DIRECTIONS: Write in vertex form and find the vertex, axis of symmetry, state how it opens, describe its shape and graph it.

1. $y = -2x^2 - 4x + 2$

2. $y = x^2 - 4x + 2$

3. $y = \frac{1}{2}x^2 - 4x + 6$

see Page 3

see Page 4

see Page 5

DIRECTIONS: Factor completely.

4. $8x^2 + 2x - 3$

5. $2x^2 + 16x + 30$

6. $x^2 - 25$

7. $9x^2 + 24x + 16$

$(2x - 1)(4x + 3)$

$2(x + 5)(x + 3)$

$(x + 5)(x - 5)$

$(3x + 4)^2$

8. $4x^2 - 5x - 6$

9. $6x^2 - 24$

10. $4x^2 - 20x + 25$

11. $x^2 + 6x + 8$

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

$6(x + 2)(x - 2)$

$(2x - 5)^2$

$(x + 4)(x + 2)$

DIRECTIONS: Simplify.

12. $\sqrt{27}$

13. $\sqrt{80}$

14. $3\sqrt{2} \cdot 2\sqrt{6}$

15. $\sqrt{10} \cdot 3\sqrt{12}$

16. $\sqrt{-6} \cdot \sqrt{-4}$

$3\sqrt{3}$

$4\sqrt{5}$

$12\sqrt{3}$

$6\sqrt{30}$

$-2\sqrt{6}$

17. $(3 + 9i) + (4 - 2i)$

18. $(5 - 2i) - (14 + 6i)$

19. $\frac{3}{4+3i}$

20. $\frac{2}{5i}$

$7 + 7i$

$-9 - 8i$

$\frac{12}{25} - \frac{9}{25}i$

$-\frac{2i}{5}$

DIRECTIONS: Solve by completing the square.

21. $x^2 - 12x + 28 = 0$

22. $4x^2 + 40x + 280 = 0$

$x = 6 \pm 2\sqrt{2}$

$x = -5 \pm 3i\sqrt{5}$

DIRECTIONS: Solve by the quadratic formula.

23. $6x^2 - 8x + 3 = 0$

24. $x^2 - 7x + 19 = 0$

$x = \frac{4 \pm i\sqrt{2}}{6}$

$x = \frac{7 \pm 3i\sqrt{3}}{2}$

DIRECTIONS: Solve by any appropriate method.

25. $x^2 + 4x - 12 = 0$

$x = -6, 2$

26. $x^2 + 3x - 1 = 0$

$x = \frac{-3 \pm \sqrt{13}}{2}$

27. $2(x + 3)^2 = 10$

$x = -3 \pm \sqrt{5}$

DIRECTIONS: Find the value of the discriminant and the nature of the roots.

28. $x^2 + 3x - 6 = 0$

33; 2 real roots

29. $2x^2 + 5x + 4 = 0$

-7; 2 imaginary roots

DIRECTIONS: Find the zeros of the function/x-intercepts.

30. $y = x^2 - 18x + 32$

$x = 2, 16$

31. $y = x^2 - 4x + 10$

DIRECTIONS: Write a quadratic function in vertex form whose graph has the given vertex and passes through the given point.

32. V(-3, 2), point (-1, -18)

$y - 2 = -5(x + 3)^2$

33. V(6, 1), point (4, 5)

$y - 1 = (x - 6)^2$

DIRECTIONS: Write a quadratic equation with integral coefficients having the given roots.

