Inverse Proportion

"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	$\frac{x^2y}{2}$	
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		$14x - 21$

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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