

Tell whether the equation shows direct variation, inverse variation, or neither

1. $y = \frac{1}{3x}$

2. $y = -\frac{1}{5}x$

3. The variables x and y vary inversely, when $y = \frac{1}{2}$, $x = -6$. Write an equation relating x and y . Then find y when $x = -3$.

4. The variables x and y vary directly when $x = \frac{5}{2}$ and $y = \frac{5}{4}$. Write an equation relating x and y . Then find x when $y = -5$.

Determine whether x and y show direct or inverse variation or neither. Write the equation describing the relationship.

5.

x	y
-3	-140
-5	-84
10	42
17.5	24
20	21

6.

x	y
-4	6
0	0
4	-6
-6	9
10	-15

7.

X	y
-2	3
4	6
6	7
10	9
14	11

Concept #1 - Multiplying and Simplifying Rational Expressions

Strategy - Factor the numerator and denominator of each fraction if possible, then cancel common factors from the numerator and denominator.

$$8. \frac{3x^2}{3x+15} \cdot \frac{x+5}{x^2-x}$$

$$9. \frac{x^2-2x}{x^2+2x+1} \cdot \frac{x^2+4x+3}{x^2+3x}$$

$$10. \frac{81x^9}{y^4} \cdot \frac{x^2y^2}{36x^5y}$$

Concept #2 - Dividing and Simplifying Rational Expressions

Strategy - Flip the fraction that follows the division sign. Factor the numerator and denominator of each fraction, then cancel common factors from the numerator and denominator.

$$11. (x^2+10x-24) \div \frac{x^2-144}{3x-36}$$

$$12. \frac{x^2-9x-22}{x^2+5x-24} \div \frac{x+2}{x-3}$$

$$13. \frac{x^2}{x^2-4} \div \frac{2x}{x+2}$$

Concept #3 - Adding Rational Expressions

Strategy - Find a common denominator and change both fractions to have this denominator. Add the numerators of each fraction and simplify.

$$14. \frac{2x-1}{8x} + \frac{x+1}{8}$$

$$15. \frac{12}{x} + \frac{4}{5}$$

$$16. \frac{x}{x^2+x-2} + \frac{1}{x+2}$$

Concept #4 - Subtracting Rational Expressions

Strategy - Find a common denominator and change both fractions to have this denominator.

Subtract the numerators of each fraction and simplify.

$$17. \frac{2x^2 - 4x + 8}{3} - \frac{5x^2 - 6x - 1}{3}$$

$$18. \frac{4x}{x^2 - 4} - \frac{3}{x + 2}$$

$$19. \frac{5}{x + 1} - \frac{2}{x + 3}$$

Concept #5 - Complex Fractions/ Complex Rational Expressions

Strategy - Follow addition, subtraction steps to get a single fraction in the numerator and a single fraction in the denominator. Then follow multiplication and division steps.

$$20. \frac{\frac{3}{x^2 - x} + \frac{1}{x - 1}}{\frac{x - 5}{x^2 - 1} - \frac{3}{x + 3}}$$

Concept #6 - Solving Equations by multiplying by the LCD - check for false solutions!

*If you get a value for x that makes the denominator of the original problem = 0, then it is a false solution.

21. $\frac{2x}{x+3} = \frac{3x}{x-3}$

22. $\frac{4x-4}{x-1} = \frac{2x-2}{x+1}$

23. $\frac{3}{x} - \frac{1}{2} = \frac{12}{x}$

24. $\frac{x+3}{2} - 4 = \frac{2x-1}{5}$