34. $1 + \sqrt{3}$, $1 - \sqrt{3}$

$x^2 - 2x - 2 = 0$

35. $\frac{1 + \sqrt{2}}{3}, \frac{1 - \sqrt{2}}{3}$

$9x^2 - 6x - 1 = 0$

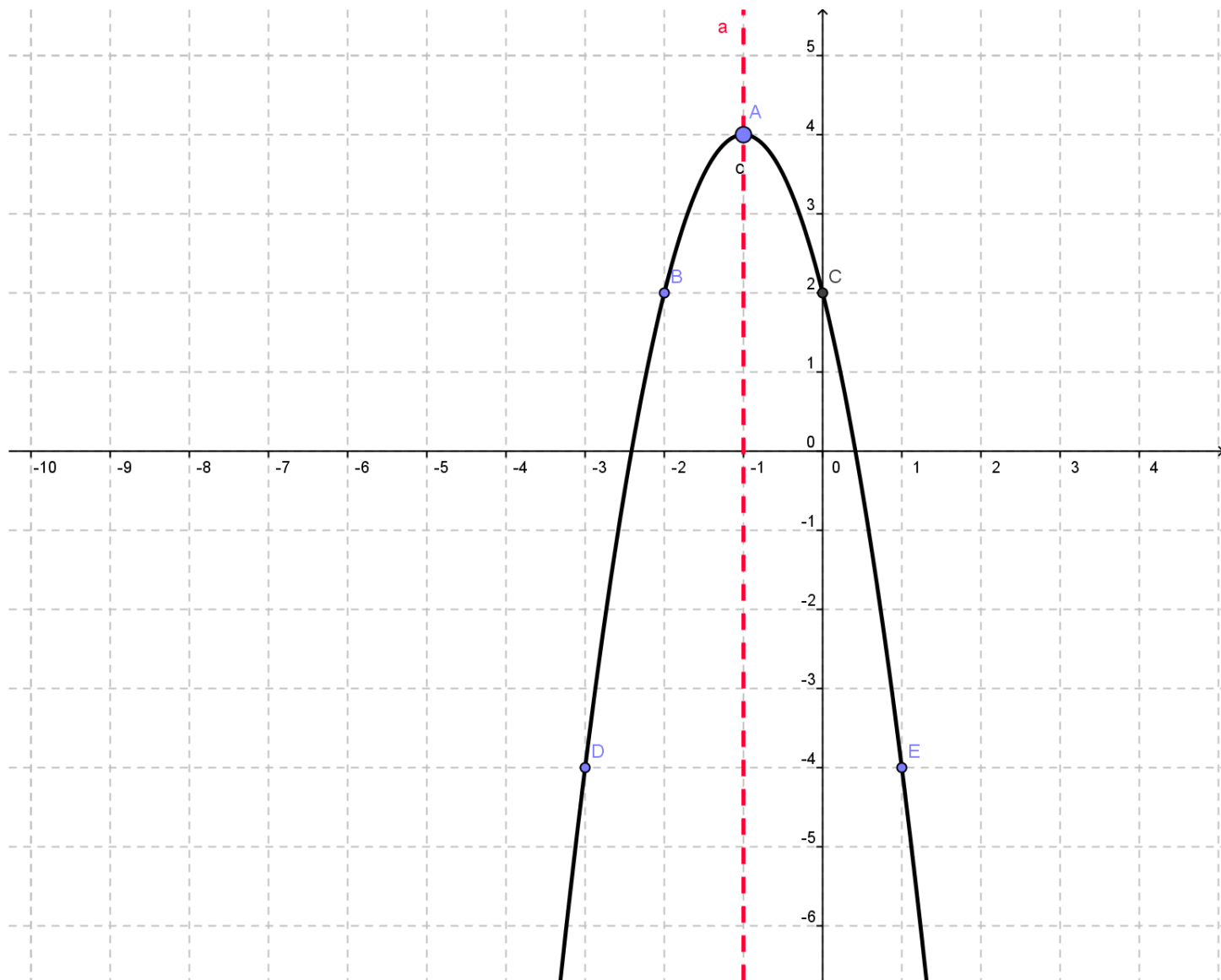**36.** $3 + i,\ 3 - i$

$x^2 - 6x + 10 = 0$

1. $y - 4 = -2(x+1)^2$

Vertex: $(-1, 4)$ Axis of symmetry: $x = -1$ Opens DOWN   narrower than $y = x^2$
