1. Consider the parabola $y = x^2 + 4x + 4$.

   a. What is the vertex of the parabola?
   b. What is the y-intercept of the parabola?
   c. What are the x-intercepts of the parabola?
   d. Draw a complete graph of the parabola.

2. Find the value of z that fits the rectangle in Figure 1.

Figure 1

3. Factor $4x^2 + 81y^2$.

4. Factor $4x^2 - 81y^2$.

5. Find the x-intercepts of the parabola $y = 3 + 5x^2$.

6. Simplify $-7x^{-2}$.

7. Simplify -7^{-2}.

8. Use the zero property to solve the equation $(x-2)(x+7) = 36$.

9. Consider the function in Figure 2.

   a. What is the domain of the function?
   b. What is the range of the function?
   c. What is the value of $g(2)$?
   d. What values of x satisfy $g(x) = 3$?

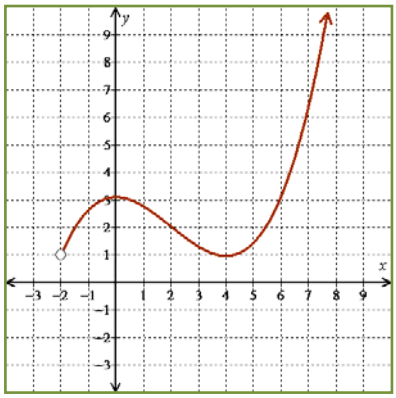

Figure 2: The function g

11. Factor $2x^3y^2 + 5x^2yz - 3xz^2$.

12. Factor $1 - 64x^{15}$.

13. Factor $30 - 11m - 2m^2$.

14. Find the value of u that fits the right triangle in Figure 3.

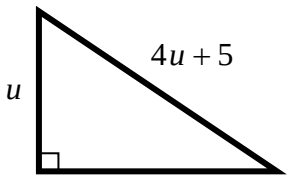

Figure 3

15. A projectile is fired into the air with an initial speed of 64 ft/s. The height (ft) of the projectile t seconds after being fired is given by the function $h(t) = -16t^2 + 64t + 192$.

   a. How high above the ground was the projectile when it was fired? How about 2 seconds later?
   b. How long did it take for the projectile to fall back to ground level?
   c. What was the highest elevation reached by the projectile?

16. Erma invested money in an account that earned interest at a rate of 7%/year. Erma's friend Trudy invested $5000 more than Erma in an account that earned interest at a rate of 4%/year. At the end of 1 year the two friends had earned exactly the same amount of interest in their accounts! How much had each of the friends invested in their accounts?

17. Consider the parabola $y = 3 - 12x - 2x^2$.

    a. What is the vertex of the parabola?
    b. What is the y-intercept of the parabola?
    c. What are the x-intercepts of the parabola?
    d. Draw a complete graph of the parabola.

18. Consider the function in Figure 4.

    a. What is the domain of the function?
    b. What is the range of the function?
    c. What is the value of $f(2)$?
    d. What is the value of $f(-6)$?

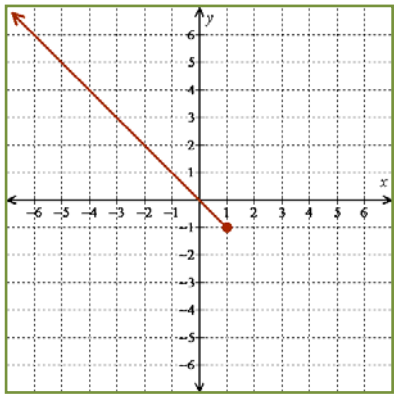

Figure 4: The function f

19. What's the value of x if $(a^x)^4 = a^{32}$?

20. What's the value of b if $x^b x^{83} = x^{100}$?

21. What's the value of t if $\frac{x^{-3}}{x^t} = x^{25}$?

22. What is the value of $f(-8)$ if $f(x) = -x^2$?

23. Solve $3t^2 + 22t - 45 = 0$ using the quadratic formula.

24. Find the value of x that fits the right triangle in Figure 5.

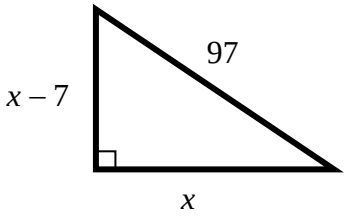

Figure 5

25. Find the value of c that fits the rectangle in Figure 6.

26. Solve $y^2 - 4 = 7y - 4$ using the zero property.

27. Factor $8 + 125x^6$.

28. Factor $2x^2 + 5x - 10$.

29. Factor $x^2 + 9$.

30. Factor $-5y^2z^4 + 20y^2$.

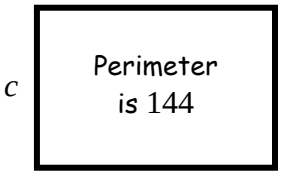

Figure 6

31. Solve $(2x + 8)^2 = 96$ using the square root property. Make sure that you completely simplify your solutions.

32. Solve each system of equations using the indicated methods.

a. $\begin{cases} 2x - 4y = -2 \\ 3x + 10y = 11 \end{cases}$ (Elimination Method)

b. $\begin{cases} y = -\frac{2}{3}x + 4 \\ 4x + 6y = 24 \end{cases}$ (Substitution)

c. $\begin{cases} y = -2x + 3 \\ 2x - 3y = 23 \end{cases}$ (Solve by graphing)