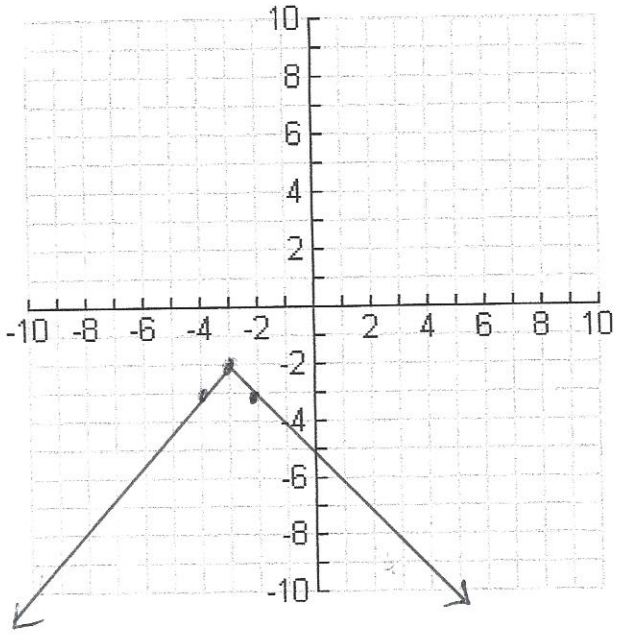


18. $y=-\sqrt{x}+5$

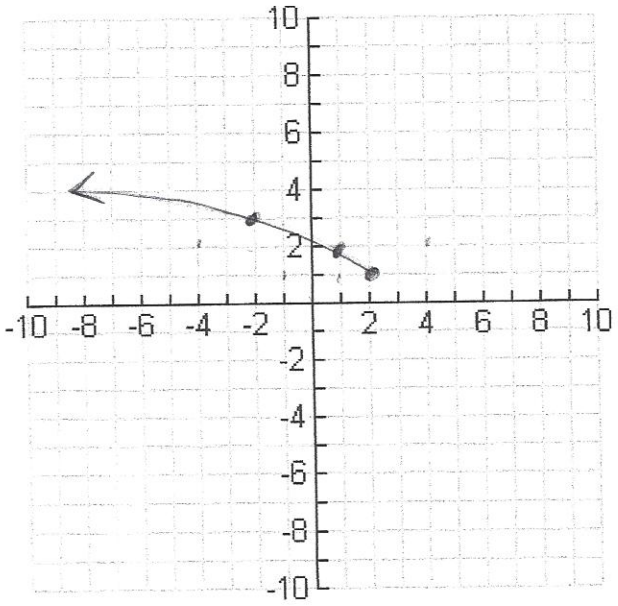


#15-16 Graph the given function on the coordinate plane.

15. $y = -|x+3| - 2$



16. $y = \sqrt{-(x-2)} + 1$



Name Liz

Unit 3 Review
Graphing Calculator Portion

DIRECTIONS: Complete each problem below and provide the final answer on the line provided or the grid provided. Show your work or explain which function on the calculator you used to find the answer.

1. A tennis ball is launched at 19.6 meters per second (m/s) from a 58.8-meter tall platform. The equation for the tennis ball's height s at time t seconds after launch is $s(t) = -4.9t^2 + 19.6t + 58.8$, where s is in meters. Round answers to the nearest tenth.

   $-1 \leq x \leq 10$; By 1
   $-1 \leq y \leq 100$; 10 } window

   a. What is the maximum height the tennis ball?

   ↑ y value of max

   78.4 m

   b. When does this maximum height occur?

   ↑ x value of max

   2 Seconds

   c. What is the height at 3 seconds?

   ↑ Table

   73.5 m

   d. When does the tennis ball strike the ground?

