Multiple-choice section

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Answer | C | B | C | A | B | D | D | C | D | D |

Question 1 [3.1]

C

16*a*10 ÷ 4*a*2

= 

= 4*a*10 – 2

= 4*a*8

Question 2 [3.6]

B

(*y* – 2)2

= *y*2 – 2 × 2 × *y* + 22

= *y*2 – 4*y* + 4

Question 3 [3.5]

C

-3(2*x* – 1) = -6*x* + 3

Question 4 [3.7]

A

5*g*5*t*7 – 10*g*5*t* = 5*g*5*t*(*t*6 – 2)

Question 5 [3.3]

B

All non-zero digits are significant.

End zero is not significant.

Middle zeros are significant.

Therefore, there are 4 significant figures.

Question 6 [3.8]

D

*wb* + 2*w* – 4*b* – 8

= *w*(*b* + 2) – 4(*b* + 2)

= (*w* – 4)(*b* + 2)

Question 7 [3.1]

D

(2)5 × (*m*2)3 × (*m*6)2

= 32 × *m*6 × *m*12

= 32*m*18

Question 8 [3.2]

C

24 × 34

= (2 × 3)4

= 64

Question 9 [3.4]

D



Question 10 [3.2]

D

15-2

= 

= 

Multiple-choice total marks: 10

Short answer section

Question 11 3 marks [3.2]

Any number written with a negative power can be written as 1 divided by the number raised to the positive power of the same magnitude.

Question 12 2 marks [3.5, 3.7]

‘Factorise’ and ‘expand’ are opposite instructions. To factorise is to express something as a product of its factors (often using brackets). To expand means to multiply these factors (to remove the brackets by multiplying factors inside the brackets by the factors outside).

e.g. 6*ab* + 8*a*:

The common factor is 2*a*, so place it outside of a pair of brackets and place the other factors inside:   
2a(3*b* + 4)

Expanding these brackets gives the original expression:   
2*a* × 3*b* + 2*a* × 4 = 6*ab* + 8*a*

Question 13 6 marks [3.1]

(a) 2*w*4 × 6*w*8 = 12*w*12

**(b)** 15*c*9 ÷ 3*c* = 5*c*8

**(c)** 

Question 14 6 marks [3.2]

(a) (5*v*2)2

= 52*v*4

= 25*v*4

(b) 

= 

= 

(c) (3*ab*4)3 × (*a*3*b*)2

= 33*a*3*b*12 × *a*6*b*2

= 27*a*9*b*14

Question 15 4 marks [3.2]

(a) 24 × 34

= (2 × 3)4

= 64

(b) *k*-4 = ****

(c) *t*13 ÷ *t*16 = *t*-3 = 

Question 16 3 marks [3.2]

(a) 80 = 1

(b) 3*m*0

= 3 × 1

= 3

(c) (21*u*)0

= 210*u*0

= 1 × 1

= 1

Question 17 4 marks [3.2]

|  |  |
| --- | --- |
| (a) | (b) |

Question 18 4 marks [3.3]

(a) 2.340 87 × 1010

(b) 56 654 000

(c) 3.08 × 10-3

(d) 60 400

Question 19 1 mark [3.3]



= 77 739.4

= 7.773 94 × 104

Question 20 3 marks [3.3]

(a) There is 1 significant zero.

There are 3 significant non-zeros.

Therefore, there are 4 significant figures.

(b) There are no significant zeros.

There are 2 significant non-zeros.

Therefore, there are 2 significant figures.

