

**KS3 Questions - Algebraic Manipulation.**

**Level 3 to 5 Questions.**

1. Simplify the following

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

.....

Answer .....

(1)

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

.....

Answer .....

(2)

(c)  $3 \times a \times 4$

.....

Answer .....

(1)

**(Total 4 marks)**

2. Simplify

(a)  $c + 4c + 2c$

.....

Answer .....

(1)

(b)  $d \times d \times d$

.....

Answer .....

(1)

(c)  $3p + 5q - 2p + q$

.....

.....

Answer .....

(2)

**(Total 4 marks)**

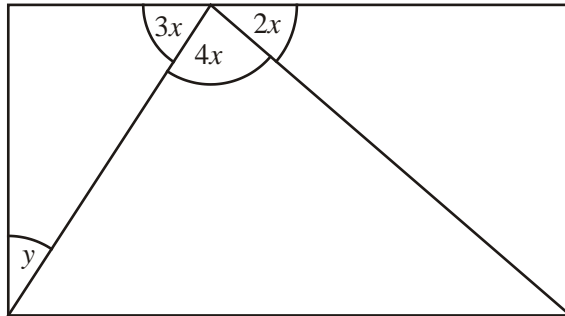
3. (a) Simplify  $2x + 3x + 4x$

.....

Answer .....km

**(1)**

(b) The diagram shows a triangle inside a rectangle.



Not drawn accurately

(i) Work out the value of  $x$ .

.....  
 .....  
 .....

Answer .....degrees

**(2)**

(ii) Work out the value of  $y$ .

.....  
 .....  
 .....

Answer .....degrees

**(3)**

**(Total 6 marks)**

4. Ali is  $x$  cm tall.

- (a) Suki is 5 cm taller than Ali.  
Write down an expression in  $x$  for Suki's height.

.....

Answer ..... cm

(1)

- (b) Ali's sister is 2 cm shorter than Ali.  
Write down an expression in  $x$  for the height of Ali's sister.

.....

Answer ..... cm

(1)

- (c) Ali's father is twice as tall as Ali.  
Write down an expression in  $x$  for the height of Ali's father.

.....

Answer ..... cm

(1)

- (d) Darius has a height, in cm, given by the expression  $2x - 65$   
He is 115 cm tall.

Solve the equation

$$2x - 65 = 115$$

to find Ali's height.

.....

.....

.....

Answer ..... cm

(2)

(Total 5 marks)

**Level 6 to 7 Questions.**

5. (a) Two sets of algebraic expressions are shown below.

Draw a line from each expression on the left to the equivalent expression on the right. One line has already been drawn.

$2x + x$	$3x$
$3x - x$	$3x + 1$
$3x \times x$	$x^3$
$3(x + 1)$	$3x^2$
$x \times x \times x$	$2x$
	$3$
	$3x + 3$

(4)

- (b) Simplify  $3p + 5q + p - 2q$

.....

Answer .....

(2)

(Total 6 marks)

6. Here are four expressions.

$n^2$

$\frac{n}{3}$

$n + 3$

$\frac{3}{n}$

- (a) If  $n = 3$ , which expression has the greatest value? Show your working.

.....  
 .....  
 .....

Answer .....

(2)

- (b) If  $n = 0.3$ , which expression has the greatest value?  
Show your working.

.....  
.....  
.....

Answer .....

(2)

(Total 4 marks)

7. (a) (i) Factorise completely  $2a^2 - a$

.....  
.....

Answer .....

(2)

- (ii) Find the value of  $2a^2 - a$  when  $a = -4.5$

.....  
.....

Answer .....

(2)

- (b) Expand and simplify  $(4x - 3)(x + 5)$

.....  
.....

Answer .....

(3)

- (c) Simplify

- (i)  $x^5 \times x^{-2}$

.....  
.....

Answer .....

(1)

(ii)  $y^5 \div y^{-2}$

.....  
.....

Answer .....

(1)

(Total 9 marks)

8. (a) Factorise  $2x + 6$

.....  
.....

Answer.....

(1)

(b) Expand  $3(4y + 1)$

.....  
.....

Answer.....

(1)

(c) Expand  $4x(x^2 + 5)$

.....  
.....

Answer.....

(2)

(Total 4 marks)

9. (a) Expand and simplify

$$5(2a - c) + 4(3a + 2c)$$

.....  
.....

Answer .....

(2)

(b) Solve  $3x + 7 < 1$

.....

.....  
.....

Answer .....

(2)

(Total 4 marks)

10. Bag A contains  $x$  counters.  
Bag B contains 6 more counters than Bag A.  
Bag C contains 4 times as many counters as Bag B.  
Show that the total number of counters in Bags A, B and C is  $6(x + 5)$ .

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

(Total 4 marks)

11. (a) Expand  $d(d^2 + 6)$

.....

Answer .....

(2)

- (b) Simplify  $g^4 \times g^4$

.....

Answer .....

(1)

(c) Expand and simplify  $2(p + 5) + 3(2p - 1)$

.....  
.....  
.....

Answer .....

(2)  
**(Total 5 marks)**

**12.** (a) Expand and simplify  $(x + 5)(x + 4)$

.....  
.....  
.....

Answer .....

(2)

(b) Make  $t$  the subject of the formula  $w = 2t + v$

.....  
.....  
.....

Answer .....

(2)  
**(Total 4 marks)**