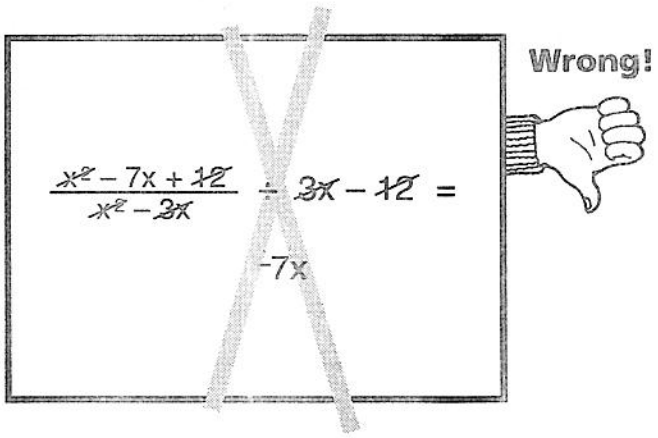
Name _____

Multiplying & Dividing Rational Expressions



$$\frac{x^2-7x+12}{x^2-3x} \div 3x-12 =$$

$$\frac{x^2-7x+12}{x^2-3x} \cdot \frac{1}{3x-12} =$$

$$\frac{(x-3)(x-4)}{x(x-3)} \cdot \frac{1}{3(x-4)} =$$

$$\frac{\cancel{(x-3)}\cancel{(x-4)}}{x\,\cancel{(x-3)}\,3\,\cancel{(x-4)}} = \frac{1}{3x}$$

Quick Review

1. To multiply, factor all polynomials. Then cancel out factors that are alike.
2. To divide, invert the divisor and multiply.

$$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$$

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{ad}{bc}$$

Simplify each expression. Use the code to learn the name of the German mathematician who developed the fundamental theorem of algebra.

1. $\frac{x}{x-4} \div \frac{x+6}{x-4} =$

2. $\frac{2x-2}{x^2-1} \cdot x+1 =$

3. $\frac{2x}{x+5} \div \frac{x-9}{x+5} =$

4. $\frac{2x-5}{-3} \cdot \frac{24}{4x-10} =$

5. $\frac{x^2-16}{3x^2} \div x-4 =$

6. $\frac{x+2}{x} \cdot \frac{x^2}{x^2-4} =$

7. $\frac{x^2-3x}{x^2-6x+15} \cdot \frac{(x-5)^2}{2x} =$

8. $\frac{3x^2}{4} \cdot \frac{3x+8}{18x} =$

9. $\frac{x^2-5x+6}{x+2} \div \frac{x-3}{x^2-4} =$

10. $\frac{4x}{x^2-25} \cdot \frac{x-5}{8x^2+20x} =$

11. $\frac{x^2-9}{5} \div \frac{x+3}{10} =$

12. $\frac{8x+12}{5x} \div \frac{x+2}{10x} =$

A	C	D	E	F	G	H	I	L	R	S	U
$\frac{x}{x-2}$	$2x-6$	$\frac{2x}{x-9}$	12	$\frac{x+4}{3x^2}$	x^2+x	$\frac{x-5}{2}$	2	$\frac{x}{x+6}$	x^2-4x+4	-4	$\frac{1}{2x^2+15x+25}$

11	6	9	1		5	9	2	12	3	9		11	7		8	6	10	4	4

Name _____

Greatest Common Factor of Monomials

$18x^3y = \cancel{2} \cdot 9 \cdot x^3 \cdot y$

$24x^2 = \cancel{2} \cdot 12 \cdot x^2$

GCF = 2

Wrong!

Right!

