Find the following if \( f(x) = -3x + 2 \), \( g(x) = 2x + 3 \), and \( h(x) = 4x^2 - 8x - 21 \).

1. \( f(-2) - g(3) \)
2. \( h(x) - f(x) \)
3. \( (fg)(x) \)
4. \( \left( \frac{h}{g} \right)(x) \)
5. Find \( (f \circ g)(x) \) for \( f(x) = x^2 - 6 \) and \( g(x) = x + 2 \)

Solve using the square root property or by the quadratic formula:

6. \( (8x - 11)^2 = 25 \)
7. \( \left( \frac{1}{3}m + 4 \right)^2 = -27 \)
8. \( 2x(x - 7) = 3x^2 + 3 \)
9. \( \frac{1}{x} + \frac{2}{x+1} = 2 \)
10. \( y^4 - 10y^2 + 9 = 0 \)
11. Solve the formula for the indicated variable. \( p = \sqrt{\frac{yz}{6}} \) for \( y \)

Determine the vertex, domain and range for the given equation. Tell whether the parabola opens up or down and whether it is narrow or wide.

12. \( f(x) = \frac{2}{5}(x - 3)^2 - 4 \)
13. \( g(x) = -3x^2 + 4x - 2 \)

Graph the equation. Show the Vertex, \( x \)-intercept(s) and \( y \)-intercept(s) and \( y \)-intercept.

14. \( y = \frac{1}{2}(x + 3)^2 - 8 \)
15. \( y = 9x^2 - 12x + 5 \)

16. A janitorial service provides two people to clean an office building. Working together, the two can clean the building in 5 hours. One person is new to the job and would take 2 hours longer than the other person to clean the building alone. How long (to the nearest tenth) would it take the new worker to clean the building alone?

17. A projectile on Earth is fired straight upward so that its distance (in feet) above the ground \( t \) seconds after firing is given by: \( s(t) = -16t^2 + 400t \). Find the maximum height it reaches and the number of seconds it takes to reach that height.

18. For problem #16, find what the height of the projectile is after 5 seconds.
19. For problem #16, find at what times the rocket reaches 1500 feet. Remember what goes up, must come down.

20. Complete the square to find the solution to \( 4x^2 - x = 39 \).
21. Two cars left an intersection at the same time, one heading due north, the other due west. Some time later, they were exactly 100 mi. apart. The car headed north had gone 20 mi. farther than the car headed west. Draw a right triangle to represent the movement of the cars. Then find how far each car traveled?

22. \(3x^2 + 10x \geq 8\)

23. \((2x+3)(3x-2)(x+7) \leq 0\)

24. \(\frac{3x+7}{x-3} \leq 0\)

25. \(\frac{2x-3}{x+1} > 4\)

SOLNS:
1. \(f(-2) - g(3) = -1\)
2. \(h(x) - f(x) = 4x^2 - 5x - 23\)
3. \((fg)(x) = -20x^2 + 19x - 3\)
4. \(\left(\frac{h}{g}\right)(x) = 2x - 7\)
5. For \(f(x) = x^2 - 6\) and \(g(x) = x + 2\), \((f \circ g)(x) = x^2 + 4x - 2\)
6. \((8x-11)^2 = 25\) \(x = \frac{3}{4}, 2\)
7. \(\left(\frac{1}{3}m + 4\right)^2 = -27\) \(x = -12 \pm 9i\sqrt{3}\)
8. \(2x(x-7) = 3x^2 + 3\) \(x = -7 \pm \sqrt{46}\)
9. \(\frac{1}{x} + \frac{2}{x+1} = 2\) \(x = -\frac{1}{2}, 1\)
10. \(y^4 - 10y^2 + 9 = 0\) \(y = \pm 3, \pm 1\)
11. \(y = \frac{6p^2}{z}\)
12. \(f(x) = \frac{2}{5}(x-3)^2 - 4\) Vertex \((3, -4)\), D: \(\mathbb{R}\), R: \([-4, \infty)\), up, wide
13. \(g(x) = -3x^2 + 4x - 2\) Vertex \(\left(\frac{2}{3}, \frac{-2}{3}\right)\), D: \(\mathbb{R}\), R: \((-\infty, \frac{-2}{3}]\), down, narrow
14. \(y = \frac{1}{2}(x+3)^2 - 8\) Vertex \((-3, -8)\), y-int \(\left(0, \frac{-7}{2}\right)\), x-int \((-7, 0), (1, 0)\)
15. \(y = 9x^2 - 12x + 5\) Vertex \(\left(\frac{2}{3}, 1\right)\), y-int \((0, 5)\), x-int - none
16. Formula is \(\frac{5}{x+2} + \frac{5}{x} = 1\), answer: \(x = 9.1\) hrs, new guy = 11.1 hrs
17. Find vertex using \(V\left(-\frac{b}{2a}, f\left(-\frac{b}{2a}\right)\right) = V(12.5, 2500)\) 12.5 seconds, 2500 ft
18. Find \(f(5) = 1600\) ft
19. Use \(1500 = -16r^2 + 400t\) to find \(\frac{25 \pm 5\sqrt{10}}{2} = 20.4, 4.6\) seconds
20. \(\frac{13}{4} - 3\)
21. Equation: \((x+20)^2 + x^2 = 100^2\) answer \(x = 60\) so cars traveled 60 and 80 miles