Changing the subject: the subject appears twice

ANSWERS

1

Make x the subject of

$ax + 2x = 7$

$x(a + 2) = 7$

$x = \frac{7}{a + 2}$

2

Make x the subject of

$px + 6x = 5$

$x(p + 6) = 5$

$x = \frac{5}{p + 6}$

3

Make x the subject of

$kx - 3x = 11$

$x(k - 3) = 11$

$x = \frac{11}{k - 3}$

4

Make x the subject of

$tx + 4x = y$

$x(t + 4) = y$

$x = \frac{y}{t + 4}$

5

Make x the subject of

$ax + 3 = 4x + 10$

$ax - 4x + 3 = 10$

$ax - 4x = 7$

$x(a - 4) = 7$

$x = \frac{7}{a - 4}$

6

Make x the subject of

$mx + 1 = 2x + 9$

$mx - 2x + 1 = 9$

$mx - 2x = 8$

$x(m - 2) = 8$

$x = \frac{8}{m - 2}$

7

Make x the subject of

$px - 4 = 3x + 2$

$px - 3x - 4 = 2$

$px - 3x = 6$

$x(p - 3) = 6$

$x = \frac{6}{p - 3}$

8

Make x the subject of *Notice the change!*

$kx + 5 = 12 - x$

$kx + x + 5 = 12$

$kx + x = 7$

$x(k + 1) = 7$

$x = \frac{7}{k + 1}$

Changing the subject: the subject appears twice *further practice*

ANSWERS

9

Make x the subject of

$ax + 7 = 2x + 15$

$ax - 2x = 8$

$x(a - 2) = 8$

Answer $x = \frac{8}{a - 2}$

10

A group of x adults and x children go to a show. An adult ticket costs £a and a child ticket costs £5. The group pays £60.

Show that $x = \frac{60}{a + 5}$. Find x when $a = 7$.

$ax + 5x = 60$

$x(a + 5) = 60$

$a = 7: 60 \div 12$

Answer $x = 5$

11

Make x the subject of

$3x + c = kx$

$c = kx - 3x$

$c = x(k - 3)$

Answer $x = \frac{c}{k - 3}$

12

Make x the subject of

$ax + 4 = bx + 9$

$ax - bx = 5$

$x(a - b) = 5$

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

13

A rectangle is x cm wide and ax cm long. Its perimeter is 24 cm.

Show that $x = \frac{12}{a + 1}$. Find the width when $a = 3$.

$2x + 2ax = 24$

$x(2 + 2a) = 24, x = 24 \div (2 + 2a)$

$a = 3: 12 \div 4$

Answer 3 cm

14

A cinema club costs £12 to join, then £m a film. Without the club a film costs £7.

n films cost the same both ways, so $12 + mn = 7n$. Make n the subject.

Find n when $m = 4$.

$12 = 7n - mn = n(7 - m)$

$m = 4: 12 \div 3$

Answer $n = \frac{12}{7 - m}$, $n = 4$

15

Make x the subject of

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

$ax - 3a = 2x + 1$

$ax - 2x = 3a + 1$

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

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

16

Ali makes x the subject of $px + 3 = 9 - 2x$ and gets $x = \frac{6}{p - 2}$. Explain Ali's mistake. Write the right answer.

Ali took 2x away from both sides.

It is − 2x, so add 2x: px + 2x = 6.

Answer $x = \frac{6}{p + 2}$