

Factoring and Rational Expressions: Chapter Test 1

1. In the algebraic expression given below, the denominator is not equal to zero.

$$\frac{x^2 + 3x + xy + 3y}{x^2 - 9}$$

Which of the following expressions is equivalent to the above expression?

a. $-\frac{y}{3}$ b. $\frac{x+y}{x-6}$ c. $\frac{3x+xy+3y}{-9}$ d. $\frac{x+y}{x-3}$

2. The polynomial $x^4 + 2x^3 + x^2 + 2x$ can be written as a product of 3 irreducible factors. What is the sum of these 3 factors?

a. $x^3 + 2x + 2$ b. $x^2 + 2x + 3$ c. $4x^{10}$ d. $6x^{10}$

3. Which of the following polynomials is equivalent to the square of a binomial?

a. $4x^2 + 25$ b. $4x^2 - 25$ c. $4x^2 - 20x + 25$ d. $4x^2 + 20x - 25$

4. Perform the following addition and simplify the result if possible.

$$\frac{a}{a-5} + \frac{2a-10}{a^2-10a+25} = ?$$

My Calculations

5. Perform the following multiplication. State the restrictions for the variable x and simplify the result.

$$\frac{10x^2 + 13x - 3}{x^2 - 4x + 4} \cdot \frac{x^2 - 4}{5x^2 + 9x - 2} = ?$$

My Calculations

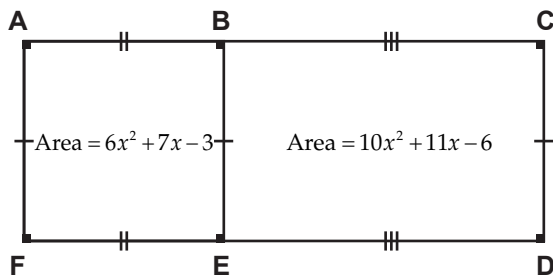
6. Perform the following division and simplify the result.

$$\frac{x^2 + x - 6}{2x^2 + x - 6} \div \frac{x^3 + 3x^2 + 4x + 12}{x^4 - 16} = ?$$

My Calculations

7. In the diagram below,

- The area of rectangle ABEF is represented by the trinomial $6x^2 + 7x - 3$.
- The area of rectangle BCDE is represented by the trinomial $10x^2 + 11x - 6$.



The lengths of the rectangles' bases and heights can be represented by binomials. What binomial represents the length of side AC?

My Calculations

8. The table below shows four rational expressions. When they are reduced to simplest form, they will show a pattern. Note that none of the denominators may be equal to zero.

#	Rational Expression	Reduced Result
1	$\frac{x^2 - x}{x - 1}$	
2	$\frac{(x^2 + x - 2)(2x + 3)}{2x^2 + 7x + 6}$	
3	$\frac{ax - 2a + bx - 2b}{?}$	
4	$\frac{x^4 - 81}{x^3 + 3x^2 + 9x + 27}$	

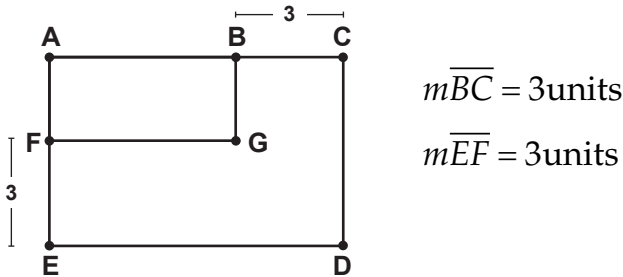
What is the missing denominator in the 3rd rational expression if we want the pattern in the reduced result column to continue?

My Calculations

9. The algebraic expression for the area of a square is $400x^2 - 440xy + 121y^2$. What is the perimeter of this square?
- _____

My Calculations

10. Given the diagram below, the polynomial $6x^2 - x - 1$ represents the area of the rectangle ACDE.



My Calculations

What is the polynomial that represents the area of rectangle ABGF? _____

Extension

11. A sum of cubes $a^3 + b^3$ can be factored as follows:

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

Using polynomial long division, show that

$$\frac{a^3 + b^3}{a + b} = a^2 - ab + b^2$$

12. Factor the following sum of cubes.

$$x^3 + 64 = \underline{\hspace{15em}}$$

My Calculations

My Calculations
