1. (6 pts.) Simplify by adding (or subtracting) like terms wherever possible:
\[ 4^\frac{1}{2} - 3\sqrt{5} + 3^\frac{1}{3} + 12^\frac{1}{7} - 3 \cdot 4^\frac{1}{7} + 4^\frac{1}{3} - \sqrt{5} \]

2. (7 pts.) Simplify completely:
\[ \sqrt{4^\frac{1}{2} - 5^3} \]

3. (7 pts.) Simplify completely:
\[ \left( \frac{4^\frac{1}{2}}{4^\frac{1}{2} + 4^\frac{1}{3}} \right)^2 \]

4. (6 pts.) Solve: \[ 2(x + 1) - \frac{x - 1}{3} = \frac{1}{2} - \frac{x + 1}{3} \]

5. (7 pts.) Solve for \( x \): \[ \frac{1}{x} + \frac{y - z}{3} = 4y \]

6. (7 pts.) The perimeter of a triangle is 45 inches. The longest side is 3 less than twice the shortest side. The middle side is 4 more than the shortest side. Find the lengths of all three sides.

7. (7 pts.) Simplify completely:
\[ (-2xz)^{-2} \left( \frac{3x^3 y^{-2} z}{y^9 z^{-3}} \right) \]

8. (6 pts.) Solve and graph the solution set: \[ 4m + 7 \geq 14(m - 2) \]

9. (7 pts.) The graph of a function, \( f \), is shown here.
   (a) What is the domain of \( f \)?
   (b) What is the range of \( f \)?
   (c) For which number(s), \( x \), does \( f(x) = 0 \)?
   (d) What is \( f(3) \)?

10. (6 pts.) Let \( f \) be the function given by \( f(x) = \frac{2x}{\sqrt{3x - 1}} \). What is the domain of \( f \)?

11. (7 pts.) Graph the function \( h(x) = 3 - |x + 1| \). Label all intercepts.

12. (6 pts.) Let \( g \) be the function given by \( g(x) = \frac{x^2 + 3x}{3x} \). Find and simplify \( g(-1) + 2g(1) \).

13. (7 pts.) Find the equation of the line through \((-3, 2)\) and \((-3, -1)\).

14. (6 pts.) Find the equation of the line containing the point \((-2, 1)\) which is parallel to the line \( 2y + 5x = -1 \).

15. (7 pts.) The length of a rectangle is 2 inches greater than twice its width, and its area is 60 square inches. Find the length and the width.

16. (7 pts.) Solve:
\[ \begin{cases} 
4x + 5y = -3 \\
6x - 3y = 6 
\end{cases} \]

17. (6 pts.) Factor completely: \( 16a^2b^2 - 9b^4 \)

18. (6 pts.) Solve: \( (y + 4)(y - 2) = -5 \)

19. (7 pts.) Simplify completely:
\[ \frac{25 - x^2}{x^2 - 10x + 25} \]

20. (7 pts.) Solve:
\[ \frac{6}{x + 3} - \frac{7}{x - 5} = \frac{-48}{x^2 - 2x - 15} \]

21. (7 pts.) The sum of 3 times a number and 2 times a second number is 45. Two more than the second number, divided by the first number is 2. What are the two numbers?
22. (6 pts.) Simplify completely: \[ \left( \frac{64}{27} \right)^{\frac{1}{3}} \]

23. (7 pts.) Simplify completely: \[ \frac{\sqrt[3]{32x^{-1}y}}{\sqrt[3]{2x^{3}y^{9}}} \]

24. (7 pts.) Solve: \[ \sqrt{2x - 5} - x = -4 \]

25. (7 pts.) A right triangle has two equal sides. The length of the hypotenuse is \( 8\sqrt{2} \) cm. What is the length of the two sides?

26. (7 pts.) Multiply and write the answer in the form \( a + bi \): \( (\sqrt{3} + 4i)(\sqrt{3} - i) \)

27. (7 pts.) Solve, writing any non-real solutions in the form \( a + bi \): \( x^3 - 4x^2 + 8x = 0 \)

28. (7 pts.) Graph, labeling the vertex and all \( x \) and \( y \) intercepts: \( g(x) = -x^2 + 2x + 3 \)

29. (7 pts.) Solve: \( x^3 + 3x^2 \geq 0 \)

30. (6 pts.) Find: (a) \( \log_3 \left( \frac{1}{27} \right) \) (b) \( \log_2(32) \) (c) \( \log_{13}(13) \)