   ↑ 2nd Calc Zero

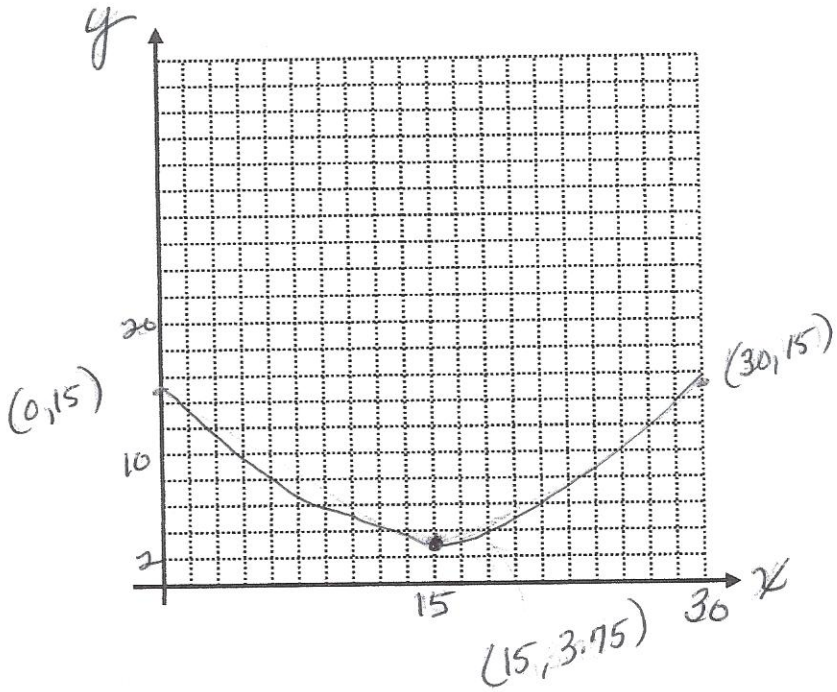
   6 Seconds

   e. If someone is standing on the ground and they catch the ball at a height of 2 meters, when does this occur?

   $y_2 = 2$
   ↓
   Intersect
   ↓
   Down Side

   5.949 seconds

2. A snowboard half-pipe ramp has a shape in the form of a parabola whose equation is $y = .05x^2 - 1.5x + 15$ where x represents the horizontal distance across the 30-foot wide half-pipe and y represents the ramp's height above the ground in feet. With the help of your calculator, sketch a graph of the half-pipe below Label its height at its endpoints and its minimum point. Include scale, axis labels and ordered pairs.



3. Use the graphing calculator to solve the following quadratic equation: Round to 3 decimal places. (HINT: You will need to adjust your window)

$$-x^2\sqrt{89} + x\sqrt{591} + 787 = 0$$

$-10 \leq x \leq 20$; 5
$-50 \leq y \leq 1000$; 100

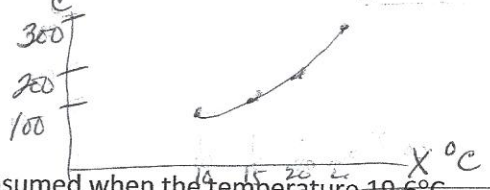
$y_1 \rightarrow$ Zeros

$x \approx 7.9355$
$x \approx 10.5124$

4. The metabolic rate of an ectothermic organism increases with increasing temperature within a certain range. Experimental data for oxygen consumption C (in microliters per gram per hour) of a beetle at certain temperatures yielded the model $C = .45x^2 - 1.65x + 50.75$ where x is the air temperature in Celsius and $10 \le x \le 25$.

a) Use the TI-83/84 to graph the consumption model over the given domain.

WINDOW
$10 \le X \le 25 ; 5$
$7 \le y \le 300 ; 50$



b) How much oxygen will be consumed when the temperature 19.6°C

$X = 19.6$

191.28 microliters/gram/hr

c) Use the graph from part (a) to approximate the air temperature resulting in oxygen consumption of 150 microliters per gram per hour.

$C = 150$
↑
y

$y_2 = 150$
Interseet

16.797°C

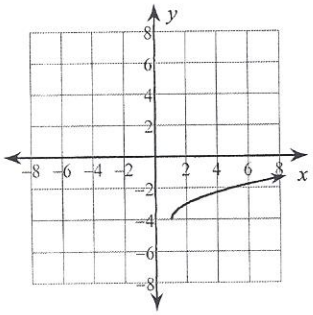
d) The temperature in increased from 10°C to 20°C. The oxygen consumption is increased by approximately what factor?

$C(10) = 79.25$
$C(20) = 197.75$

249% or 2.495

Answers to Functions - Transformations, Shifts & Reflections (ID: 1)

1)



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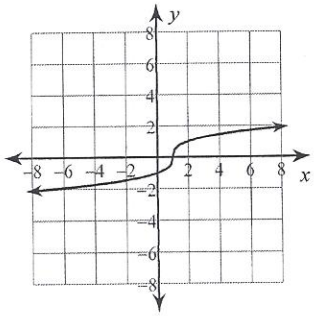

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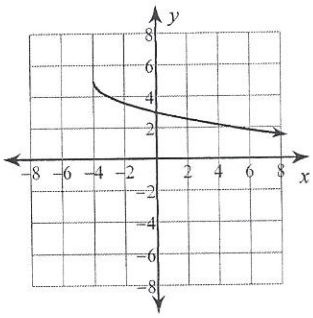

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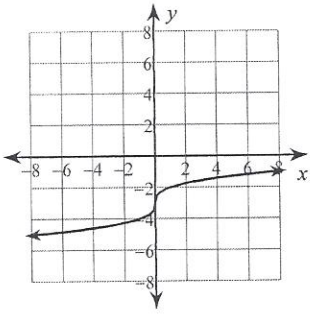