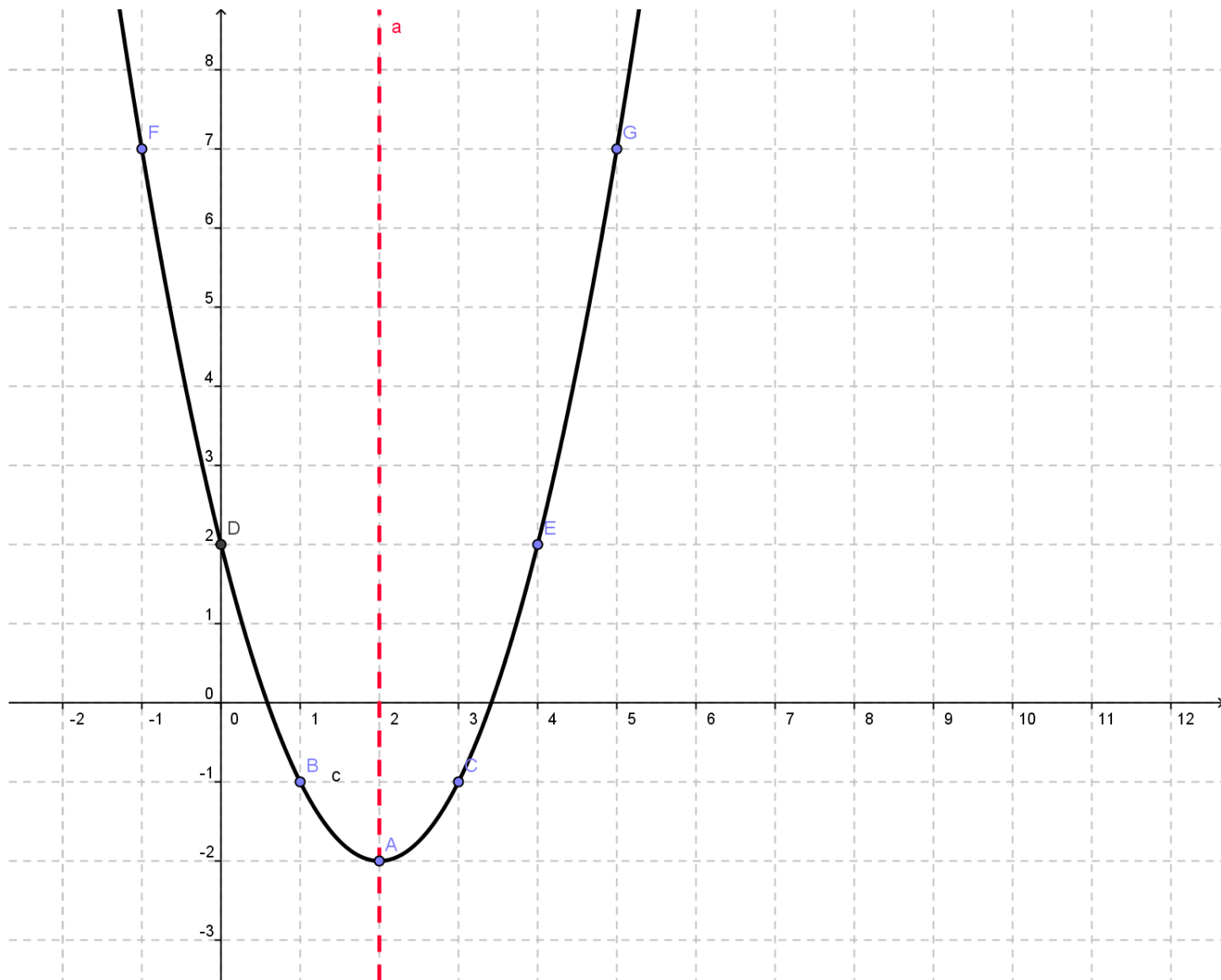
2. $y + 2 = (x - 2)^2$

Vertex: $(2, -2)$ Axis of symmetry: $x = 2$ Opens UP   same shape as $y = x^2$

3. $y + 2 = \frac{1}{2}(x - 4)^2$

Vertex: $(4, -2)$ Axis of symmetry: $x = 4$ Opens UP   wider than $y = x^2$