Rearranging When the Subject Appears Twice

ANSWERS

1

Make x the subject of

$mx + 1 = 4x + 9$

every x term		everything else
$mx - 4x$	=	8

factorise: take x out

$x(m - 4) = 8$

divide by the bracket

$x = \frac{8}{m - 4}$

2

Make x the subject of

$tx - 6 = 2x + k$

every x term		everything else
$tx - 2x$	=	$k + 6$

factorise: take x out

$x(t - 2) = k + 6$

divide by the bracket

$x = \frac{k + 6}{t - 2}$

3

Make x the subject of

$7x + p = qx + 2$

every x term		everything else
$7x - qx$	=	$2 - p$

factorise: take x out

$x(7 - q) = 2 - p$

divide by the bracket

$x = \frac{2 - p}{7 - q}$

4

Make x the subject of

$ax = 5x + b$

$ax - 5x$	=	b

$x(a - 5) = b$

$x = \frac{b}{a - 5}$

5

Make x the subject of

$gx - 3 = x + h$

$gx - x = h + 3$

$x(g - 1) = h + 3$

$x = \frac{h + 3}{g - 1}$

6

Priya makes x the subject of

$ax + 4 = 3x + b$. She writes

$x = \frac{3x + b - 4}{a}$. Explain why she has not finished. Then finish it.

x is still on both sides

$ax - 3x = b - 4$

$x(a - 3) = b - 4$

$x = \frac{b - 4}{a - 3}$

7

Make x the subject of

$4(x - k) = nx$

$4x - 4k = nx$

$4x - nx = 4k$

$x(4 - n) = 4k$

$x = \frac{4k}{4 - n}$

8

Make x the subject of

$y = \frac{3x - 1}{x + 2}$

$xy + 2y = 3x - 1$

$2y + 1 = 3x - xy$

$2y + 1 = x(3 - y)$

$x = \frac{2y + 1}{3 - y}$

Rearranging When the Subject Appears Twice

further practice

ANSWERS

9

Make x the subject of

$px + q = rx$

$rx - px = q$

$x(r - p) = q$

$x = \dfrac{q}{r - p}$

10

Make x the subject of

$a(x - 2) = b(x + 1)$

$ax - 2a = bx + b$

$ax - bx = b + 2a$

$x(a - b) = b + 2a$

$x = \dfrac{b + 2a}{a - b}$

11

Make x the subject of

$y = \dfrac{2x}{x + 5}$

$xy + 5y = 2x$

$5y = 2x - xy$

$5y = x(2 - y)$

$x = \dfrac{5y}{2 - y}$

12

One rectangle is $(x + 3)$ cm long and 2 cm wide. Another is x cm long and k cm wide. They have the same area. Find x in terms of k.

$2x + 6 = kx$

$6 = kx - 2x = x(k - 2)$

$x = \dfrac{6}{k - 2}$

13

Make a the subject of $P = \dfrac{a + b}{a - b}$.

$Pa - Pb = a + b$

$Pa - a = b + Pb$

$a = \dfrac{b(P + 1)}{P - 1}$

14

Sam makes x the subject of

$xy = 2x + 7$. He writes $x(y - 2) = 7$, so $x = \dfrac{7}{y} - 2$. What has Sam done wrong? Write the right answer.

He divided by y, not by $(y - 2)$

$x = \dfrac{7}{y - 2}$

15

Make x the subject of $\dfrac{x}{3} + \dfrac{x}{k} = 2$.

$\times 3k: kx + 3x = 6k$

$x(k + 3) = 6k$

$x = \dfrac{6k}{k + 3}$

16

Ben makes x the subject of

$mx + 3 = 2x + 11$ and gets $x = \dfrac{8}{m - 2}$. Show that his answer works when $m = 6$.

$x = 8 \div 4 = 2$

$6 \times 2 + 3 = 15$ and $2 \times 2 + 11 = 15$

both sides are 15

Answer