

- x is inversely proportional to the square of y . If $x = 4$ when $y = \frac{4}{3}$, find x when $y = 4$.
- R varies jointly as U and T and inversely as S . If $R = 40$ when $U = 4$, $T = 28$, and $S = 5$, find R when $U = 7$, $T = 26$, and $S = 6$.
- A spring extends or compresses in direct proportion to the mass being supported. If spring A extends 13 cm when supporting 100 grams, how far will it extend when supporting 20 grams?
- The electrical resistance in ohms (Ω) of a wire varies directly as its length and inversely as the square of its diameter. If 96 m of a wire with diameter 2 mm has a resistance of 8Ω , what would be the resistance of 150 m of wire of the same material with a diameter of 5 mm?

Multiply and simplify:

5. $\frac{14m^2y}{3x^2} \cdot \frac{5y}{7m^2}$

6. $\frac{x^3-49x}{x^2+5x-14} \cdot \frac{3x^2-3x-6}{x^2-7x}$

Divide and simplify:

7. $\frac{(x+y)^2}{x^2+y^2} \div \frac{x^2-y^2}{x-y}$

8. $(x^2 + 3x - 28) \div \frac{x-4}{x+1}$

Reduce:

9. $\frac{3x^2-11x-4}{x^2-16}$

10. $\frac{x^2+2x-8}{4-x^2}$

Answers: 1) $\frac{4}{9}$; 2) $\frac{325}{6}$; 3) 2.6 cm; 4) 2Ω ; 5) $\frac{10y^2}{3x^2}$; 6) $3x + 3$; 7) $\frac{x+y}{x^2+y^2}$; 8) $x^2 + 8x + 7$; 9) $\frac{3x+1}{x+4}$; 10) $-\frac{x+4}{x+2}$

Add or subtract and simplify:

11. $\frac{x-5}{4x} + \frac{x+1}{3x}$

12. $\frac{x}{x-3} - \frac{2x+12}{x^2-9}$

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

14. $\frac{7+x}{8} - \frac{x+1}{16}$

Solve for x. (Domain = all real numbers.)

15. $\frac{x-3}{12} - \frac{x+2}{3} = \frac{x-5}{4}$

16. $\frac{x+6}{x-2} = \frac{x+3}{x+5}$

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

18. $\sqrt{2x-1} = 7$

19. $x = \sqrt{20-x}$

20. $5 + \sqrt{x+7} = x$

21. $\sqrt{3x-2} - \sqrt{2x+5} = 1$

Answers: 11) $\frac{7x-11}{12x}$; 12) $\frac{x+4}{x+3}$; 13) -1; 14) $\frac{x+13}{16}$; 15) $\frac{2}{3}$; 16) $-\frac{18}{5}$; 17) $-\frac{3}{2}, 3$; 18) 25; 19) 4; 20) 9; 21) 22;