1. (7 pts.) Simplify by adding (or subtracting) like terms wherever possible:

\[ 5x + 3^5 - 4^5 - \sqrt{3} x + 7^5 + \sqrt{2} x - 5 \cdot 3^5 \]

2. (7 pts.) Simplify completely:

\[ \sqrt[4]{x^2 y^0 \cdot 4y^3} \cdot \sqrt[4]{64x^{-18} y^7 z^8} \]

3. (7 pts.) Simplify completely:

\[ \left( \frac{3}{2^2} - \frac{1}{2^2} \right)^2 \]

4. (7 pts.) Simplify completely:

\[ \frac{\sqrt{25^{-1}} + 3^2}{3^{-2} - \sqrt{25^{-1}}} \]

5. (6 pts.) Solve:

\[ 3 - \left| \frac{1 - 2x}{3} \right| = 4 \]

6. (6 pts.) Solve:

\[ 7 - 2|x - 5| \geq -3 \]

7. (7 pts.) A small bag of mixed nuts is purchased from one of the vending machines in State Hall. Inside the bag are cashews, almonds and peanuts. The number of cashews is one-third the number of peanuts. The number of almonds is three-fourths the number of peanuts. There are 50 nuts in total. How many of each type of nut are there?

8. (7 pts.) Solve for \( w \):

\[ wz + 3 = \frac{2 + w}{t} \]

9. (6 pts.) Let \( H \) be the function given by

\[ H(x) = \frac{25x + 5}{x^2 - 5x - 6} \]

What is the domain of \( H \)?

10. (6 pts.) Let \( f \) be the function given by

\[ f(x) = |3 - x| + 5x \]

Find and simplify \( f(4) + \left[ f(-1) \right]^2 \).

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11. (7 pts.) Let \( g \) be the function given by \( g(x) = x^2 + 2x \).
Find and simplify \( \frac{g(2x) - 2g(x - 2)}{-4x} \).

12. (6 pts.) Find the equation of the line that is perpendicular to the line \( y = -4 \) and passes through the point \((5,1)\).

13. (6 pts.) Find the equation of the line that is parallel to the line \(-3y + 5x = 7\) and passes through the point \((2,-1)\).

14. (7 pts.) A large rectangular piece of poster board has an area of 18 square feet. The length of the poster board is 3 feet more than the width. What is the length of the diagonal of this poster board?

15. (7 pts.) Solve, writing any non-real solutions in the form \(a + bi\): \(x^4 + 8x^2 = 4x^3\)

16. (7 pts.) Graph, labeling the vertex and all \(x\) and \(y\) intercepts: \(f(x) = -x^2 - 4x + 5\)

17. (7 pts.) Simplify completely: \(\frac{2 + \frac{x + 4}{x - 5}}{x - 2} \cdot \frac{1}{25 - x^2}\)

18. (7 pts.) Let \(f(x) = \frac{x}{2} - \sqrt{-2x + 5}\). Find all input(s), \(x\), such that \(f(x) = 2\).

19. (7 pts.) Solve: \((x + 2)^2 (x - 3) < 0\)

20. (7 pts.) Solve: \(\frac{x + 6}{2x - 3} \leq 3\)

21. (7 pts.) The graph of a function, \(f\), is shown here.
   a) What is the domain of \(f\)?
   b) What is \(f(-3)\)?
   c) For what input(s), \(x\), is \(f(x) = -1\)?
22. (7 pts.) Given \( f(x) = 5x^{-2} - 4x^{-1} - 1 \), find the \( x \)-intercept(s) of the graph of \( f \).

23. (6 pts.) Find: a) \( \log_{10} \left( \frac{1}{100} \right) \) b) \( \log_{27} (3) \) c) \( \log_{81} \left( \frac{1}{3} \right) \)

24. (6 pts.) Using the approximate values \( \log_{3} (20) = 2.7 \) and \( \log_{3} (4) = 1.3 \) find:
   a) \( \log_{3} (16) \) b) \( \log_{3} (12) \) c) \( \log_{3} (5) \)

25. (7 pts.) Solve: \( \frac{1}{2} \log_{3} \left( x^2 - 7 \right) - 1 = 0 \)

26. (7 pts.) Identify and sketch the curve given by \( \frac{(x + 3)^2}{4} + \frac{(y - 1)^2}{9} = 1 \).

27. (7 pts.) Arrange the following numbers in order from smallest to largest:
   \( \tan(\pi) \), \( \log_{7}(9) \), \( \sin(3.2) \), \( \cos(3.2) \)

28. (6 pts.) Convert to radians: a) \( 140^\circ \) b) \( \frac{360^\circ}{\pi} \)

29. (6 pts.) In the right triangle shown, find \( x \):

30. (7 pts.) Daniela goes out for her morning jog. She jogs the 100 meters to the nearby convenience store at a constant speed. If she had doubled her speed, the jog to the store would have taken 4 minutes less time. What was Daniela’s jogging speed?