

Lesson 4

Algebra, Change of Subject : GCSE

4.1 Practice

Marks Available : 58

Question 1

Quick 'In your head' Questions.

In each of the following, there is one manipulation that takes you from the question to the answer and so there is no need for any working.

(i) Make x the subject

$$x + 17 = \sqrt{m}$$

[1 mark]

(ii) Make x the subject

$$23x = k$$

[1 mark]

(iii) Make x the subject

$$\frac{x}{5} = v^2$$

[1 mark]

(iv) Make x the subject

$$\frac{1}{x} = \frac{11}{8}$$

[1 mark]

Question 2

Write down the reciprocal of each of the following;

(i) $\frac{5}{3}$

(ii) $\frac{4x^2}{\sin(x)}$

(iii) 7

(iv) $\frac{1}{2}$

(v) $\frac{1}{\sqrt{5}}$

(vi) π

(vii) $8 + 3k$

(viii) $\frac{3 + v^2}{5p}$

(ix) $\frac{2 + \arcsin(x)}{\pi}$

[9 marks]

Question 4

Showing full working, make x the subject

$$ax - 8\sqrt{n^2 + 1} = 5k$$

[3 marks]

Question 5

Showing full working, make x the subject

$$\sqrt{3}x - 7 = \sin(z) + y$$

[3 marks]

Question 6

Showing full working, by first expanding the brackets, make x the subject

$$6(4x + p) = 13$$

[3 marks]

Question 7

Showing full working, by first subtracting $12a$ from both sides, make x the subject

$$\frac{x}{4} + 12a = 7c$$

Write your answer without any brackets.

[3 marks]

Question 8

Showing full working, make p the subject

$$5p + 4v = \sqrt{\sin(m)}$$

[3 marks]

Question 9

Quick 'In your head' Questions.

In each of the following, there is one manipulation that takes you from the question to the answer and so there is no need for any working.

(i) Make x the subject

$$x + m^2 = v^2 + \frac{1}{c}$$

[1 mark]

(ii) Make x the subject

$$\frac{x}{8 \cos(\sqrt{k})} = f$$

[1 mark]

(iii) Make x the subject

$$\frac{1}{x} = \frac{m + 3\sqrt{k}}{z + 8}$$

[1 mark]

(iv) Make x the subject

$$\frac{1}{x} = a^2 + b^2 - 5$$

[1 mark]

Question 10

Without any working, make w the subject of the formula

$$w - \frac{2v}{p} = m^2$$

[2 marks]

Question 11

Showing full working, by first subtracting $5k$ from both sides, make x the subject;

$$\frac{4}{x} + 5k = 7m$$

[3 marks]

Question 12

Showing full working, make x the subject;

$$\frac{7f}{x} + 4 = \sin(w)$$

[3 marks]

Question 13

Showing full working, by first taking the reciprocal of both sides, make x the subject;

$$\frac{1}{x + 5p} = \frac{a^2}{7 + b}$$

[3 marks]

Question 14

Showing full working, by first adding $4km$ to both sides, make x the subject;

$$\frac{3 + m}{x} - 4km = u^2$$

[3 marks]

Question 15

Showing full working, by first adding $3h$ to both sides, make x the subject;

$$\frac{4}{5z^3 + x} - 3h = g - 1$$

[3 marks]

Question 16 (Challenge !)

Showing full working, by first squaring both sides, make x the subject;

$$\sqrt{x + 1} = z + 3$$

You may leave brackets in your answer.

[3 marks]

Question 17 (Challenge !)

Showing full working, by first square rooting both sides, make x the subject;

$$(x + 5)^2 = m$$

[3 marks]

Question 18 (Challenge !)

Showing full working, by first taking the reciprocal of both sides, make x the subject;

$$\frac{1}{\sqrt{x}} = \frac{3}{8}$$

[3 marks]

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Teachers may obtain detailed worked solutions to the exercises by email from mhh@shrewsbury.org.uk