$18x^3y = 2 \cdot 9 \cdot x^3 \cdot y$

$= 2 \cdot 3 \cdot 3 \cdot x \cdot x \cdot x \cdot y$

$24x^2 = 2 \cdot 12 \cdot x^2$

$= 2 \cdot 2 \cdot 6 \cdot x \cdot x$

$= 2 \cdot 2 \cdot 2 \cdot 3 \cdot x \cdot x$

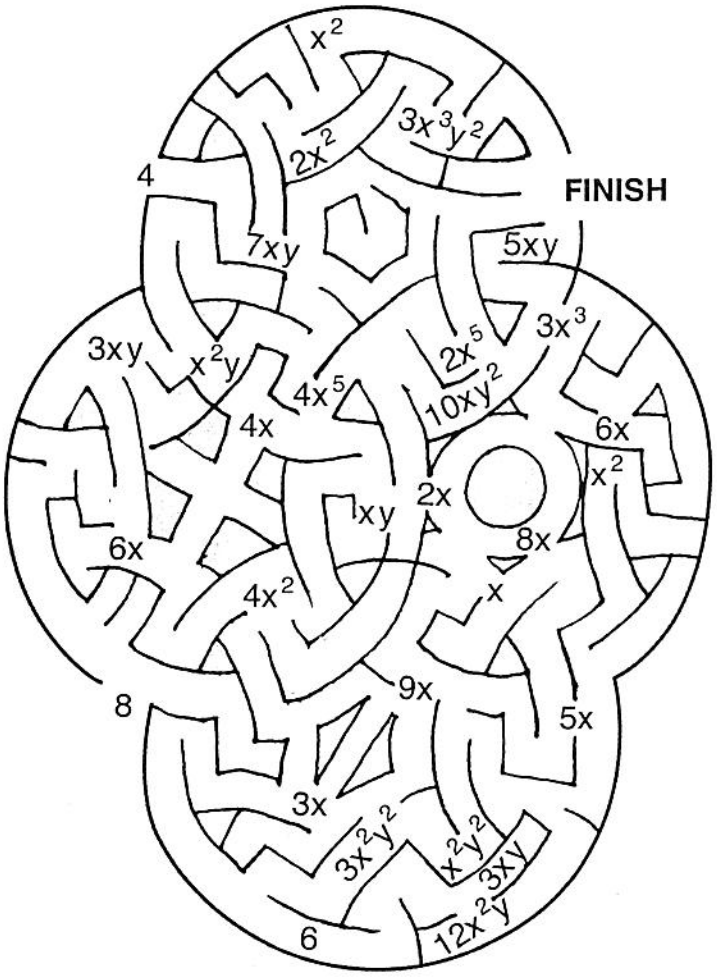
GCF = $2 \cdot 3 \cdot x \cdot x = 6x^2$

Quick Review

Completely factor the numeric coefficients within each monomial. A shortcut for finding the greatest common factor (GCF) of a variable is to compare the powers of variables that are in both monomials and choose the power which is the least amount.

Find the GCF for each pair. Follow your answers in order through the maze.

1. $16x^2$ and 8 _____
2. 18x and $24x^2$ _____
3. $12x^3$ and $4x^2$ _____
4. $9x^3y$ and 12x _____
5. $24x^2y^4$ and $21x^2y^2$ _____
6. 6y and $6x^2$ _____
7. $12x^2y^3$ and $24x^2y$ _____
8. $10x^3$ and 35x _____
9. $9x^2$ and 11x _____
10. 8xy and $18x^2$ _____
11. $9x^4$ and $15x^3$ _____
12. $20x^2y^2$ and $30xy^3$ _____
13. $4x^7$ and $12x^5$ _____
14. 21xy and $14x^2y^2$ _____
15. $15x^3$ and $8x^2$ _____
16. $6x^3y^4$ and $9x^5y^2$ _____



Name _____

Solving Quadratics by Quadratic Formula

Quick Review

If the equation you are solving is not easily factorable, you can always use the quadratic formula.

Given $ax^2 + bx + c = 0$,

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

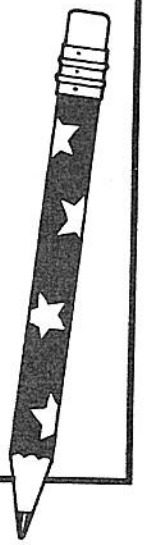
$2x^2 - x - 3 = 0$

$$x = \frac{1 \pm \sqrt{(-1)^2 - 4(2)(-3)}}{2(2)}$$

$$x = \frac{1 \pm \sqrt{25}}{4} = \frac{1 \pm 5}{4}$$

$$x = \frac{1 + 5}{4} = \frac{6}{4} = \boxed{\frac{3}{2}}$$

and $$x = \frac{1 - 5}{4} = \frac{-4}{4} = \boxed{-1}$$



Use the quadratic formula to solve these equations. Then follow your answers in order through the maze.

1. $x^2 - 3x + 2 = 0$ x = _____, _____
2. $x^2 - 6x = 0$ x = _____, _____
3. $8x^2 - 16x + 8 = 0$ x = _____
4. $3x^2 + 6x - 12 = 0$ x = _____
5. $2x^2 + 3x - 5 = 0$ x = _____, _____
6. $x^2 - 4x - 4 = 0$ x = _____
7. $3x^2 - 2x - 1 = 0$ x = _____, _____
8. $x^2 + 6x - 18 = 0$ x = _____
9. $2x^2 - 8 = 0$ x = _____, _____
10. $x^2 - 10x + 9 = 0$ x = _____, _____