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Rearranging Formulae - Worksheet

Skill

Group A - Rearranging linear formulae

Make x the subject:

1) $y = 4x + 8$ 　　　　　　**2)** $y = 4x - 8$ 　　　　　　**3)** $3y = 4x - 8$

4) $y = 2x - 7$ 　　　　　　**5)** $y = 2x + 7$ 　　　　　　**6)** $5y = 2x + 7$

7) $y = 7x + 5$ 　　　　　　**8)** $y = 7x - 5$ 　　　　　　**9)** $6y = 7x - 5$

10) $y = 4 + 3x$ 　　　　　　**11)** $y = 4 - 3x$ 　　　　　　**12)** $4y = 4 - 3x$

Group B - Rearranging formulae with fractions

Make x the subject:

1) $y = \dfrac{6x+5}{3}$ 　　　　**2)** $y = \dfrac{6x-5}{3}$ 　　　　**3)** $y = \dfrac{2x+7}{3}$

4) $y = \dfrac{2x-7}{3}$ 　　　　**5)** $y = \dfrac{x}{8} - 7$ 　　　　**6)** $y = \dfrac{x}{8} + 7$

7) $y = \dfrac{x}{3} + 5$ 　　　　**8)** $y = \dfrac{x}{3} - 5$ 　　　　**9)** $y = \dfrac{5x+4}{7}$

10) $y = \dfrac{4-5x}{7}$ 　　　　**11)** $3y = \dfrac{4-2x}{5}$ 　　　　**12)** $-3y = \dfrac{4-2x}{5}$

Group C - Rearranging formulae with powers and roots

Make x the subject:

1) $y = x^2 - 5$ 　　　　　　**2)** $y = x^2 + 5$ 　　　　　　**3)** $y = \sqrt{\dfrac{x-4}{5}}$

4) $y = \sqrt{\dfrac{x+4}{5}}$ 　　　　**5)** $y = \dfrac{\sqrt{x-4}}{5}$ 　　　　**6)** $y = \dfrac{\sqrt{x+4}}{5}$

8) $y = (x - 4)^3$

7) $y = (x + 4)^3$ 　　　　　　　　　　　　　　　　**9)** $y = (2x + 4)^3$

**10)** $y = (2x - 4)^3$ 　　　　**11)** $\sqrt[3]{x - 7y} = 2$ 　　　　**12)** $\sqrt[3]{x + 7y} = 2$

Rearranging Formulae - Worksheet

Applied

1) The circumference of a circle is given as $c = 2\pi r$.
Make the radius, r, the subject of the formula.

2) Make x the subject in the following formulae:

(a) $A = \pi r^2 + 2\pi rx$

(b) $5(x + 2) = 4(x + 3y)$

3) The cosine rule is $a^2 = b^2 + c^2 - 2bc\cos(A)$.
Make $\cos(A)$ the subject.

4) **(a)** Make u the subject in the following formulae: $v = u + 10t$

(b) Work out the value of u when $v = 4$ and $t = 2$.

5) Given that $2x + 3y = 1$, what does y equal?

6) Below is a rectangle.

$$4x + 3$$

$$x$$
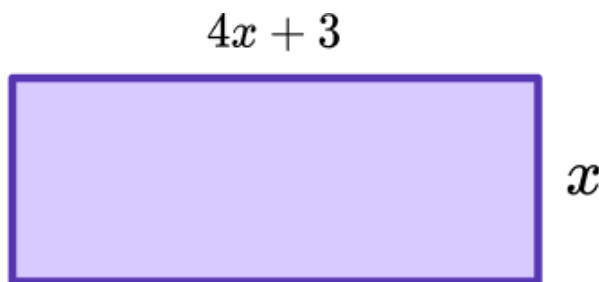
(a) P is the perimeter of the rectangle. Show that $P = 10x + 6$

(b) Express x in terms of P.

Rearranging Formulae - Exam Questions

1)   Make g the subject of $f = 2g - 6$.

....
(2 marks)

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2)   Rearrange $p = \dfrac{4r}{7}$ to make r the subject.

....
(2 marks)

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3)   Given that $v^2 = u^2 + 2as$:

(a)   Work out the value of v when $u = 5$, $a = 2$ and $s = 3$.

....
(3)

(b)   Make u the subject of the formula $v^2 = u^2 + 2as$

....
(2)

Rearranging Formulae - Exam Questions

(c)   Make s the subject of the formula $v^2 = u^2 + 2as$

....
(2)
(7 marks)

4)   Rearrange $4x - y + 4 = 0$ to make x the subject.

....
(2 marks)

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Rearranging Formulae - Answers

	Question	Answer
	Skill Questions	
Group A	Make x the subject: **1)** $y = 4x + 8$	**1)** $x = \dfrac{y-8}{4}$
	2) $y = 4x - 8$	**2)** $x = \dfrac{y+8}{4}$
	3) $3y = 4x - 8$	**3)** $x = \dfrac{3y+8}{4}$
	4) $y = 2x - 7$	**4)** $x = \dfrac{y+7}{2}$
	5) $y = 2x + 7$	**5)** $x = \dfrac{y-7}{2}$
	6) $5y = 2x + 7$	**6)** $x = \dfrac{5y-7}{2}$
	7) $y = 7x + 5$	**7)** $x = \dfrac{y-5}{7}$
	8) $y = 7x - 5$	**8)** $x = \dfrac{y+5}{7}$
	9) $6y = 7x - 5$	**9)** $x = \dfrac{6y+5}{7}$
	10) $y = 4 + 3x$	**10)** $x = \dfrac{y-4}{3}$
	11) $y = 4 - 3x$	**11)** $x = \dfrac{4-y}{3}$
	12) $4y = 4 - 3x$	**12)** $x = \dfrac{4-4y}{3}$