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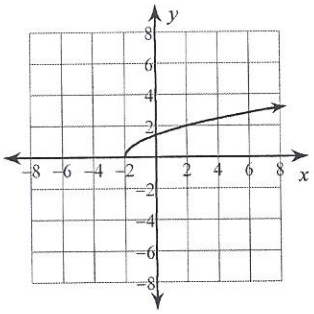

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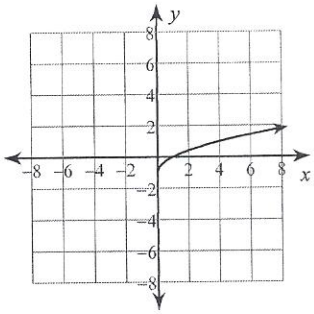

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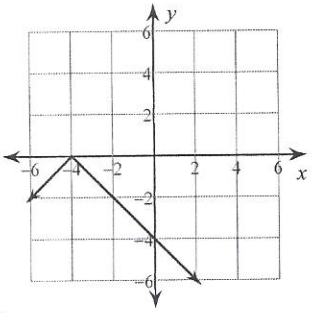

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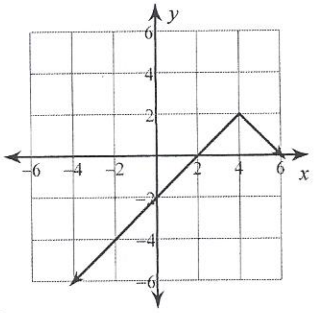

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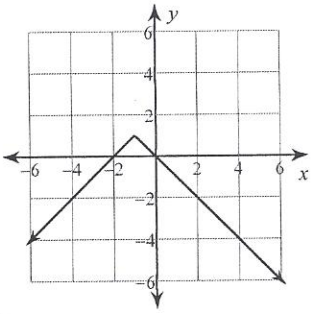

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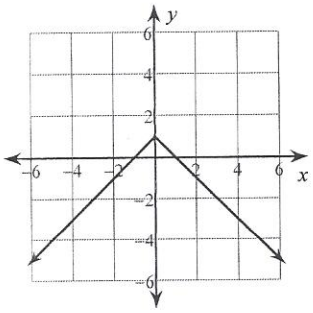

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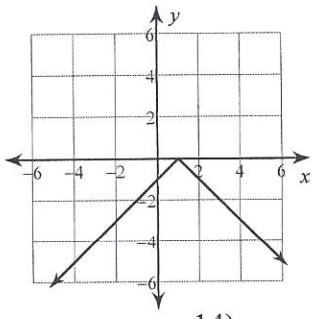

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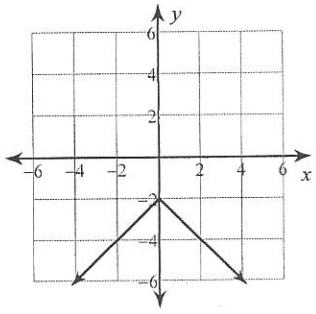

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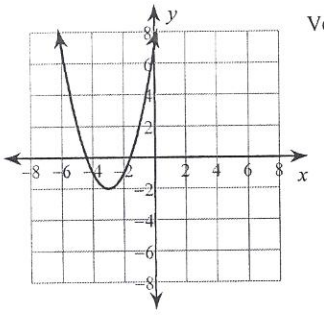
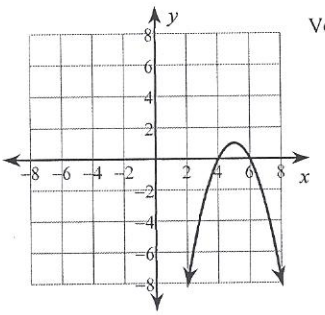


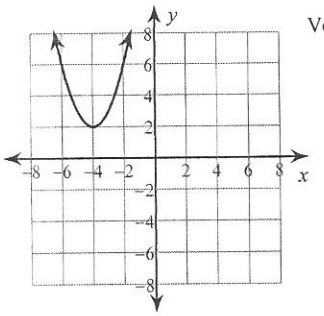
Vertex: (–3, –2)

14)



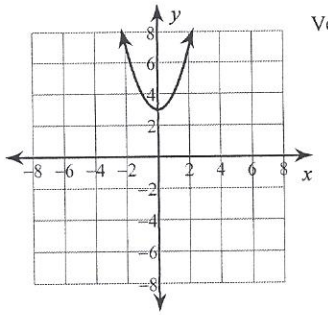
Vertex: (5, 1)

15)



Vertex: (–4, 2)

16)



Vertex: (0, 3)