1) (6 Points) Place each of the following numbers in the appropriate place on the number line.

| a) −1.999 | b) \(\frac{8}{3}\) | c) \(2 \frac{3}{4}\) | d) \(\frac{5}{13}\) | e) \(\frac{7}{8}\) | f) \(−\frac{2}{99}\) |

2) Arrange the following numbers in order from smallest on the left to largest on the right: \(\frac{4}{7}, \frac{5}{32}, \frac{6}{11}, \frac{18}{19}\)

3) Arrange the following numbers in order from smallest on the left to largest on the right: \(0.03, \frac{1}{30}, 0.03\)

4) (2 Points) Write 1.27 as a fraction. Don’t bother to simplify the fraction.

5) (2 Points) Find a number between 0.99879 and 0.998798.
6) Simplify completely: \( \left( \frac{5}{4} - 3 \right) \left( \frac{2}{7} + 2 \right) \)

7) On a bookshelf, the ratio of math books to novels is 2 to 7. If there are 12 math books, how many novels are on the bookshelf?

8) A circular running path is \( 10\frac{1}{2} \) kilometers long. Nicole has run \( 6\frac{3}{4} \) kilometers along the path. How much farther does she need to run to complete the loop?

9) Denzel can ride his bike \( 5\frac{1}{2} \) miles per hour. How long will it take Denzel to ride 22 miles?

10) It takes Sandy 1 hour to type 4 pages of her term paper. How many pages can she type in \( 2\frac{3}{4} \) hours?
11) Jim paid $3.12 for three pounds of apples and $0.85 for one pound of grapes. What was the total amount Jim paid for the fruit?

12) An exam containing 70 questions has a passing score of 60%, meaning that to pass you must answer 60% of the questions correctly. How many questions must you answer correctly to pass?

13) Evaluate \( \frac{a^2 + md^2}{a^2 - md^2} \) when \( a = -1, \ m = -1 \) and \( d = 2 \).

14) Simplify completely: \( a^2 + 2abc + b^2 + 5abc - 3a^2b^2 + 3b^2 - 2a^2 \)

15) Simplify completely: \( 2x^2 + 2x^2[x - 2(x - 3) - 6] \)
16) Multiply and simplify: \((a + b)(a^2 - ab + b^2)\)

17) Solve: \(2(1 - 2x) + 3 = 7 - 2(x + 3)\)

18) Solve: \(\frac{1}{6}x - \frac{1}{2} = x - \frac{2}{3}\)

19) Solve for \(y\): \(2x = \frac{z - xy}{y}\)

20) 36 is what percent of 40?
21) Solve: \(3 < \frac{3 - 2x}{-2}\)

22) Solve and graph the solution set: \(2(x + 1) \geq 4 - (2 + x)\)

23) Graph: \(3x + 2y = 6\). **Label two points.**

24) Given the line \(5x + 2y = -5\)
   a) Find the \(y\) intercept.
   b) Find the \(x\) intercept.

25) Graph: \(y = -2\)
26) Find the slope (if it exists) of the line through the given points:
   a) \((-4, 2)\) and \((3, -1)\)     
   b) \((0, 4)\) and \((0, -2)\)

27) Graph the line that has a y intercept \((0, -1)\) and a slope of 2.
    Label two points.

28) Find the slope (if it exists) of each of the following lines:
   a) \(y = -1\)     
   b) \(3x - 2y = 18\)     
   c) \(x = 2\)

29) The graph shows the number of births per 1000 population for the years 1940 through 1996.
    a) How many births per 1000 were there in 1964?
    b) In what year were there 65 births per 1000 population?

30) The third angle of a triangle is 3 times as large as the first. The second angle is 18° more than twice the first angle. Find the measure of each angle.

31) Solve the system:
    \[
    \begin{align*}
    2x - 3y &= 5 \\
    x - 2y &= 6
    \end{align*}
    \]
32) Simplify completely: \((xy^2)(2x^3y^2)^3\)

33) Simplify completely: \(5x(2x^2 - x + 1) - 4(x^3 + 2x - 5)\)

34) Perform the indicated operation and simplify completely: \((m - 2n)^2\)

35) Simplify completely: \(3^{-2}\left(3^{-1} - 3^0\right)\)
36) Simplify completely: \( \frac{3^{-2}a^{-2}b^{-3}}{3^{-3}a^{2}b^{-4}} \)

37) Express 23,000,000,000 in Scientific Notation.

38) Factor completely: \( 6x^{4}y^{2}z^{3} - 9x^{3}yz^{3} - 6xyz \)

39) Factor completely: \( 25x^{2} + 10x + 1 \)

40) Factor completely: \( 100x^{2} - 49y^{2} \)
41) Solve: \(4x^2 - 9 = 0\)

42) Solve: \((3a + 1)(a - 1) = 4\)

43) The difference between two numbers is 24. Three times the smaller number plus twice the bigger number is 68. What are the numbers?

44) Place each of the following numbers in the appropriate place on the number line.

   a) \(\sqrt[3]{-27}\)  
   b) \(\frac{25}{4}\)  
   c) \(-\sqrt{17}\)  
   d) \(\sqrt{3}\)

45) The triangle show is a right triangle. Find \(x\).
46) Simplify completely: \( \frac{2xy + 2y}{2xy} \)

47) Multiply and simplify: \( \frac{x^2}{x - 1} \cdot \frac{x + 3}{x(x + 1)} \)

48) Add and simplify: \( \frac{3x}{x - 3} + \frac{7}{x - 1} \)

49) Divide and simplify: \( \frac{x}{y^3} + \frac{y}{x + 1} \)

50) (6 points) Which of the following are not real numbers?

a) \( \sqrt{-9} \)  
   c) \( -\sqrt{5} \)  
   e) \( \frac{0}{\sqrt{3}} \)

b) \( \sqrt{-1} \)  
   d) \( \frac{4}{0} \)  
   f) \( -\sqrt{4} \)