

Rearrange the formula.

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Method ① you will be given a specific letter

② you will need to divide or multiply or add or subtract to get that letter on its own.

Eg1) Give your answer in terms of x

$$x - y = 2z$$

We need to get x on its own

$$+y \quad | \quad x = 2z + y \quad | \quad +y \quad \text{We use stabilizers to rearrange}$$

Eg2) Make x the subject of the formula.

$$\begin{array}{l} \text{LCD} \\ 3 \end{array} \left| \begin{array}{l} \cancel{3}x - 2y = 8 \\ \cancel{3}x - 2y = 8 \\ x - 6y = 24 \\ x = 24 + 6y \end{array} \right. \begin{array}{l} \text{LCD} \\ 3 \end{array} \left| \begin{array}{l} \text{multiply} \\ +6y \end{array} \right.$$

Pg 422
Q1 → 3



T&T 21.5
Rearrang...

Algebraic Fractions – Formulae

Chapter

21

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Section 21.5 Rearranging formulae

Example 1

If $bc - d = a$, make c the subject of the formula.

Example 2

If $a = \frac{b}{c} - d$, make b the subject of the formula.

Example 3

If $y = \frac{c - ax}{b}$, make x the subject of the formula.

Exercise 21.5

1. Change the following equations to the form $y = \dots$

(i) $2x + y - 4 = 0$

(ii) $2x + y = -7$

(iii) $3x + y - 7 = 0$

2. Make the underlined letter the subject of the formula in each of the following:

(i) $2\underline{x} - 4 = y$

(ii) $a = 8\underline{b} - 6$

(iii) $c = 4\underline{d} - 1$

(iv) $h = 2\underline{k} - 2$

3. Rearrange each of these formulas to make the underlined letter the subject:

(i) $a = 3\underline{b} - 5$

(ii) $b = 4\underline{w} + 2$

(iii) $d = 6\underline{e} - 12$

(iv) $g = 18 - 5\underline{h}$

4. Which of the following are correct rearrangements of $a = 2b - 10$?

A $b = \frac{a - 10}{2}$

B $b = \frac{a}{2} + 5$

C $b = \frac{a + 10}{2}$

D $b = \frac{a + 2}{10}$

E $b = \frac{a - 2}{10}$

F $b = \frac{10 + a}{2}$

5. Copy and complete each of the following:

(i) $v = u + at$

$v - \square = at$

$t = \dots$

(ii) $ap + bq = k$

$ap = k - \square$

$p = \frac{k - \square}{\square}$

(iii) $p = \frac{g}{5} + 3h$

$p - \square = \frac{g}{5}$

$\square (p - \square) = g$

$g = \dots$

6. Make x the subject of the formula in each of these:

(i) $x - y = 2z$

(ii) $3x - b = 4c$

(iii) $6y + 3x = 7$

(iv) $\frac{x}{3} - 2y = 8$

7. Make a the subject of the formula in each of these:

(i) $2a - b = \frac{1}{2}$

(ii) $ab - 3a = 5$

(iii) $7(a - 3) = 4b$

8. Make the letter in brackets the subject of the formula in each of the following:

(i) $c = \frac{a}{2} - 4b \dots (a)$

(ii) $2(a - 2b) = 3c \dots (a)$

(iii) $2x - \frac{1}{3} = \frac{y}{3} \dots (x)$

(iv) $5(b - 3) = \frac{a}{2} \dots (b)$

(v) $x = \frac{y - 2z}{3} \dots (z)$

(vi) $a = \frac{b}{2} - \frac{3c}{4} \dots (b)$

9. Make x the subject of the formula in each of these:

(i) $xa + xb = 3c$

(ii) $ax - 3x = 5$

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

10. If $k = s(a - b)$, make b the subject of the formula.

11. The formula $h = \frac{a}{k} + j$ gives h in terms of a , k and j .

Which of the following are correct rearrangements of the formula?