**(c)** 5.999 34 × 105 = 6.00 × 105

Question 21 2 marks [3.4]

(a) *d* = 

*d* × *v* = *m*

*m* = *dv*

(b) 3*pq* – *s* = *b*

3*pq* = *b* + *s*

3*pq* – *b* = *s*

*s* = 3*pq* – *b*

Question 22 3 marks [3.4]

(a) *A* = × (5 + 4) × 8

*A* = 36 cm2

(b)



Substitute *A =* 36, *h =* 8, *a =* 5:



Question 23 4 marks [3.5]

(a) 2(*m* – 4*j*) = 2*m* – 8*j*

**(b)** 2(*u* – 3) + 4(*u* + 5*f*)

= 2*u* – 6 + 4*u* + 20*f*

= 6*u* + 20*f* – 6

Question 24 4 marks [3.5]

|  |  |
| --- | --- |
| (a) (*g* + 7)(*g* + 3)  = *g*2 + 3*g* + 7*g* + 21  = *g*2 + 10*g* + 21 | **(b)** 5(12 – *n*)(*n* + 1)  = 5(12*n* + 12 – *n*2 – *n*)  = 5(-*n*2 + 11*n* + 12)  = -5*n*2 + 55*n* + 60 |

Question 25 3 marks [3.5]

|  |  |
| --- | --- |
| (a) *A* = 15 × 19  *A* = 285 m2  ACPM9_PR_3_01ssb | (b) *A* = (19 + *v*)(15 + *v*)  = 285 + 19*v* + 15*v* + *v*2  = *v*2 + 34*v* + 285  ACPM9_PR_3_02ssb_RR copy |

Question 26 4 marks [3.6]

|  |  |
| --- | --- |
| (a) (8 – *p*)2  = 82 – 2 × 8 × *p* + *p*2  = *p*2 – 16*p* + 64 | **(b)** (2*k* – 3)2  = (2*k*)2 – 2 × 2*k* × 3 + 32  = 4*k*2 – 12*k* + 9 |

Question 27 4 marks [3.6]

(a) (*w* – *z*)(*w* + *z*) = w2 – *z*2

**(b)** (4*h* + 3*q*)(4*h* – 3*q*)

= (4*h*)2 – (3*q*)2

= 16*h*2 – 9*q*2

Question 28 3 marks [3.7]

(a) 28*c* – 14 = 14(2*c* – 1)

**(b)** 4*fgh* – 3*gh* = *gh*(4*f* – 3)

**(c)** 8*v*3*w* – 40*vw*3 = 8*vw*(*v*2 – 5*w*2)

Question 29 4 marks [3.7]

|  |  |
| --- | --- |
| (a) 3*b*2 + 12*b* – 36 = 3(*b*2 + 4*b* – 12) | **(b)** *x*5 + 4*x*2 – 4*x*3  = *x*2(*x*3 + 4 – 4*x*)  = *x*2(*x*3 – 4*x* + 4) |

Question 30 4 marks [3.7]

(a) 2(*k* – 3) + *b*(*k* – 3) = (*k* – 3)(2 + *b*)

(b) 5*y*(3*z* + 2) – 7(3*z* + 2) = (3*z* + 2)(5*y* – 7)

Question 31 2 marks [3.8]

4*x* + 20 – 2*xy* – 10*y*

= 4(*x* + 5) – 2*y*(*x* + 5)

= (4 – 2*y*)(*x* + 5)

Short answer total marks: 73

Extended answer section

Question 32 5 marks [3.3]

(a) 220 ÷ 1 000 000 = 0.000 22 m = 2.2 × 10-4 m

(b) 7.40 × 10-4 m = 0.000 74 m

0.000 74 × 1 000 000 = 740 µm

(c) Amoeba B – amoeba A = 740 µm – 220 µm

= 520 µm

= 520 × 10-6 m

= 5.2 × 10-4 m

(d) **(i)** 1 mm = 10-3 m

1 µm = 10-6 m

0.62 mm = 620 µm

**(ii)** 6.2 × 10-4 m

Question 33 6 marks [3.4, 3.5]

(a) 2*x* + 2*y* = 140

or 2(*x* + *y*) = 140

(b) 2*x* + 2*y* = 140

2*y* = 140 – 2*x*

**

*y* = 70 – *x*

(c) *A* = *x* × *y*

*A* = *x*(70 – *x*)

(d) *A* = *x* × (70 – *x*)

= 70*x* – *x*2

(e) *A* = 70 × 42 – 422

= 1176 cm2

*y* = 70 – 42

= 28 cm

Extended answer total marks: 11

TOTAL test marks: 94