Multiple-choice section – choose the correct answer

Question 1 [3.1]

Simplified, 16*a*10 ÷ 4*a*2 equals:

A 4*a*5 B 4*a*12 C 4*a*8 D 12*a*8

Question 2 [3.6]

Expanded, (*y* – 2)2 is equivalent to:

A *y*2 – 4 B *y*2 – 4*y* + 4 C 4 – *y*2 D *y*2 + 4*y* + 4

Question 3 [3.5]

Expanded, -3(2*x* – 1) is equal to:

A 6*x* + 3 B 2*x* + 3 C -6*x* + 3 D 6*x* – 1

Question 4 [3.7]

Fully factorising 5*g*5*t*7 – 10*g*5*t* gives:

A 5*g*5*t*(*t*6 – 2) B 5*g*5(*t*7 – 2*t*) C 5*gt*(*gt*12 – 2) D *g*5*t*(5*t*6 – 10)

Question 5 [3.3]

How many significant figures does the number 42 040 have?

A 5 B 4 C 3 D 2

Question 6 [3.8]

The complete factorisation, using grouping, of *wb* + 2*w* – 4*b* – 8 is:

A (*b* – 2)(*w* + 4)

B *w*(*b* + 2) – 4(*b* + 2)

C *b*(*w* – 4) + 2(*w* – 4)

D *b*(*w* – 4) + 2(*w* – 4)

Question 7 [3.1]

Simplified, 25 × (*m*2)3 × (*m*6)2 equals:

A 10*m*17 B 32*m*17 C 25*m*6 D 32*m*18

Question 8 [3.2]

The expression 24 × 34 simplifies to:

A 58 B 54 C 64 D ****

Question 9 [3.4]

Rearranging the formula  to make *d* the subject of the equation gives:

A *d* = *bz* + *gh* B  C *d* = *z* + *bgh* D *d* = *bz* + *bgh*

Question 10 [3.2]

The number 15-2 is equivalent to:

A 30-1 B -152 C  D 

Multiple-choice results: \_\_\_ / 10

Short answer section

Question 11 3 marks [3.2]

Use words from the list below to complete the following sentences.

positive negative magnitude multiplied divided power

Any number written with a negative power can be written as 1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the number raised to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ power of the same \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Question 12 2 marks [3.5, 3.7]

Explain the difference between the instructions ‘factorise’ and ‘expand’. Use the expression   
6*ab* + 8*a* to help you explain.

Question 13 6 marks [3.1]

Simplify each of the following.

(a) 2*w*4 × 6*w*8

(b) 15*c*9 ÷ 3*c*

(c) 

Question 14 6 marks [3.2]

Simplify each of the following.

(a) (5*v*2)2

(b) 

(c) (3*ab*4)3 × (*a*3*b*)2

Question 15 4 marks [3.2]

Simplify each of the following, leaving your answers in index form with a single positive power.

(a) 24 × 34

(b) *k*-4

(c) *t*13 ÷ *t*16

Question 16 3 marks [3.2]

Simplify each of the following.

(a) 80

(b) 3*m*0

(c) (21*u*)0

Question 17 4 marks [3.2]

Simplify each of the following, leaving your answers in index form with positive powers.

(a) 

(b) 

Question 18 4 marks [3.3]

(a) Write the number 23 408 700 000 in scientific notation.

(b) Write 5.6654 × 107 as a number.

(c) Write the number 0.003 08 in scientific notation.

(d) Write 6.04 × 104 as a number.

Question 19 1 mark [3.3]

Evaluate . Express your answer in scientific notation.

Question 20 3 marks [3.3]

**(a)** How many significant figures does the number 23.40 have?

**(b)** How many significant figures does the number 0.0042 have?

**(c)** Round 599 934 to 3 significant figures. Express your answer using scientific notation.

Question 21 2 marks [3.4]

Rearrange the formulas below to make the variables in brackets the subject.

(a)  (*m*)

(b) 3*pq – s* = *b* (*s*)

Question 22 3 marks [3.4]

The area of a trapezium is given by the rule *A* =  × (*a* + *b*) × *h*.

**(a)** Find the area of the trapezium with a height of 8 cm and parallel sides of 5 cm and 4 cm.

(b) Rearrange the formula to make the parallel side *b* the subject of the equation. Use your answer from part **(a)** to show that *b* = 4.

Question 23 4 marks [3.5]

Expand and simplify the following expressions.

(a) 2(*m* – 4*j*)

(b) 2(*u* – 3) + 4(*u* + 5*f*)

Question 24 4 marks [3.5]

Expand and simplify each of the following.

(a) (*g* + 7)(*g* + 3)

(b) 5(12 – *n*)(*n* + 1)

Question 25 3 marks [3.5]

(a) Amit has a rectangular piece of land 15 m by 19 m. Draw a diagram to represent this land and calculate its area.

(b) Amit wishes to extend both the length and the width of this land by *v* metres. Draw a diagram to represent this extended land and write down an expanded and simplified expression for its area.

Question 26 4 marks [3.6]

Expand and simplify each of the following.

(a) (8 – *p*)2

(b) (8 – *p*)2

Question 27 4 marks [3.6]

Expand and simplify each of the following.

(a) (*w* – *z*)(*w* + *z*)

(b) (4*h* + 3*q*)(4*h* – 3*q*)

Question 28 3 marks [3.7]

Fully factorise each of the following.

(a) 28*c* – 14

(b) 4*fgh* – 3*gh*

(c) 8*v*3*w* – 40*vw*3

Question 29 4 marks [3.7]

Fully factorise each of the following.

(a) 3*b*2 + 12*b* – 36

(b) *x*5 + 4*x*2 – 4*x*3

Question 30 4 marks [3.7]

Fully factorise each of the following.

(a) 2(*k* – 3) + *b*(*k* – 3)

(b) 5*y*(3*z* + 2) – 7(3*z* + 2)

Question 31 2 marks [3.8]

Use the grouping in pairs technique to fully factorise 4*x* + 20 – 2*xy* – 10*y*.

Short answer results: \_\_\_ / 73

Extended answer section

Question 32 5 marks [3.3]

Consider some very small micro-organisms.

(a) Amoeba A is 220 µm (micrometres) in length. 1 µm is equivalent to 1 millionth of a metre   
(10-6 m). Write amoeba A’s length in metres, expressing your answer in scientific notation.

(b) Amoeba B is 7.40 × 10-4 m in length. Convert this length to micrometres (µm).

(c) What is the difference in length between Amoeba B and Amoeba A? Express your answer in metres in scientific notation.

(d) Amoeba C is 0.62 millimetres long. Write this length in:

**(i)** micrometres

**(ii)** metres, in scientific notation.

Question 33 6 marks [3.4, 3.5]

(a) A fashion designer’s customised rectangular piece of fabric has a perimeter of 140 cm. It has a length of *x* cm and a width of *y* cm. Write an equation for the perimeter of this piece of fabric.

(b) Rearrange this equation to make *y* the subject.

(c) Use your answer to **(b)** to write an equation for the area of the fabric in terms of *x*.

(d) Expand this equation. Simplify if possible.

(e) Given that *x* = 42 cm, find the area and width of the piece of fabric.

Extended answer results: \_\_\_ / 11

TOTAL test results: \_\_\_ / 94