

**Directions:** 1) Show all your work. 2) Simplify. 3) Box your final answer

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1. Given  $f(x) = -(x + 3)^2 + 2$ :

- a). Find the vertex
  
  
  
  
  
  
  
  
  
  
- b). Give the equation of the axis of symmetry
  
  
  
  
  
  
  
  
  
  
- c). Find the y-intercept
  
  
  
  
  
  
  
  
  
  
- d). Is the parabola concave up or down? You must give a reason.
  
  
  
  
  
  
  
  
  
  
- e). Graph the function and on the plot mark the answers to parts a, b and c from above.

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2. Complete both parts *a* and *b*.

a). Graph the parabola whose vertex is at  $(-1, -1)$  and passes through the point  $(-2, -2)$

b). Determine the equation of this parabola.

3. Write an equation for the following situation:

The value of your stock where the starting value was \$12 and it increases 3% for  $x$ , months.

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4. The population in 1985 of a city was 25,000 people. By 1995 the same city's population had increased by 50%:

a). Write the exponential model  $f(T)$  that represents the city's population where  $T$  is the number of decades since 1985.

b). What is the population of this city in 1995. Compute the answer.

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5. Find the solutions to the following:

a).  $f(x) = 2x^2 + 4x + 2$

b).  $f(x) = 2x^2 - 2x + 1$

6. Find the exponential function goes through points  $(2, 6)$  and  $(-1, 2)$

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7. Match each function with it's graph

$$y_1 = 3\left(\frac{2}{3}\right)^x$$

$$y_2 = \left(\frac{1}{3}\right)^x$$

$$y_3 = 2(1.25)^x$$

$$y_4 = 2(4.5)^x$$