Rearranging Formulae - Answers

Group B	Make x the subject:	
	1) $y = \dfrac{6x+5}{3}$	**1)** $x = \dfrac{3y-5}{6}$
	2) $y = \dfrac{6x-5}{3}$	**2)** $x = \dfrac{3y+5}{6}$
	3) $y = \dfrac{2x+7}{3}$	**3)** $x = \dfrac{3y-7}{2}$
	4) $y = \dfrac{2x-7}{3}$	**4)** $x = \dfrac{3y+7}{2}$
	5) $y = \dfrac{x}{8} - 7$	**5)** $x = 8(y + 7)$
	6) $y = \dfrac{x}{8} + 7$	**6)** $x = 8(y - 7)$
	7) $y = \dfrac{x}{3} + 5$	**7)** $x = 3(y - 5)$
	8) $y = \dfrac{x}{3} - 5$	**8)** $x = 3(y + 5)$
	9) $y = \dfrac{5x+4}{7}$	**9)** $x = \dfrac{7y-4}{5}$
	10) $y = \dfrac{4-5x}{7}$	**10)** $x = \dfrac{4-7y}{5}$
	11) $3y = \dfrac{4-2x}{5}$	**11)** $x = \dfrac{4-15y}{2}$
	12) $-3y = \dfrac{4-2x}{5}$	**12)** $x = \dfrac{4+15y}{2}$

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Rearranging Formulae - Answers

Group C	Make x the subject:	
	1) $y = x^2 - 5$	**1)** $x = \sqrt{y + 5}$
	2) $y = x^2 + 5$	**2)** $x = \sqrt{y - 5}$
	3) $y = \sqrt{\dfrac{x-4}{5}}$	**3)** $x = 5y^2 + 4$
	4) $y = \sqrt{\dfrac{x+4}{5}}$	**4)** $x = 5y^2 - 4$
	5) $y = \dfrac{\sqrt{x-4}}{5}$	**5)** $x = 25y^2 + 4$
	6) $y = \dfrac{\sqrt{x+4}}{5}$	**6)** $x = 25y^2 - 4$
	7) $y = (x + 4)^3$	**7)** $x = \sqrt[3]{y} - 4$
	8) $y = (x - 4)^3$	**8)** $x = \sqrt[3]{y} + 4$
	9) $y = (2x + 4)^3$	**9)** $x = \dfrac{\sqrt[3]{y}-4}{2}$
	10) $y = (2x - 4)^3$	**10)** $x = \dfrac{\sqrt[3]{y}+4}{2}$
	11) $\sqrt[3]{x - 7y} = 2$	**11)** $x = 7y + 8$
	12) $\sqrt[3]{x + 7y} = 2$	**12)** $x = 8 - 7y$

Rearranging Formulae - Answers

	Question	Answer
	Applied Questions	
1)	The circumference of a circle is given as $c = 2\pi r$. Make the radius, r, the subject of the formula.	$r = \dfrac{c}{2\pi}$
2)	**a)** Make x the subject in the following formulae. $A = \pi r^2 + 2\pi rx$ **b)** $5(x + 2) = 4(x + 3y)$	**a)** $x = \dfrac{A - \pi r^2}{2\pi r}$ **b)** $x = 12y - 10$
3)	The cosine rule is $a^2 = b^2 + c^2 - 2bc\ \cos(A)$. Make $\cos(A)$ the subject.	$\cos(A) = \dfrac{b^2 + c^2 - a^2}{2bc}$
4)	**a)** Make u the subject in the following formulae $v = u + 10t$. **b)** Work out the value of u when $v = 4$ and $t = 2$	**a)** $u = v - 10t$ **b)** $u = 4 - (10 \times 2) = -16$
5)	Given that $2x + 3y = 1$, what does y equal?	$y = \dfrac{1 - 2x}{3}$
6)	Below is a rectangle. $4x + 3$ x P is the perimeter of the rectangle. **a)** Show that $P = 10x + 6$ **b)** Express x in terms of P.	 **a)** $P = 4x + 3 + 4x + 3 + x + x$ $P = 10x + 6$ **b)** $x = \dfrac{P - 6}{10}$

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Rearranging Formulae - Mark Scheme

	Question	Answer	
	Exam Questions		
1)	Make g the subject of $f = 2g - 6$	$f + 6 = 2g$ $g = \dfrac{f+6}{2}$	**(1)** **(1)**
2)	Rearrange $p = \dfrac{4r}{7}$ to make r the subject.	$7p = 4r$ $r = \dfrac{7p}{4}$	**(1)** **(1)**
3) (a)	$v^2 = u^2 + 2as$ Work out the value of v when $u = 5$, $a = 2$ and $s = 3$.	**(a)** $v^2 = 5^2 + 2 \times 2 \times 3$ $v^2 = 37$ $v = \sqrt{37}$ or 6.08 (to 2 dp)	**(1)** **(1)** **(1)**
(b)	Make u the subject of the formula $v^2 = u^2 + 2as$	**(b)** $u^2 = v^2 - 2as$ $u = \sqrt{v^2 - 2as}$	**(1)** **(1)**
(c)	Make s the subject of the formula $v^2 = u^2 + 2as$	**(c)** $2as = v^2 - u^2$ $s = \dfrac{v^2 - u^2}{2a}$	**(1)** **(1)**
4)	Rearrange $4x - y + 4 = 0$ to make x the subject.	$4x = y - 4$ $x = \dfrac{y-4}{4}$	**(1)** **(1)**