Multiple-choice section – choose the correct answer

Question 1 [3.1]

The expression *h*8 × *h s*implifies to:

A *h*7 B *h*8 C  D *h*9

Question 2 [3.6]

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

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

Question 3 [3.5]

Expanded, 3(*x* – 1) is equal to:

A 3*x* + 3 B 3*x* – 3 C 3*x* – 1 D *x* – 1

Question 4 [3.7]

Fully factorising 5*g*2*t* – 10*g*2 gives:

A 5*g*2(*t* – 2) B 5*g*(*gt* – 2*g*) C 5*gt*(*gt* – 2*g*) D -5*g*2*t*(*t* + 2)

Question 5 [3.3]

How many significant figures does the number 307 080 have?

A 3 B 4 C 5 D 6

Question 6 [3.8]

When using grouping in pairs to factorise the expression *wb* + 2*w* + 4*b* + 8, the pairs that share common factors could be:

A *wb* and 8, and 2*w* and 4*b*

B *wb*, 2*w* and 4*b*, and 8

C *wb* and 4*b*, and 2*w* and 8

D *wb*, 4*b* and 8, and 2*w*

Question 7 [3.1]

Simplified, 18*m*8 ÷ 6*m*2 equals:

A 3*m*4 B 3*m*6 C 12*m*6 D 3*m*10

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 *t* the subject of the equation gives:

A *t* = *sd* B  C  D *d* = *st*

Question 10 [3.2]

3-2 is equivalent to:

A 6-1 B  C  D -9

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

Short answer section

Question 11 3 marks [3.3]

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

base index reciprocal scientific notation significant figures expression

Scientists use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to write very large or very small numbers in a convenient way. When writing index numbers, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ indicates the number of times the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is multiplied by itself.

Question 12 2 marks [3.5, 3.7]

Explain the difference between the instructions ‘factorise’ and ‘expand’. Use the expression   
4*x* + 10*xy* to help you explain.

Question 13 2 marks [3.1]

Simplify each of the following.

(a) 2*w*4 × 6*w*8

(b) 15*c*9 ÷ 3*c*

Question 14 4 marks [3.1]

Simplify each of the following.

(a) 

(b) (*f*6)3 × (*f*2)2

Question 15 4 marks [3.2]

Simplify each of the following.

(a) (5*v*2)2

(b) 

Question 16 2 marks [3.2]

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

(a) *k*-4

(b) *t*13 ÷ *t*16

Question 17 3 marks [3.2]

Simplify each of the following.

(a) 80

(b) 3*m*0

(c) (21*u*)0

Question 18 4 marks [3.3]

(a) Write the number 234 000 in scientific notation.

(b) Write 5.66 × 105 as a number.

(c) Write the number 0.0308 in scientific notation.

(d) Write 2.79 × 10-3 as a number.

Question 19 2 marks [3.3]

Evaluate 4.56 × 10-3 ÷ 5.89 × 10-8. Express your answer in scientific notation.

Question 20 1 mark [3.3]

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

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

Question 21 3 marks [3.4]

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

(a)  (*m*)

(b) *pq* – *s* = *b* (*p*)

Question 22 3 marks [3.5]

Expand and simplify the following expressions.

(a) 2(*m* – 4*j*)

(b) 2(*u* – 3) + 4(*u* + 5*f*)

Question 23 4 marks [3.5]

Expand and simplify the following expressions.

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

(b) (*r* – 8)(*r* + 7)

Question 24 4 marks [3.6]

Expand and simplify each of the following.

(a) (*a* + 3)2

(b) (*p* – 8)2

Question 25 2 marks [3.6]

Expand and simplify each of the following.

(a) (*w* – *z*)(*w* + *z*)

(b) (*y* – 4)(*y* + 4)

Question 26 3 marks [3.7]

Fully factorise each of the following.

(a) 28*c* – 14

(b) 4*fgh* – 3*gh*

Question 27 2 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 28 2 marks [3.8]

Use the grouping in pairs technique to fully factorise the expression *mp* + 7*m* + 5*p* + 35.

Short answer results: \_\_\_ / 50

Extended answer section

Question 29 5 marks [3.3]

Consider our solar system.

(a) Mercury is 57 910 000 km from the Sun. Write this in scientific notation.

(b) Venus is 108 200 000 km from the Sun. How many significant figures are there in this distance?

(c) Mars is 2.2794 × 108 km from the Sun. Saturn is 1.433 × 109 km from the Sun. How much closer to the Sun is Mars? Express your answer in scientific notation.

(d) Earth is 149 597 890 km from the Sun. Round this to 4 significant figures, expressing your answer in scientific notation.

Extended answer results: \_\_\_ / 5

TOTAL test results: \_\_\_ / 65