Answers!

DIRECTIONS: For #1-4, use the following equation to answer the questions.

$$y + 5 = 4(x - 2)^2$$

1. What is the **vertex**? $(2, -5)$

2. What is the **axis of symmetry**? $x = 2$

3. Does the parabola open UP or DOWN?   **UP**

4. Is the shape, NARROWER, WIDER, or the SAME WIDTH as $y = x^2$? **NARROWER**

DIRECTIONS: For #5-9, use the following equation to answer the questions.

$$y - 3 = -\frac{1}{2}(x + 1)^2$$

5. What is the maximum/minimum **value**?   **3**

6. Is this value a MAXIMUM or a MINIMUM?   **MAXIMUM**

7. What is the **domain**?   **all real numbers**

8. What is the **range**? $y \leq 3$

9. What are the **zeros**? $-1 \pm \sqrt{6}$

DIRECTIONS: For #10, graph the given equation. Be sure to include the axis of symmetry and as many points as possible.

10. $y - 8 = -2(x + 2)^2$
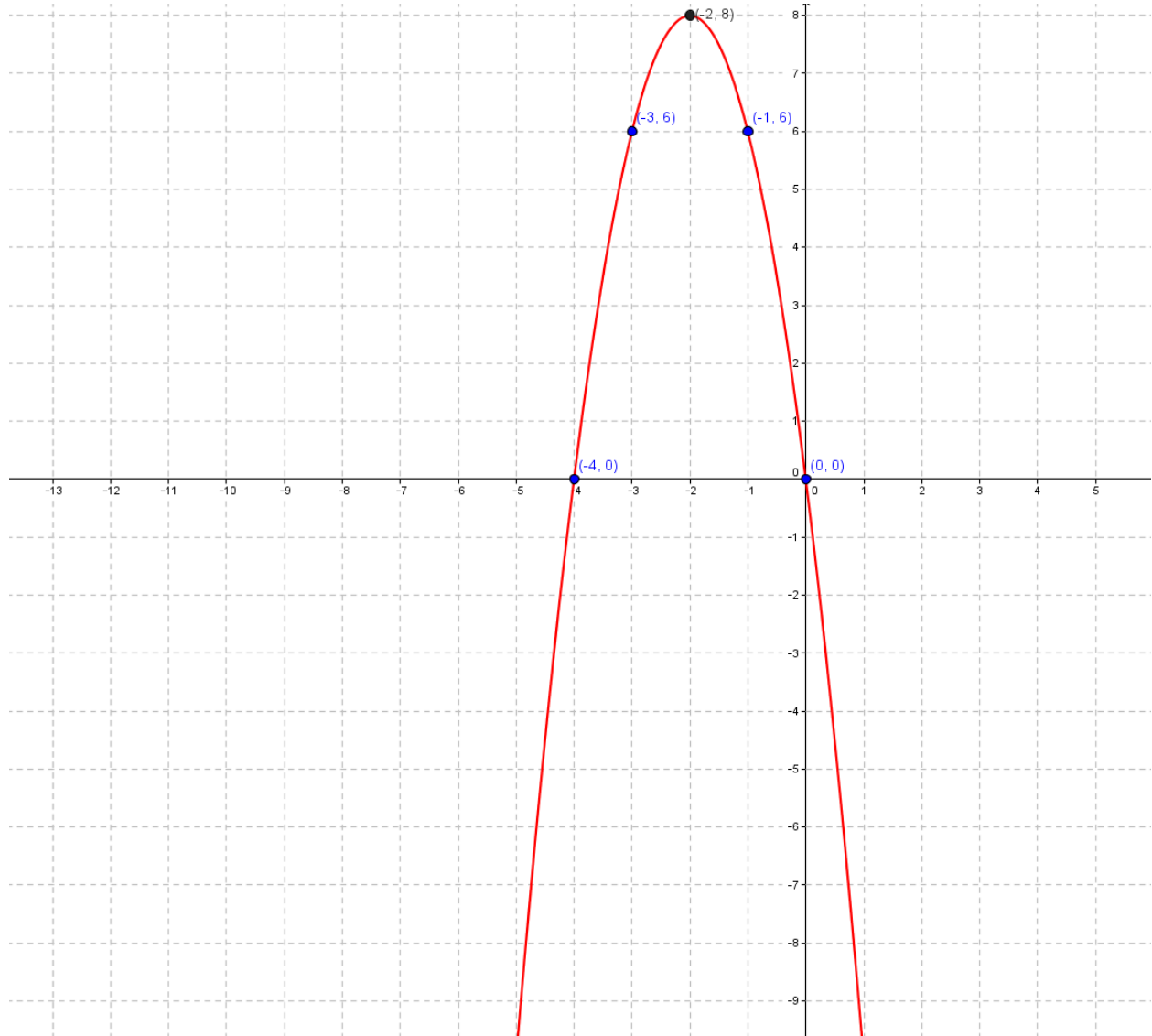
DIRECTIONS: For #11-14, write the functions in **vertex form** $\rightarrow y - k = a(x - h)^2$

11. $f(x) = x^2 - 6x + 16$ $\qquad\qquad\qquad\qquad$ $y - 7 = (x - 3)^2$

12. $f(x) = -4(x - 5)^2 - 3$ $\qquad\qquad\qquad$ $y + 3 = -4(x - 5)^2$

13. $g(x) = 2x^2 + 10x + 17$ $\qquad\qquad\qquad$ $y - \dfrac{9}{2} = 2(x + \dfrac{5}{2})^2$

14. $h(x) = 20x - 5x^2$ $\qquad\qquad\qquad\qquad$ $y - 20 = -5(x - 2)^2$

DIRECTIONS: For #15-21, use the following function to answer the questions.

$$f(x) = 5 - 6x - x^2$$

15. What is this function in **vertex form**? $y - 14 = -(x + 3)^2$

16. What is the **vertex**? $(-3, 14)$

17. What is the **axis of symmetry**? $x = -3$

18. What is the maximum/minimum **value**? 14

19. Is this value a MAXIMUM or a MINIMUM?   **MAXIMUM**

20. What is the **range**? $y \leq 14$

21. What are the **zeros**? $-3 \pm \sqrt{14}$

DIRECTIONS: For #22-23, descriptions of parabolas are provided. Write equations for each in **vertex form**$\rightarrow y - k = a(x - h)^2$

22. Vertex $(3, -9)$ and contains the point $(-1, \ 55)$ $y + 9 = 4(x - 3)^2$

23. Vertex $(-6, -7)$ and y-intercept is -61 $y + 7 = -\frac{3}{2}(x + 6)^2$

<u>DIRECTIONS</u>: For #24-26, write quadratic equations ($ax^2 + bx + c = 0$) with integer coefficients for the given roots.

24. Roots are -5 and 3 $x^2 + 2x - 15 = 0$

25. Roots are $7 + i$ and $7 - i$ $x^2 - 14x + 50 = 0$

26. Roots are $\dfrac{3+\sqrt{5}}{4}$ and $\dfrac{3-\sqrt{5}}{4}$ $4x^2 - 6x + 1 = 0$

<u>DIRECTIONS</u>: For #27, a description of a parabola is provided. Write a quadratic function $\rightarrow f(x) = ax^2 + bx + c$

27. Minimum value of -8; x-intercepts are 1 and 5 $f(x) = 2x^2 - 12x + 10$

DIRECTIONS: For #28, solve and show work (to prove your answer is correct). Write your answer in the provided blank.

28. A rectangular plot is to be enclosed on three sides with 200 meters of fencing. The fourth side is up against a barn and does not require a fence. Find the maximum area that can be enclosed.

5000 m^2