1.   For the following function: $f(x) = \dfrac{\sqrt{x+3}}{2}$

a)   Give the domain of this function using set builder notation.

b)   Find the inverse of the function.

c)   Show $(f^{-1} \circ f)(x) = x$

2.   Assume that x = distance from the tent where the wire is attached to the ground. A tent has wires attached to it to help stabilize it. A wire is attached to the ground some distance from the tent. The length of wire used is 2 feet greater than the distance from the tent, and the height of the tent is 1 foot greater than the distance from the tent. How long is the wire?

3.   Solve the following equation:
      $\sqrt{3a+3} = 4 - \sqrt{a-1}$

4.   Solve by using the quadratic formula. Simplify completely. $x^2 + 8x = -3$
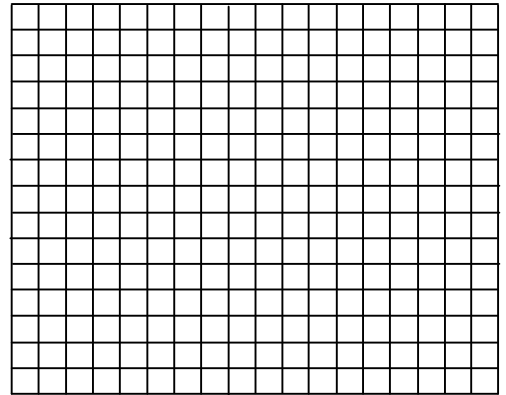
5.   Write the equation $y = 2x^2 + x - 1$ in the form $y = a(x - h)^2 + k$ and then answer the following questions:

a)   Name the **Vertex** as an ordered pair _____

b)   Give the equation for the **Line of Symmetry** _____

c)   Give the **x – intercepts** as ordered pairs _____

d)   Give the **y-intercept** as an ordered pair _____

e)   What is the range of the function?

f)   Graph the function on the graph to the right.

6.   Simplify completely. Write in radical form. No rational exponents & no radicals in denominators.

a) $\sqrt[3]{-16x^6 y^3 z^{12}}$

b) $\sqrt{\dfrac{y}{12x^2}}$

c) $\dfrac{4}{3 - \sqrt{2}}$

d) $2\sqrt{18} - \sqrt{2}$

e) $(\sqrt{2} + 5\sqrt{x})(2\sqrt{2} + 3\sqrt{x})$

7. Solve by completing the square. $x^2 - 5x - 24 = 0$

8. Solve the following by using substitution to put it in quadratic form.
    $$2b^{-2} = 7b^{-1} - 3$$

9. Simplify the following and write your answer as a complex number $(a + bi)$ when necessary.

a) $\sqrt{-169}$

b) $(7 - 8i) + (-12 - 4i)$

c) $(2 + 3i)(2 - i)$

d) i^{21}

e) i^{83}

f) $i^{30} + i^{28}$

10.   Which best represents the inverse natural log of 2?

11.   What is the domain of the exponential function: $f(x) = a^x$?

12.   What 3 points do you need to graph an exponential function?

13.   What is the domain of the logarithmic function: $f(x) = \log_a x$?

14.   What 3 points do you need to graph a logarithmic function?

15.   Write the correct logarithmic form for: $5^3 = 125$

16.   Write the correct exponential form for: $\log_2 x = 6$

17.   Evaluate. I need to see work for changing to exponential form so that you can solve each problem.

a) $\log_z 100 = 2$ b) $\log_4 64 = y$

c) $\log_{25} x = \frac{1}{2}$ d) $\ln x = 0$

18.   What is the base of the natural log, ln?

19.   What is the base of the common log, log?

20.   Solve: $\log 10(x + 1) = 2$

21.   Show the use of the base change formula to calculate $\log_5 12$

22. Condense the following: $\log_2 x + \log_2 (x + 1)$

23. Expand the following: $\log_5 x^2(x + 5)^3$

24. Solve: $\log_2 x + \log_2 (x + 2) = 3$

25. Graph each of the following on the same coordinate system:
$$f(x) = 2^x \qquad \& \qquad g(x) = \log_2 x$$