1. There are 12 problems on 11 pages (counting this page).
2. No calculators, notes, or books are allowed.
3. Give exact answers (fractions, square roots, etc.). Decimal approximations may not receive full credit.
4. You do not need to simplify your answers unless told to. Answers such as \( x = \frac{32\sqrt{25} + 6}{12} \) are okay.
5. Use only the scratch paper provided. Work appearing on your scratch paper will not be graded.
6. Show your work and make your methods clear. Unjustified answers may receive no credit.
7. Put your final answer in the box provided.

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1. (15 Points) Vital Errors

(a) Simplify

\[ x^{1/4} (2x)^{1/3} \]

Answer:

(b) Factor completely:

\[ 6t^2 + 17t + 5 \]

Answer:

(c) Simplify completely:

\[ (a^{-2} + 3)^{-1} \]

Answer:
2. (10 Points) Solve for $x$:

$$x - [7 - (2x - (8 - x))] = 12.$$ 

$$x =$$

3. (10 Points) The points $P(-1, 2)$ and $Q(-5, -4)$ are the endpoints of a diameter of a circle. Find the center and radius of the circle.

Center: 

Radius:
4. (15 Points) Find the equation for the line that is perpendicular to \(x - 2y + 4 = 0\) and passes through the point \((4, -3)\).

Answer:

5. (10 Points) Find the slope of the line which connects the point \((-2, 4)\) to the point \((-2 + h, (-2 + h)^2)\). Simplify your answer COMPLETELY.

Answer:
6. (15 Points)

(a) Find the intercept(s) of the graph whose equation is \( x = 4 - y^2 \).

- \( x \)-intercept(s): __________
- \( y \)-intercept(s): __________

(b) Does the graph of \( x = 4 - y^2 \) have symmetry to the

- (i) the \( x \)-axis? Yes No
- (ii) the \( y \)-axis? Yes No
- (iii) the origin? Yes No

(c) Sketch a graph of the equation. Clearly LABEL all intercepts.
7. (15 Points) Specify the center and radius of the circle

\[ 4x^2 + 8x + 4y^2 - 4y + 1 = 0. \]

| Center: | Radius: |

8. (10 Points) Solve for \( x \):

\[ |2x - 4| + \frac{3}{4} = 0 \]

\( x = \)
9. (10 Points) Find all real solutions:
   \[ 3x^2 + 6x - 4 = 0 \]

   \[ x = \]

10. (10 Points)
    
    (a) Find the discriminant of the equation \( 5x^2 - 7x + 3 = 0 \). How many real roots does this equation have?

    Discriminant:  
    Number of real roots:

    (b) Find the value(s) of \( k \) such that the equation \( kx^2 + 4x - 3 = 0 \) has exactly one real root.

    \[ k = \]
11. (15 Points) Solve the following equation:

\[ s^{4/3} - 5s^{2/3} - 36 = 0. \]
12. (15 Points) In a certain rectangle, the length exceeds the width by 3 inches. If the length is increased by 5 inches, and the width is decreased by 3 inches, the area of the new rectangle is same as that of the original rectangle. Find the dimensions of the original rectangle.

| Original Length: | Original Width: |