Math-90 Elementary Algebra Practice Final

INSTRUCTIONS: ANSWER ALL THE QUESTIONS. Show your work and circle your final answers. CLOSED-BOOK AND CLOSED-NOTES EXAM.

1. Percents:
   a. Change 5.4 to a percent.
   b. Change 7% to a decimal.
   c. What is 172% of 63?

2. For the most coveted graduate study positions, only 86 out of 600 students are accepted. What percent are accepted?

3. Six less than five times a number is the same as twice the number. Find the number.

4. A number is decreased by 45%, giving 390. Find the number.

5. Find the x- and y-intercepts for the following lines: \[3x - 4y = 24\]

6. What is the equation of the line in slope-intercept form with a y-intercept of (0, –3) and a slope of \(-\frac{4}{3}\)?

7. What are the intercepts of the following graph? (Be sure to label them clearly.)
8. Simplify:
   a. \( (6x^4 + 4) - (3x^2 + 8) + (3x^4 - 4x^2) \)

   b. \( 8x^2 - 2x^2y + 8x^2 - 5xy + 5xy \)

   c. \( (x^2y^5)(x^2y^4) \)

   d. \( (-3a^4b^5c)(4ab)(-2ab^3c^2) \)

9. What is the equation of the line in slope-intercept form containing:
   a. \((6, -2)\) with slope \(\frac{2}{3}\)
   b. \((-1, 2)\) and \((3, -4)\)

   c. \(y\)-intercept at \(-7\) and parallel to \(5x + 3y = -12\)

10. Find the degree: \(v^9 + 12v^2w^9x^6 - 3x^4\)

11. Evaluate the polynomial: \(4x^2 - 7x - 2\) for \(x = -3\)

12. Multiply:
   a. \((5x^3y^2 - 4xy + 7)(-4yx^2)\)

   b. \((4y - 3)(2y - 7)\)
3. Simplify:
$$5x - [4x - x(2 - y)]$$

4. Divide:
   a. $$\left(39x^5 - 45x^4 + 36x^2 - 3x\right) \div (3x)$$
   b. $$\left(12y^3 - 20y^2 + 8y\right) \div (-4y)$$

5. Write the expression with only positive exponents:
   a. $$\frac{-18x^{-8}y^9z^{-3}}{30x^{-2}y^{-3}z^3}$$
   b. $$(-4x^{-4}y)^{-5}$$
   c. $$\left(\frac{4y^{-5}z^0}{30y^3}\right)^3$$
16. a. Write 0.0000038 in scientific notation.

   b. Write $-8.2 \times 10^5$ in standard form.

17. a. Write $\left(3.5 \times 10^{-14}\right) \left(4.8 \times 10^{-5}\right)$ in scientific notation.

   b. Write $\frac{5.8 \times 10^{-5}}{8.4 \times 10^{-14}}$ in scientific notation.

18. Factor completely:
   a. $16x^3y^2 + 5xy^2 - 5x^2y^4$

   b. $2wx + 6wy - 3x^2 - 9xy$

   c. $5x^2 - 2x - 3$

   d. $6x^2 + 24x + 18$

   e. $49w^2 - 1$

   f. $4x^2 - 144$

   g. $16x^2 + 24x + 9$
19. Perform the indicated operations and simplify.
   a. \( \frac{s^2t^2}{16s^3t^5} \div \frac{20s^2t^4}{4t^3} \)
   b. \( \frac{m^2 - 2m - 35}{m^2 + 6m + 5} \)
   c. \( \frac{x^2 + 2x - 15}{3 - x} \)
   d. \( \frac{t^2 - 16}{t^2 - 10t + 24} \div \frac{t^2 - 5t - 6}{t^2 + 8t + 16} \)
   e. \( \frac{w^2 - 36}{w^2 + 12w + 36} \div \frac{6w}{6w} \)

20. A rectangle has an area of 88 square centimeters. The length of the rectangle is 3 centimeters longer than the width. Find the length and width of the rectangle.

21. A cable, 41 feet long, runs from the top of a utility pole to a point on the ground 17 feet from the base of the pole. How tall is the utility pole?

22. Add or subtract:
   a. \( \frac{2}{a^2 + a - 6} - \frac{a}{3a - 6} \)
   b. \( \frac{x + 4}{x^2 + x - 20} + \frac{x - 1}{x^2 - 25} \)
23. Solve:
   a. \( x^2 - x - 90 = 0 \)

   b. \( 12m^2 + 17m = 5 \)

   c. \( 3x^3 + 9x^2 - 12x = 0 \)

24. Solve.
   a. \( \frac{-4}{x} + \frac{5}{x - 3} = 1 \)

   b. \( \frac{x}{x^2 - 36} + \frac{6}{x - 6} = \frac{1}{x + 6} \)

25. Solve for \( t \):
   \( s = 4t - 7a \)

26. Graph to solve the following system of equations.
   a. \( y = -2x - 3 \)
   b. \( 3x + y = 5 \)