Secondary 2H **Name**_____
Unit 4 **Unit 4 STUDY GUIDE**
CALCULATORS ALLOWED **Score** _____

SHOW ALL WORK on a separate piece of paper, no work means no credit.

1. Write the quadratic in standard form. a. $y = 2(x+3)^2 - 8$ b. $y = (2x-3)(3x-1)$

2. Write the quadratic in intercept form. a. $y = 3x^2 + 13x - 30$ b. $y = (2x+3)(2x-5)$

3. Write the quadratic in vertex form. a. $f(x) = 3x^2 + 18x + 15$ b. $f(x) = 6(x-3)(x+1)$

4. Factor the following polynomials completely. Remember, to be completely factored, each factor is simplified (there are no additional GCF's).

a. $5k^3 + 13k^2 - 6k$ b. $10m^2 + 56m - 24$ c. $7a^2 + 27ab + 18b^2$ d. $x^2 + 20x + 100$

5. Consider the quadratic function $f(x) = 2x^2 - 9x - 56$

a. What are the x-intercepts of $f(x)$? b. What is the y-intercept of $f(x)$?

6. Solve the quadratic $4(x-3)^2 = 80$

7. Write a quadratic equation with solutions $-\frac{5}{2}$ and 3.

8. The manufacturer of a CD player has found that the revenue R (in dollars) is $R(p) = -4p^2 + 1280p$, when the unit price is p dollars. If the manufacturer sets the price p to maximize revenue, what is the maximum revenue to the nearest whole dollar? Explain the meaning of your answer in the context of the problem.

9. A projectile is thrown upwards so that its distance above the ground after t seconds is $h(t) = -11t^2 + 286t$.

a. Find the **zeros** of the function and explain the meaning in the context of the problem.
b. Find the **vertex** of the function and explain the meaning in the context of the problem.

10. A table top in the shape of a triangle has a side (base) that is 20 inches longer than the length (height) across the table. The area is 526.5 in^2. Find the height and the base. Write your answer in a complete sentence.

11. The maximum size envelope that can be mailed with a large envelope has a length 3 inches longer than its width. Find the length and the width of the envelope. Write your answer in a complete sentence.

12. A rectangular garden is 30 feet by 40 feet. Part of the garden is removed in order to install a walkway of uniform width around it. The area of the new garden is one-half the area of the old garden. How wide is the walkway? Write your answer in a complete sentence.

13. Alec has written an award winning short story. His mother wants to frame it with a uniform border. She wants the finished product to have an area of 315 in^2. The writing portion occupies an area that is 11 inches wide and 17 inches long. How wide is the border? Write your answer in a complete sentence.

14. Britton wants to build a pen for his teacup pig. He has 36 feet of fencing and he wants to use all of it. What should the dimensions of the pen be to maximize the area for his pig? What is the maximum area? Write your answer in a complete sentence.

15. Find 3 positive consecutive integers such that the sum of their squares is 149. Write your answer in a complete sentence.

16. An object is launched from ground level directly upward 39.2 m/s. For how long is the object at or above a height of 34.3 meters? Use the formula $h(t) = -4.9t^2 + v_0 t + h_0$. Write your answer in a complete sentence.

17. Explain what information is easily discovered from a quadratic equation in vertex form and when you would want it in that form.

18. Explain what information is easily discovered from a quadratic equation in intercept form and when you would want it in that form.

19. Explain what information is easily discovered from a quadratic equation in standard form and when you would want it in that form.

20. Use the quadratic $y = -x^2 - 4x + 5$ to answer questions a-g.

a. Rewrite the function in vertex form $f(x) = a(x-h)^2 + k$

b. Identify the axis of symmetry.

c. Determine the vertex.

d. Determine if the vertex is a maximum or minimum.

e. Determine the y-intercept.

f. Determine the x-intercept(s).

g. Sketch the rough graph of the function with its axis of symmetry. (Label the vertex and the intercepts.)