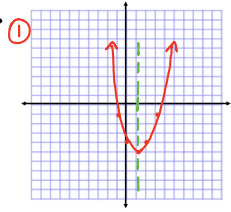


Algebra 2A Chapter 4 Review

Graph the function. Identify the vertex, axis of symmetry, y-intercept, and maximum or minimum value.

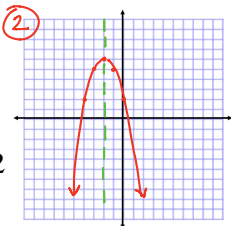
1. $y = x^2 - 2x - 4$

Vertex: (1, -5)
 a.o.s: $x = 1$
 y-int: -4
 min: -5



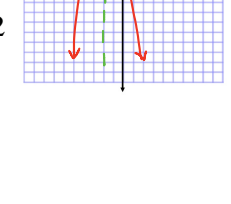
2. $y = -x^2 - 4x + 2$

Vertex: (-2, 6)
 a.o.s: $x = -2$
 y-int: 2
 max: 6



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

Vertex: (-1, -2)
 a.o.s: $x = -1$
 y-int: -3
 max: -2



4. $y = 2x(x+2)$

Vertex: (-1, -2)
 a.o.s: $x = -1$
 y-int: 0
 min: -2



Tell how to translate the graph of $y = 0.2x^2$ in order to produce the graph of the function.

5. $y = 0.2(x+3)^2 - 4$

The graph would shift 3 units to the left and 4 units down.

Find the zeros of the function.

6. $y = x^2 - 11x + 18$

$x = 9, 2$

7. A farmer wants to fence off a portion of a square field for a vegetable garden. The length of the garden will be 4 feet less than the length of the square field. The width of the garden will be 8 feet less than the length of the square field.

- a. Using x as the length of the square field, write an expression for the area of the garden. $(x-8)(x-4)$
 b. If the area of the garden will be 192 square feet, what are the dimensions of the vegetable garden?
 $x = 20$, so the dimensions are 16 by 12 feet.

Factor the expression.

8. $16x^2 - 25 = (4x+5)(4x-5)$

9. $5x^2 - 42x + 16 = (x-8)(5x-2)$

Solve.

10. $4x^2 - 12x - 16 = 0$ $x = -1, 4$

11. $3x^2 = x + 14$ $x = \frac{7}{3}, -2$

12. $x^2 - 18x + 81 = 0$ $x = 9$

13. $3x^2 - 9 = 3$ $x = \pm 2$

14. $-3(x+9)^2 = -63$ $x = -9 \pm \sqrt{21}$

15. $\frac{1}{3}x^2 + 1 = 33$ $x = \pm 4\sqrt{6}$

16. $4x^2 + 5 = -7$ $x = i\sqrt{3}$

17. $4x^2 - 8x + 1 = 0$ $x = \frac{2 \pm \sqrt{3}}{2}$

18. $2x^2 - x + 2 = 0$ $x = \frac{1 \pm i\sqrt{15}}{4}$

19. $2x^2 - 3x - 5 = 0$ $x = -1, \frac{5}{2}$

20. Write the functions $f(x) = x^2 + 4x - 12$ and $g(x) = 5x^2 + 20x - 60$ in intercept form. Then, compare the vertex and zeros of f with the vertex and zeros of g . Generalize your observations to explain the relationship between the vertex and zeros of $y = a(x-r)(x-s)$ and the vertex and zeros of $y = (x-r)(x-s)$.
*See bottom of the page

Write the expression as a complex number in standard form.

21. $-i + (7 - 5i) - 3(2 - 3i) = 1 + 3i$

22. $(-3 + 7i)(1 - 2i) = 11 + 13i$

23. $(3 - 2i)^2 = 5 - 12i$

24. $\frac{5}{1+i} = \frac{5}{2} - \frac{5}{2}i$

25. $\frac{-1 + 10i}{-9i} = -\frac{10}{9} - \frac{1}{9}i$

26. Solve the equation by completing the square.
 $x^2 + 2x - 24 = 0$ $x = -6, 4$

(#20) $f(x) = (x+6)(x-2)$; $g(x) = 5(x+6)(x-2)$
vertex: $(-2, -16)$ vertex: $(-2, -80)$
zeros: $-6, 2$ zeros: $-6, 2$

$f(x)$ and $g(x)$ both have the same zeros (x-intercepts) and the x-value of the vertex is the same, but for $g(x)$ the y-value is 5 times the y-value for $f(x)$.

The value of a will not change the x-intercepts or the x-value of the vertex, but the y-value of the vertex of $y = a(x-r)(x-s)$ will be a times the y-value of the vertex of $y = (x-r)(x-s)$

Solve by completing the square.

27. $-3x^2 - 12x + 18 = 0$
 $x = -2 \pm \sqrt{10}$

28. A rock is thrown from the top of a tall building. The distance, in feet, between the rock and the ground t seconds after it is thrown is given by $d = -16t^2 - 4t + 412$. How long after the rock is thrown is it 410 feet from the ground?

$\frac{1}{4}$ sec.

Write a quadratic function whose graph has the given characteristics.

29. $(-2, 2), (-1, -1), (2, 6)$

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

30. x-intercepts: $(4, -1)$
point: $(1, -2)$

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

31. one x-intercept $(8, 0)$, axis of symmetry $x = 4$, and maximum value 8.

$y = -\frac{1}{2}(x-4)^2 + 8$

Find the discriminant of the equation and give the number and type of solutions of the equation.

32. $6x^2 = 4 - 5x$

$|21|$; 2 real solutions

33. $2y^2 - 3y = -4$

-23 ; 2 imaginary solutions

34. Graph: $y > x^2 + 3x + 3$

