1. Write a quadratic function in vertex form given the vertex (-4, 6) and point on the parabola (-1, 9). What is the maximum or minimum?

2. Write a quadratic function in intercept form given *x*-intercepts 4 and -1 and point on the parabola (5, -12).

3. Write a quadratic function in standard form given that (-4, 8), (-2, 1), and (2, 5) are on the parabola.

4. Use completing the square to rewrite $f(x) = -2x^2 + 12x - 23$ in vertex form. Identify the vertex, axis of symmetry, and maximum or minimum.

5. Rewrite the function $f(x) = 3x^2 + 17x - 6$ in intercept form.

6. If the parent function $f(x) = x^2$ is horizontally stretched by a factor of 2, translated 11 units to the left, then translated 5 units down, write the resulting function $g(x)$ in vertex form.

Factor completely.

7. $16x^4 - 88x^2y^2 + 121y^4$

8. $3x^8 - 48$

9. $12x^4 - 2x^2 - 24$

10. $(x-5)^2 - 10(x-5) - 56$

11. Factor by completing the square:
$x^2 - 30x + 176$

Solve by completing the square.

12. $2x^2 - 4x + 50 = 0$

13. $5x^2 + 6x - 15 = 0$

Solve using quadratic formula.

14. $4x^2 = 28x + 15$

15. $\sqrt{3}x^2 + 2x - 2\sqrt{3} = 0$

Find the zeros of the function.

16. $f(x) = -4x^2 - 24x$

17. $g(x) = 18x^2 - 75x + 42$

Solve for x.

18. $\frac{3}{2}x^2 + 50 = -10$

19. $3(x+5)^2 - 4 = 50$

20. $2x^2 - 3ix + 1 = 0$

Give the number and type of solutions. Do not solve.

21. $3x^2 = 8x - 5$

22. $9x^2 + 30x + 25 = 0$

23. Find k so that $k^2x^2 - 8x + 4 = 0$ has 2 nonreal solutions.

Solve using algebra.

24. $3x^2 - 16x + 5 < 0$

25. $\frac{x^3}{15} + \frac{2x}{5} \geq \frac{x^2 + 2x}{6}$

Simplify. Give answers in $a+bi$ form as needed.

26. $2i\sqrt{30} \cdot 4i\sqrt{3}$

27. $\sqrt{-6} \cdot \sqrt{-30}$

28. $-i + (7 + 5i) - 3(2 - 3i)$

29. $2i(1 - 4i)^2$

30. $(2+7i)(-3-5i)$

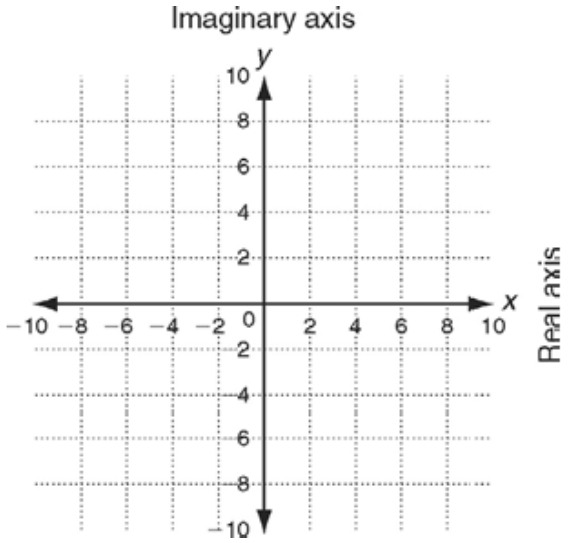
31. $\frac{7 - 6i}{4i}$

32. $\frac{5-3i}{4 + 2i}$

33. i^{51}

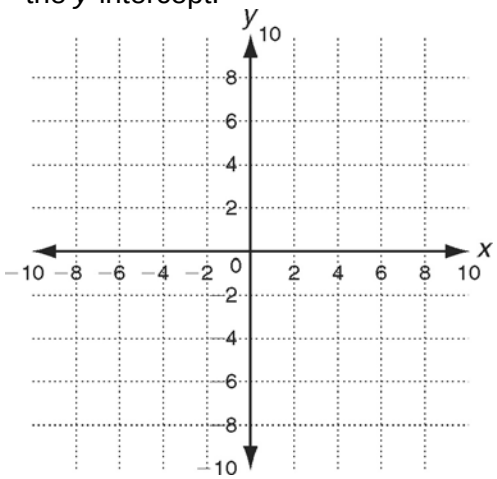
34. $|6 - 5i|$

35. Graph $-3+2i$, $5-4i$, $5i$, and 2.5 in the complex plane.

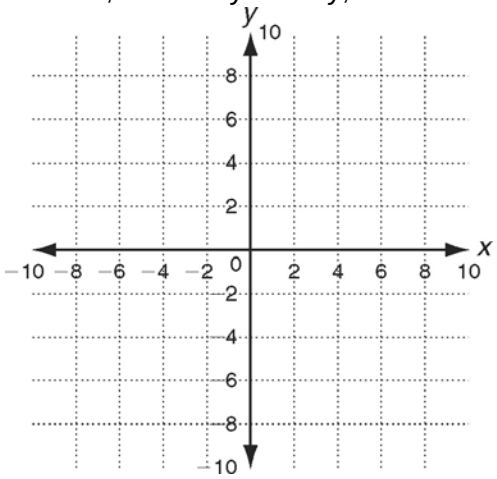


#36-39: Locate at least 3 points on each parabola graph.

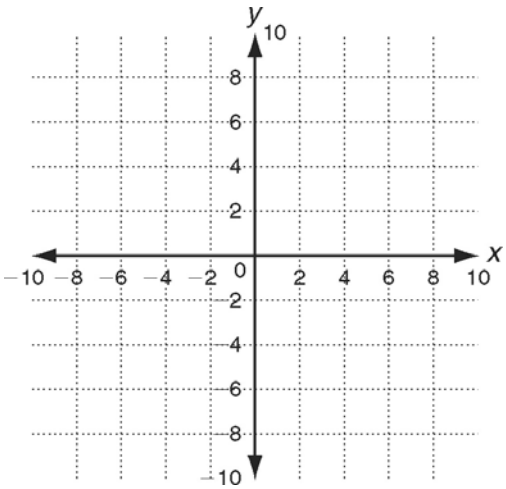
36. Graph $y = 2x^2 - 4x + 5$. Identify vertex, axis of symmetry, maximum or minimum, and the *y*-intercept.



37. Graph $y = \frac{-1}{4}(x-3)(x+5)$. Identify vertex, axis of symmetry, and x-intercepts.



38. Graph $y = \frac{-1}{2}(x+2)^2 + 4$. Identify vertex, axis of symmetry, and *y*-intercept.



39. Graph $y > 2x^2 + 12x + 15$.