

To receive full credit, show all steps and present the exact value of solutions.

1. Find the average of $-\frac{2}{3}$, $3\frac{1}{6}$, 4, and $-\frac{1}{2}$
2. Simplify each of the following expressions. Show all steps.

(a) $\sqrt{(-1)^4 - 2 \cdot 3^2 \div (-2) \cdot 6 + (-3)^2} =$

(b) $\left(3\frac{3}{5}\right) \div \left(1\frac{1}{3}\right) + \frac{3}{10} =$

(c) $|-3^2 + 3 - |(-6)^2 + (-2)^3| - 2| + 1 =$

(d) $(x + 6)(x^2 - 6x + 36) =$

(e) $\frac{20 - 5x^2}{6x^2 + 3x^3} =$

(f) $\frac{2x - 5}{5 - 2x} =$

3. Perform the indicated operations.

(a) $\left(2x^3 - 4x^2 + \frac{1}{2}x - 5\right) - \left(-x^3 + 4x^2 + \frac{1}{2}x - 4\right) =$

(b) $(p - 1)(p + p^2 + p^3 + p^4 + 1) =$

(c) $(x - 1)^2 - 2x(x - 3) - (2x + 1)^2 =$

4. Factor completely each of the following expressions.

(a) $2ax^2 - 18ay^2 - bx^2 + 9by^2 =$

(b) $600ab^2 - 6ab^4 =$

(c) $(3a - b)^2 - (3a + b)^2 =$

(d) $60st^2 - 44st^2x + 8st^2x^2 =$

(e) $(2x - 1)^2 - 9 =$

(f) $a^4 - 16 =$

5. Solve each of the following equations. Make sure to check your solutions.

(a) $\frac{2x + 1}{3} - \frac{1 - 5x}{7} = 2x - 6$

(b) $15x^3 = 55x^2 + 20x$

(c) $5(2x - 3) - 3(4x - 7) = -2x$

(d) $\frac{2}{3}x - \frac{3}{5} = 3\frac{2}{5}$

(e) $7 - (2x - 1)(x + 5) = (3 - x)(2x + 7) - 17$

(f) $3x^3 = 75x$

6. Word Problems.

- (a) The difference between two numbers is 7, their sum is 93. Find these numbers.
- (b) Ann is four years younger than Tina. How old is Ann if the sum of their ages is 62?
- (c) The difference between two numbers is 7, their product is 228. Find these numbers.
- (d) One side of a rectangle is 4 in shorter than 3 times the other side. Find the sides of the rectangle if its perimeter is 48 in.
- (e) One side of a rectangle is 4 in shorter than 3 times the other side. Find the sides of the rectangle if its area is 319 in².

7. Consider the graph of the equation $x^2 - 2y^2 + y + 15 = -5x$. For each point given, determine if it is on the graph of the equation or not.

- (a) (0, 3)
- (b) (1, -2)
- (c) (1, -3)