

## E Summer Proportion Inverse

“The light that burns twice as bright burns half as long – and you have burned so very, very brightly, Roy.”

BLADE RUNNER

Two quantities are in *inverse proportion* if, when one quantity gets *multiplied* by any factor, then the other quantity gets *divided* by the same factor. For example if one quantity is doubled then the other quantity is halved. We say that  $y \propto \frac{1}{x}$ .

### Questions

1. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	8	24		11	
$y$	15		$\frac{40}{13}$		$\frac{260}{3}$

$39, \frac{18}{13}, 5, \frac{120}{11}$

2. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	5	625		$\frac{1}{35}$	$\frac{2500}{3}$
$y$	16		$\frac{4}{15}$		

$300, \frac{16}{125}, 2800, \frac{12}{125}$

3. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	$\frac{11}{7}$	$\frac{22}{91}$		$\frac{198}{1001}$
$y$	$\frac{18}{13}$		$\frac{99}{455}$	

10, 9, 11

4. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	$\frac{14}{19}$		$\frac{168}{7429}$	
$y$	$\frac{12}{23}$	$\frac{21}{873}$		$\frac{28}{1321}$

$\frac{6984}{437}, \frac{7926}{437}, 17$

5. The variables  $p$  and  $q$  vary in inverse proportion. Copy and complete the following table.

$p$	$x$			$\frac{1}{81}$		$\frac{1}{9}$
$q$	$y$	$\frac{xy}{3}$	1		$81x^2y^2$	

$3, xy, \frac{1}{81xy}, 81xy, 9xy$

6.  $A$  and  $B$  are positive.  $A$  is inversely proportional to  $B$ . When  $A = 48$ ,  $B = 147$ . Find the value of  $A$  when  $A = B$ .

$A = 84$

7. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	1			$b$	
$y$	$\frac{b^2}{a}$	1	$a^2$		$\frac{1}{a}$

$$\frac{b^2}{a}, \frac{b^2}{a^3}, b^2, \frac{b}{a}$$

8. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	$\frac{7}{q}$	$\frac{p}{q}$		$q$	$p^2$
$y$	$q^2$		$\frac{7}{pq}$		

$$pq^2, \frac{7q^2}{p}, 7, \frac{7q}{p^2}$$

9. The variables  $p$  and  $q$  vary in inverse proportion. Copy and complete the following table.

$p$	$x^2 - 1$	$(x + 1)^2$	
$q$	$x + 1$		$x(x + 1)^2$

$$\frac{x-1}{x}, x-1$$

10. The variables  $M$  and  $t$  vary in inverse proportion. Copy and complete the following table.

$M$	$x$	$\frac{x^2 y}{2}$	
$t$	$\frac{y}{x}$		$\frac{x}{y}$

$$\frac{y^2}{x}, \frac{2}{x^2}$$

11. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	$n$		$\frac{n^2+n}{2n+4}$	$10n^3 + 10n^2$
$y$	$5n^2 + 5n$	$5n$		

$$n(n+1), 10n(n+2), \frac{1}{2}$$

12. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	$r$	$3r + 6$	
$y$	$4r + 8$		$12r^2 + 24$

$$\frac{r(r+2)}{3(r^2+2)}$$

13. The variables  $v$  and  $w$  vary in inverse proportion. Copy and complete the following table.

$v$	$x - y$	$x^2 - y^2$	$7qx^3 - 7qy^2x$	
$w$	$7q$			$x - y$

$$7q, \frac{7q}{x+y}, \frac{1}{x(x+y)}$$

14. The variables  $p$  and  $q$  vary in inverse proportion. Copy and complete the following table.

$p$	$3\pi x$	
$q$	$15\pi x + \frac{3\pi}{x}$	$\frac{9\pi^2(5x^2+1)}{5x+1}$

$$5x + 1$$

15. The variables  $L$  and  $M$  vary in inverse proportion. Copy and complete the following table.

$L$	$xy - x$	$y^2 - 1$
$M$	$y + 1$	

$$x$$

16. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	$n$	$n^3$	$3n^{\frac{3}{2}}$
$y$	$3n^2$		

$$3, n^{\frac{3}{2}}$$

17. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	$2a$			$\frac{a-b}{c}$	$\frac{2}{a+b+c}$
$y$	$bc$	$b + c$	$\frac{ab}{c}$		

$$\frac{2abc}{b+c}, 2c^2, \frac{2abc^2}{a-b}, abc(a+b+c)$$

18. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	$n$		$\frac{n^2+n}{m}$	
$y$	$m$	$\frac{m}{n+1}$		$nm^2$

$$n(n+1), \frac{1}{m}, \frac{m^2}{n+1}$$

19. The variables  $P$  and  $Q$  vary in inverse proportion. Copy and complete the following table.

$P$	$x$		$\frac{2xy}{x+4}$	$x^2y + 2xy$		$xy$
$Q$	$y$	$2x + 4$			$\frac{y}{x+2}$	

$$\frac{xy}{2(x+2)}, x(x+2), \frac{x+4}{2}, \frac{1}{x+2}, 1$$

20. The variables  $r$  and  $s$  vary in inverse proportion. Copy and complete the following table.

$r$	$2xy - 4x - 3y + 6$	$7y - 14$
$s$		$14x - 21$

$$49$$

21. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	$\pi^2 - 36$	
$y$	$12$	$12\pi + 72$

$$\pi - 6$$

22. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	$\sqrt{a}$	$b^2$
$y$	$\frac{a^{\frac{1}{2}}}{b^{-2}}$	

$b^4$

23. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	$(\sqrt[3]{a})^2$	$b^{\frac{1}{2}}$
$y$	$\frac{a^{\frac{1}{3}}}{\sqrt{b}}$	

$\frac{a}{b}$

24. The variables  $P$  and  $Q$  vary in inverse proportion. Copy and complete the following table.

$P$	$3x + 9$	$5x^2 + 16x + 3$
$Q$	$5x + 1$	

3

25. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	$r^2 - r$	$r^2 - 1$
$y$	$r - 1$	

$\frac{r(r-1)}{r+1}$

26. The variables  $p$  and  $q$  vary in inverse proportion. Copy and complete the following table.

$p$	$\sqrt{x^5} + 6x^{\frac{3}{2}} + 9\sqrt{x}$	
$q$	$2x^{\frac{3}{2}}$	$x^2$

$2(x+3)^2$

27. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	$a^2 - b^2$	$2a^2 + 4ab + 2b^2$	
$y$	$(a - b)^{-1}$		$(a + b)^{-1}$

$(a+b)^2, \frac{1}{2(a+b)}$

28. The variables  $p$  and  $q$  vary in inverse proportion. Copy and complete the following table.

$p$	$x^3 + x$	$x^6 - x^2$	
$q$	$x^2 - 1$		$x$

$x^4 - 1, \frac{1}{x}$

29. The variables  $x$  and  $y$  vary in inverse proportion. Copy and complete the following table.

$x$	$r^2$	$r^4 - r^2$
$y$		$r^2 + 1$

$r^4 - 1$