Multiple-choice section

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Question | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Answer | B | A | D | C | D | A | B | D | C | C | B | A |

Question 1 [1.1]

B

-5 − (+ 4) + 3 = -6

Question 2 [1.2]

A

6 × -2 × -3 = 36

Question 3 [1.3]

D

36 ÷ -4 = -9

Question 4 [1.5]

C

(-3)2 + (-2)3 = 9 + -8 = 1

Question 5 [2.1]

D

5.817 = 5

Question 6 [2.2]

A

= 4.472... ≈ 4.5

Question 7 [2.5]

B

1.05 × 100% = 105%

Question 8 [3.2]

D

*a* = 3 and *b* = 7

3*a* – 4*b* = 3 × 3 – 4 × 7

= -19

Question 9 [3.4]

C

4*x*2 + 3*xy* – 7*yx* + 7*x*2 + *x* = 11*x*2 – 4*xy + x*

Question 10 [4.2]

C

5 cm : 4 mm

= 50 : 4

= 25 : 2

Question 11 [5.3]

B

*C* = π*d*

= π × 10

= 31.42 cm

Question 12 [5.7]

A

1 m3 = 1 kL

Multiple-choice total marks: 12

Short answer section

Question 13 12 marks

(a) The fraction  written as a *percentage* is 40% and as a *decimal* is 0.40.

(b) In the expression 42, the 4 is known as the *base* and the 2 is called the *power* or *index* or *exponent.*

(c) A *ratio* is a comparison of two amounts of the same type.

(d) The distance around the outside of a circle is called the *circumference.*

(e) In the term 4*x*, the number 4 is called the *coefficient* and the *x* is identified as the *pronumeral* or *variable.*

(f) *Capacity* is a term used for the volume of space inside a container.

Question 14 4 marks [3.1, 5.1, 5.4, 5.7]

(a) An expression is formed when terms are added or subtracted together, for example 2*x* + 9. Whereas an equation is a statement that joins two expressions with an equals sign, such as   
2*x* + 9 = 5*x* +3.

(b) Answers will vary.  
Perimeter = distance around a 2D shape  
Area = space inside a 2D shape  
Volume = space inside a 3D solid

Question 15 2 marks [1.1]

-4, -2, -1, 0, 1, 4, 7

Question 16 5 marks [1.4]

(a) 2 – 12 + 8 = -2

(b) 12 + 6 × 10 – 10 + 6  
= 12 + 60 – 10 + 6  
= 68

Question 17 4 marks [1.6]

(a)   
= = 1

(b) 9 × -8 = -72

Question 18 4 marks [2.3]

(a)  +  = 

(b)  ×   
= =  (alternatively, cancel fractions first)

Question 19 5 marks [2.3]

(a) 3.87

(b)  ÷   
=  ×   
=  ×  = 

Question 20 2 marks [2.5]

(a) 0.85 × 100 = 85%

(b) 2 = 2.15  
2.15 × 100 = 215%

Question 21 3 marks [2.6]

A number of different methods can be used. The simplest method is to get all fractions to a common denominator of 20.

English: 

Maths: = 

Science: 80% = 

= 

Therefore, English is the best result.

Question 22 2 marks [2.8]

(a)  × $550 = $55

(b)  × 40 minutes = 48 minutes

Question 23 3 marks [2.9]

(a) $5000 × 104%  
$5000 × 1.04 = $5200

(b) $5200 × (100% − 4%) = $5200 × 96%  
$5200 × 0.96 = $4992

Question 24 3 marks [3.2]

(a) 2 × 4 + 6 = 14

(b)   
=   
=   
= 2

Question 25 2 marks [3.4, 3.5]

(a) 2*a* + 5*a* + 6*b* – 4*b* = 7*a* + 2*b*

(b) 4× 8*a* × *a* × -*b* = -32*a*2*b*

Question 26 3 marks [3.6]

(a) 2 × 3*x* + 2 × 5 = 6*x* + 10

(b) 3 × 2 + 3 × *x* + -4 × *x* + -4 × -2  
= 6 + 3*x* – 4x + 8   
= 14 – *x*

Question 27 2 marks [3.7]

(a) HCF = 5  
5 × 3*a* – 5 × 5 = 5 (3*a* – 5)

