

1. y varies inversely as the square root of x . If $y = 4$ when $x = 9$, find y when $x = 4$.

2. y varies jointly with r and s^2 and inversely as t .

(a) If $y = 90$ when $r = 5$, $s = 3$, and $t = 2$, write an equation that relates y , r , s , t , and the numerical value of k .

(b) Find r when $y = 80$, $s = 2$, and $t = 6$.

3. The lateral area (L) of a pyramid varies jointly as the perimeter (p) of its base and the slant height (s) of the pyramid. If lateral area is 60 sq. cm when the base perimeter is 20 cm and the slant height is 6 cm, find the slant height when the lateral area is 10 sq. cm and the base perimeter is 5 cm.

*Simplify completely.

4.
$$\frac{1 - 4x^{2n}}{4x^{2n} - 4x^n + 1}$$

5.
$$\frac{x^3 + x^2 - y^3 - y^2}{x^2 - 2xy + y^2}$$

6.
$$\frac{x^2y^3 - 3xy^3}{x^3 - 2x^2} \cdot \frac{(x-2)^2}{xy^3 - 2y^3}$$

7.
$$\frac{6x^2 - 32x + 10}{3x - 15} \div \frac{3x^3 + 11x^2 - 4x}{2x^2 - 32}$$

8.
$$(x^2 - xy + y^2)^{-1} (x^2y^{-1} + y^2x^{-1}) (x^{-2} - y^{-2}) (x^{-2} + 2x^{-1}y^{-1} + y^{-2})^{-1}$$

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

10.
$$\frac{3x}{x^2 + 3x + 2} - \frac{3x + 6}{x^2 + 4x + 4}$$

11.
$$\frac{5}{2x^2 + 3x - 2} - \frac{3}{x^2 - 4} + \frac{3}{2x^2 - 5x + 2}$$

12.
$$\frac{\frac{1}{3x^2} - \frac{25}{3y^2}}{\frac{1}{x^2y} + \frac{5}{xy^2}}$$

13.
$$\frac{\frac{x+y}{x-y} + 1}{\frac{xy}{x^2 - y^2} + \frac{x}{x+y}}$$

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

*Solve for x .

15. $\frac{x}{x-5} = \frac{2x+7}{x-1}$

16. $\frac{2x^2+15}{x^3+1} - \frac{6}{x^2-x+1} = \frac{5}{x+1}$

17. $\frac{1}{2x^2-3x+1} + \frac{1}{2x+1} + \frac{4}{4x^2-1} = 0$

*Graph. State the domain and range. Locate 2 points per branch & show asymptotes.

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

19. $y = \frac{4}{x-2} + 3$

20. $y = \frac{6}{x+1} - 2$

*Write and solve an equation.

21. John paddled his kayak 10 km upstream against a 3 km/hr current and back again in $3\frac{1}{2}$ hours. Find his paddling rate in still water.

22. Machine A can fill a grain storage bin in half the time it takes machine B. Working together, it takes the two loading machines 4 hours to fill the bin. Working alone, how long does the small loading machine take to fill the bin?

23. Dan starts a business manufacturing golf balls, spending \$42,000 on supplies and equipment. Dan spends \$12 per dozen on manufacturing. How many dozens of golf balls must Dan produce before the average cost per dozen is \$15?

24. Mike's current point total in his math class is 330 out of 370 possible points. How many points must Mike earn on the next 50-point test so that his average will be 90%?

25. The sum of a number and five times its reciprocal is $10\frac{1}{2}$. Find the number.

26. A car's braking distance (d), in feet, can be modeled by the formula $d = s + \frac{s^2}{20}$, where s is the speed at which the car is traveling in miles per hour. Find the speed that results in a braking distance of 75 feet. (NO TAILGATING!!!)

ANSWERS: 1. 6 2. (a) $y = \frac{4rs^2}{t}$ (b) 30 3. 4 4. $\frac{-(1+2x^n)}{2x^n-1}$

5. $\frac{x^2+xy+y^2+x+y}{x-y}$ 6. $\frac{x-3}{x}$ 7. $\frac{4(x-4)}{3x}$ 8. $\frac{y-x}{xy}$ 9. $\frac{x+4}{x(x+2)}$

10. $\frac{-3}{(x+2)(x+1)}$ 11. $\frac{1}{(x+2)(x-2)}$ 12. $\frac{y-5x}{3}$ 13. $\frac{2(x+y)}{x}$ 14. $\frac{x^3}{x^4-x^2+1}$

15. 7, -5 16. $-\frac{4}{3}, 1$ 17. -2 18. D: $x \neq 0$, R: $y \neq 2$ 19. D: $x \neq 2$, R: $y \neq 3$

20. D: $x \neq -1$, R: $y \neq -2$ 21. 7 km/hr 22. 12 hrs 23. 14,000 dz 24. 48 pts 25. $\frac{1}{2}$ or 10

26. 30 mph