A $a = hk - j$

B $a = k(h - j)$

C $a = jk - kh$

D $a = \frac{k}{h - j}$

E $a = hk - jk$

12. Make the letter in brackets the subject of the formula in each of the following:

(i) $x = \frac{2y - 3z}{4} \dots (z)$

(ii) $\frac{b}{3} + \frac{3c}{4} = 2a \dots (b)$

(iii) $\frac{3x}{4} = 5(y + z) \dots (y)$

(iv) $\frac{ab}{3} = \frac{b}{2} + c \dots (b)$

12. Make the letter in brackets the subject of the formula in each of the following:

$$(v) t = \frac{x - 2y}{z} \dots (y)$$

$$(vi) \frac{p}{q} = \frac{q}{t} + 1 \dots (t)$$

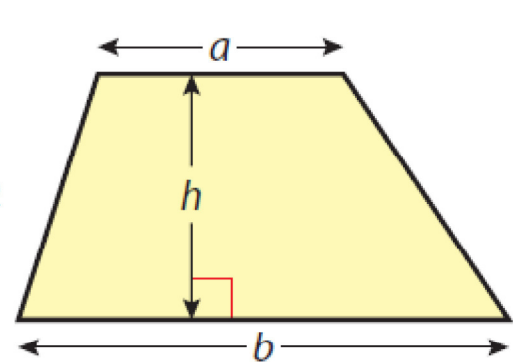
$$(vii) y = \frac{3x + 4}{x - 1} \dots (x)$$

$$(viii) p = \frac{qr}{q - r} \dots (r)$$

13. Given that $z = \frac{3y + 2}{y - 1}$, express y in terms of z .
Hence find the value of y when $z = \frac{1}{2}$.

14. The area A of a trapezium can be written $A = \frac{(a + b)h}{2}$.

- (i) Rearrange this formula to make h the subject.
(ii) Work out the height of a trapezium whose area is 100 cm^2 and whose parallel sides are 6.5 cm and 7.8 cm .
Give your answer to the nearest whole number.



Answers

Exercise 21.5

- (i) $y = 4 - 2x$ (ii) $y = -2x - 7$
(iii) $y = 7 - 3x$
- (i) $x = \frac{y + 4}{2}$ (ii) $b = \frac{a + 6}{8}$
(iii) $d = \frac{c + 1}{4}$ (iv) $k = \frac{h + 2}{2}$
- (i) $b = \frac{a + 5}{3}$ (ii) $w = \frac{b - 2}{4}$
(iii) $e = \frac{d + 12}{6}$ (iv) $h = \frac{18 - g}{5}$
- B, C, F
- (i) $u, \frac{v - u}{a}$ (ii) bq, bq, a
(iii) $3h, 5, 3h, 5(p - 3h)$
- (i) $x = y + 2z$ (ii) $x = \frac{b + 4c}{3}$
(iii) $x = \frac{7 - 6y}{3}$ (iv) $x = 3(2y + 8)$
- (i) $a = \frac{2b + 1}{4}$ (ii) $a = \frac{5}{b - 3}$
(iii) $a = \frac{4b + 21}{7}$

Answers

- (i) $a = 2(4b + c)$ (ii) $a = \frac{4b + 3c}{2}$
(iii) $x = \frac{y + 1}{6}$ (iv) $b = \frac{a + 30}{10}$
(v) $z = \frac{y - 3x}{2}$ (vi) $b = 4\frac{a + 3c}{2}$
- (i) $x = \frac{3c}{a + b}$ (ii) $x = \frac{5}{a - 3}$
(iii) $x = 3y + 3$
- $b = \frac{as - k}{s} = \left(a - \frac{k}{s}\right)$ 11. B, E
- (i) $z = \frac{2y - 4x}{3}$ (ii) $b = \frac{24a - 9c}{4}$
(iii) $y = \frac{3x - 20z}{20}$ (iv) $b = \frac{6c}{2a - 3}$
(v) $y = \frac{x - tz}{2}$ (vi) $t = \frac{q^2}{p - q}$
(vii) $x = \frac{y + 4}{y - 3}$ (viii) $\frac{pq}{p + q}$
- $y = \frac{z + 2}{z - 3}; -1$
- (i) $h = \frac{2A}{a + b}$ (ii) 14 cm