

Exam Questions

Introduction to Algebra

Algebraic Notation / Algebraic Vocabulary / Substitution / Collecting Like Terms

Easy (13 questions)	/23
Medium (16 questions)	/43
Hard (10 questions)	/27
Total Marks	/93

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Easy Questions

1



You can work out the amount of medicine, c *ml*, to give to a child by using the formula

$$c = \frac{ma}{150}$$

m is the age of the child, in months.

a is an adult dose, in *ml*.

A child is 30 months old.

An adult's dose is 40 *ml*.

Work out the amount of medicine you can give to the child.

(2 marks)

2

$$f = 3g + 7h$$

Work out the value of f when $g = -5$ and $h = 2$

(2 marks)

3 Simplify $4y + 2x - 3 + 3x + 8$

(2 marks)

4 Simplify $6g - 5h - 4g + 2h$

(2 marks)

5 Simplify $ab - 5g + 5ab - 2g$

(2 marks)

6 Choose the expression that is equivalent to $3a - a \times 4a + 2a$

A. $8a^2 + 2a$

B. $12a^2$

C. $5a - 4a^2$

D. $3a - 6a^2$

(1 mark)

7 Sofia is trying to simplify $\frac{6c + 10}{2}$

Her method is

- divide $6c$ by 2
- then add 10

Evaluate her method.

(1 mark)

8 Use the formula $s = ut + \frac{1}{2}at^2$.

Calculate s when $u = 5$, $t = 10$ and $a = 3$.

$s = \dots\dots\dots$

(2 marks)

9 Simplify $3a + 7b - 4a + b$.

(2 marks)

10 Simplify $3a - 5b - a + 2b$

(2 marks)

11 Simplify $5c - d - 3d - 2c$.

(2 marks)

12 Find the value of $7x + 3y$ when $x = 12$ and $y = -6$.

(2 marks)

13 Complete the statement.

When $w = \dots\dots\dots$, $10w = 70$.

(1 mark)

Medium Questions

- 1 (a) The body mass index, B , for a person of mass m kg and height h metres is given by the formula

$$B = \frac{m}{h^2}$$

Usman has a mass of 50 kg.
He has a height of 1.57 m.

Work out Usman's body mass index.
Give your answer correct to one decimal place.

(2 marks)

- (b) Tom's height is 1.80m.
He wants his body mass index to be 21

Work out the mass that will give Tom a body mass index of 21.

(2 marks)

2 $A = 4bc$

- $A = 100$
- $b = 2$

Work out the value of c .

(2 marks)

3 You can change temperatures from °F to °C by using the formula

$$C = \frac{5(F - 32)}{9}$$

F is the temperature in °F.

C is the temperature in °C.

The minimum temperature in an elderly person's home should be 20 °C.

Mrs Smith is an elderly person.

The temperature in Mrs Smith's home is 77 °F.

Decide whether or not the temperature in Mrs Smith's home is lower than the minimum temperature should be.

(3 marks)

4 $x = 0.7$

Work out the value of $\frac{(x + 1)^2}{2x}$

Write down all the figures on your calculator display.

(2 marks)

5 (a)

$$h = 3t^2$$

Work out the value of h when $t = 5$

(2 marks)

(b)

$$h = 3t^2$$

Work out the value of t when $h = 108$

(2 marks)

(c) Make a the subject of the formula

$$v = u + at$$

(2 marks)

6

$$h = 5t^2 + 2$$

i) Work out the value of h when $t = -2$

[1]

ii) Work out a value of t when $h = 47$

[2]

(3 marks)

7 $w = 5y^2 - y^3$

Work out the value of w when $y = -2$

$w = \dots\dots\dots$

(2 marks)

8 $G = c^2 - 4c$

Find the value of G when $c = -5$

$G = \dots\dots\dots$

(2 marks)

9 Given that $a \times 60 = b$ work out the value of $\frac{4b}{a}$

(2 marks)

10 (a) Martina has answered some questions on algebra. In each question, she has made an error.

Describe her error and give the correct answer to each problem.

Question 1 Simplify. $2a \times a \times a$

Martina's answer $4a$

Martina's error is

Correct answer =

(2 marks)

(b) **Question 2** Simplify. $\frac{x^{10}}{x^2}$

Martina's answer x^5

Martina's error is

Correct answer =

(2 marks)

(c) **Question 3** $s = ut + \frac{1}{2}at^2$

Find s when $u = 0$, $t = 5$ and $a = 6$.

Martina's solution $s = 0 \times 5 + \frac{1}{2} \times 6 \times 5^2$

$$s = 0 + 15^2$$

$$s = 225$$

Martina's error is.....

Correct answer =

(2 marks)

11 Find the value of s when $u = 12$, $a = 10$ and $t = 4$.

$$s = ut + \frac{1}{2}at^2$$

(2 marks)

12 Simplify $2p - q - 3q - 5p$

(2 marks)

13 $y = mx + c$

Find the value of y when $m = -3$, $x = -2$ and $c = -8$.

$y =$

(2 marks)

14 $y = mx + c$.

Find the value of y when $m = -2$, $x = -7$ and $c = -3$.

$y =$

(2 marks)

15

$$s = ut + \frac{1}{2}at^2$$

Find the value of s when $u = 5.2$, $t = 7$ and $a = 1.6$.

$s =$

(2 marks)

16 Complete the statement.

When $5x = 15$, $12x =$

(1 mark)

Hard Questions

1 $y = p - 2qx^2$

- $p = -10$
- $q = 3$
- $x = -5$

Work out the value of y .

(2 marks)

2 $d = 2f$ and $\frac{e-f}{d-e} = \frac{1}{4}$

Work out the ratio $e : f$

(3 marks)

3 $\frac{a}{b} = 3c$ and $\frac{b}{c} = 2$

Work out the value of a when $c = 8$

(3 marks)

4 a and b are positive values.

Show that $\frac{7a+2b-3a}{8a+6b+2a-b}$ always simplifies to the same value.

(3 marks)

5 Work out the values of a and b in the identity

$$5(7x + 8) + 3(2x + b) \equiv ax + 13$$

$a = \dots\dots\dots$ $b = \dots\dots\dots$

(4 marks)

6 Amy has x beads.

Billy has three more beads than Amy.

Carly has four times as many beads as Billy.

Choose the expression for the number of beads that Carly has.

- A. $4x + 3$
- B. $3x + 4$
- C. $4(x + 3)$
- D. $x + 12$

(1 mark)

- 7 Kelly is trying to work out the two values of w for which $3w - w^3 = 2$
Her values are 1 and -1

Are her values correct?

You **must** show your working.

(2 marks)

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

Find the value of y when $x = -1$.

$y = \dots\dots\dots$

(2 marks)

9 $s = ut + \frac{1}{2}at^2$

Find s when $t = 26.5$, $u = 104.3$, $a = -2.2$.

Give your answer in standard form, correct to 4 significant figures.

$s = \dots\dots\dots$

(4 marks)

- 10 (a) One solution of the equation $ax^2 + a = 150$ is $x = 7$.

Find the value of a .

$a = \dots\dots\dots$

(2 marks)

(b) Find the other solution.

$x =$

(1 mark)