(b) HCF = 4*mn*4 × 2 × *m* × *n* × *n* + 4 × 3 *m* × *m* × *n* = 4*mn*(2*n* + 3*m*)

Question 28 2 marks [4.2]

(a) Divide both sides by HCF of 5  
∴ 2 : 5

(b) 1500 cm : 450 cm  
Divide both sides by the HCF of 150  
∴ 10 : 3

Question 29 2 marks [4.4]

(a)  =   
∴ *a* = 18

(b) =   
∴ *b* = 18

Question 30 2 marks [4.6]

Total number of parts = 4 + 5 + 6 = 15

The value of 1 part = $240 ÷ 15 = $16

6 × $16 = $94

Therefore, the largest share is $94.

Question 31 2 marks [4.7]

Get both to an equivalent weight of 250 g

500 g can: $2.40 ÷ 2 = $1.20 per 250 g

750 g can: $3.40 ÷ 3 =  per 250 g

Therefore, the 750 g can is the best value for money.

Question 32 2 marks [5.1]

*P* = 7 m + 3 m + 4 m + 1 m + 3 m + 2 m = 20 m

Question 33 2 marks [5.3]

The perimeter of the shape is the circumference of the 4 semicircles, which is equivalent to two circles with a radius of 14 cm or diameter of 28 cm.

*P* = 2 × 2π*r* or *P* = 2 × π*d*

*P* = 2 × 2π ×14 = 175.93 cm

Question 34 4 marks [5.4]

(a) *A* = 

*A* = 

*A* = 40 cm2

(b) *A* =  × *h*

*A* =  × 15

*A* = 675 cm2

Question 35 6 marks [5.6]

(a) shaded area = 6 × 6 – π × 22

= 23.43 cm2

(b) shaded area = *A*large semicircle − *A*small semicircle

= 

= 50.27 cm2

Question 36 2 marks [5.7]

*V* = π*r*2*h*

= π × 22 × 2.4

= 15.08 m3

1 000 000 mL = 1 m3

capacity: 15.08 × 1 000 000 = 15 080 000 mL

Short answer total marks: 80

Extended answer section

Question 37 3 marks [1.4]

Assume that all questions are answered, as an unanswered questions scores 0 points

Trial and improvement

12 incorrect and 8 correct = 12 × -2 + 8 × 5 = 16

Therefore, a positive response means that more incorrect responses would result in a positive score

13 incorrect and 7 correct = 13 × (-2) + 7 × 5 = 9

14 incorrect and 6 correct = 14 × (-2) + 6 × 5 = 2

15 incorrect and 5 correct = 15 × (-2) + 5 × 5 = -5

Therefore, the greatest number of incorrect responses that will still result in a positive score is 14 incorrect responses.

Question 38 3 marks [2.10]

Discount of 20% = 80% of the marked price

∴ $2550 × 0.8 = $2040

A further 20% discount:

$2040 × 0.8 = $1632

The single equivalent discount is 80% × 80% = 64%

Check: $2550 × 0.64 = $1632

Question 39 6 marks [5.7]

(a) The volume of the resulting prism removing *x* cm from each corner can be represented by the equation:  
*V* = (12 – 2*x*) × (12 – 2*x*) × *x*Where *x* = 1 cm: *V* = (12 – 2) × (12 – 2) × 1 = 100 cm3Where *x* = 2 cm: *V* = (12 – 4) × (12 – 4) × 2 = 128 cm3Where *x* = 3 cm: *V* = (12 – 6) × (12 – 6) × 3 = 108 cm3Where *x* = 4 cm: *V* = (12 – 8) × (12 – 8) × 4 = 64 cm3Where *x* = 5 cm: *V* = (12 – 10) × (12 – 10) × 5 = 20 cm3

(b) The maximum volume occurs around 2 cm.   
Where *x* = 1.8 cm: *V* = (12 – 3.6) × (12 – 3.6) × 1.8 = 127.01 cm3Where *x* = 1.9 cm: *V* = (12 – 3.8) × (12 – 3.8) × 1.9 = 127.76 cm3Where *x* = 2.1 cm: *V* = (12 – 4.2) × (12 – 4.2) × 2.1 = 127.76 cm3The maximum volume is 128 cm3 and the square cut-out is 4 cm2.

Extended answer total marks: 12

TOTAL test results: 104