Multiple-choice section

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

Question 1 [1.4]

C

2 + (-5) × (-3) – (-4) = 2 + 15 + 4

= 21

Question 2 [1.5]

D



Question 3 [2.1]

A



Question 4 [2.6]

B



Question 5 [3.2]

C



Question 6 [3.4]

A

4*x*2 + 8*x* – 7*x*3 – 4*x*2 – 3*x* = -7*x*3 + 4*x*2 – 4*x*2 + 8*x* – 3*x*

= 5*x* – 7*x*3

Question 7 [4.2]

D

50 g : 4 kg

50 g : 4000 g

1 : 80

Question 8 [4.6]

C

1 + 4 = 5

45 ÷ 5 = 9

1 × 9 : 4 × 9

9 : 36

Question 9 [5.4]

C

27 000 m2 = 27 000 ÷ 1002

= 27 000 ÷ 10 000

= 2.7 ha

≠ 27 ha

Question 10 [6.2]

B

Checking the point (-3, 9):

*x* = -3: *y* = -2*x* + 3

= -2(-3) + 3

= 9

Question 11 [8.1]

A

*c* and *f*  (the other pair of alternate angles is *d* and *e*)

Question 12 [9.7]

C

*n*(*B'*) = 5 + 7 = 12

Multiple-choice total marks: 12

Short answer section

Question 13 11 marks

(a) The expression 24 is in *index* form, while 2 × 2 × 2 × 2 is written in *expanded* form.

(b) An irrational number is a *non-terminating decimal* that cannot be written as a fraction and when written in the form of a square root is called a *surd.*

(c) In the *expression* 2*a* + 4, the number 2 is the *coefficient* and the letter *a* is called the *pronumeral.* The number 4 all by itself is the *constant.*

(d) A parallelogram is a *quadrilateral* with two sets of parallel sides.

(e) The *origin* is the point at which the *x*- and *y*-axes intersect on the *Cartesian plane*.

Question 14 2 marks [8.2]

A square can be classified as a rectangle, because it shares the rectangle’s properties of opposite sides parallel and four right angles. However, the rectangle does not possess the critical property of a square: four equal sides.

Question 15 6 marks [1.4]

**(a)** 6 × -7 – 56 ÷ -8  
= -42 + 7

= -35

**(b)** 8 ÷ -2 + 2 × (6 + 3 × 9) – 11  
= -4 + 2 × (6 + 27) – 11  
= -4 + 2 × 33 – 11  
= -4 + 66 – 11   
= 51

Question 16 5 marks [1.6]

**(a)** 

**(b)** 16 × -8 = -128

Question 17 2 marks [2.1]

Convert all values to decimals first:

2 = 2.6 and 3 = 3.2

Therefore in descending order:

3.32, 3.2, 2.3, 2.03, 2.003

Question 18 5 marks [2.3]

**(a)** -5.2 × -4.5 = 23.4

**(b)** Convert 2.25 into the fraction 2 .  
 ÷ -1  
=  ÷ -  
=  
=  × -  
= -

Question 19 3 marks [2.6]

50% = 

=  + 

∴  = 12 mL

The maximum volume = 1 =  × 3

∴ 12 mL × 3 = 36 mL

Question 20 2 marks [3.2]

8 = 8

= 64

Question 21 2 marks [3.4, 3.5]

**(a)** 3*x*2 + 4*x*2 + 6*xy* *–* 8*yx* – 5*x*– 3*x*= 7*x*2 – 2*xy* – 8*x*

**(b)**  = 4*b*

Question 22 3 marks [3.5]

*A* = *lw*

40 = 2 × (*x* + 5)

20 = *x* + 5

*x* = 15

Question 23 2 marks [4.2]

**(a)**  : 4 is equivalent to ( × 3) : (4 × 3)  
11 : 12

**(b)** 2 days : 14 days : 14 days is equivalent to 1 : 7 : 7

Question 24 2 marks [4.4]

Replace *b* with 3*c* and replace *a* with 6*c*, because *a* = 2*b* = 2(3*c*) = 6*c*.

6*c* : 3*c* : *c* is equivalent to 6 : 3 : 1

Question 25 2 marks [4.6]

2 parts cement = 50 kg

1 part cement = 25 kg

Total number of parts = 2 + 4 + 5 = 11

Total amount of concrete = 11 × 25 kg = 275 kg

Question 26 2 marks [5.1]

Length of ribbon = (40 + 20 + 40 + 20) + (30 + 20 + 30 + 20) + 60

= 280 cm

Question 27 2 marks [5.6]

Two semicircles of equal size which is equivalent to one circle with radius 12.5 cm.

Area = *A*rectangle − *A*circle

= 35 × 25 – π × 12.52

= 384.13 cm2

Question 28 3 marks [5.7]

Volume = π*r*2*h*

= π × 302 × 90

= 254 469 cm3

In litres: 254 469 mL = 254.469 L

Number of water bottles = 254.469 ÷ 1.25

= 203.58

203 water bottles can be filled.

Question 29 4 marks [7.3]

**(a)** 3(2*a* + 7) = 3  
 2*a* + 7 = 1  
 2*a* = -6  
 *a* = -3

**(b)**  = 13  
 5*m* − 4 = 26  
 5*m* = 30  
 *m* = 6

Question 30 5 marks [7.4]

**(a)** 5*a* + 3 = 11 + 3*a*5*a* – 3*a* = 11 – 3

2*a* = 8  
 *a* = 4

**(b)**  =   
 3(*b* + 2) = 2(2*b* – 3)  
 3*b* + 6 = 4*b* – 6   
 6 + 6 = 4*b* – 3*b*

*b* = 12

Question 31 6 marks [8.1]

**(a)** *w* = 132° (supplementary angle to 48°)  
*x* = 48° (corresponding angles on parallel lines to 48°)  
*y* = 48° (vertically opposite angles to *x*)  
*z* = 90° − 48° = 42° (corresponding angles on parallel lines, supplementary angles)

**(b)** 4*x* – 3 + *x* – 12 = 180° (co-interior angles on parallel lines)  
 5*x* = 195  
 *x* = 39

Question 32 5 marks [8.2]

**(a)** *x* = 75° (co-interior angles on parallel lines)  
*z* = 75° (diagonally opposite angles equal)   
*y* = 105° (diagonally opposite angles equal)

**(b)** 2*x* + *x* + 20 + 40 + 3*x* – 6 = 360° (angle sum of a quadrilateral is 360°)  
 6*x* = 306  
 *x* = 51

Question 33 2 marks [8.4]

∠*NOE* = ∠*WOT* (vertically opposite angles are equal)

Side *OT* = *OE* given

∠*NEO* = ∠*WOT* given

Therefore congruent due to ASA

Question 34 2 marks [9.2]

Total number of points for first 9 games = 9 × 24 = 216 points

Total after 10th game = 216 + 54 = 270 points

Therefore, mean =  = 27 points

Question 35 2 marks [9.6]

Pr(scores a goal) =  = 

Pr(two goals in a row) =  ×  = 

Short answer total marks: 81

Extended answer section

Question 36 5 marks [2.10]

**(a)** Staff discount first: $1000 × (100% − 10%) = $1000 × 90%  
 = $1000 × 0.9

= $900  
Stocktake discount second: $900 × (100% − 30%) = $900 × 70%  
 = $900 × 0.7

= $630

**(b)** Stocktake discount first: $1000 × (100% − 30%) = $1000 × 70%  
 = $1000 × 0.7

= $700  
Staff discount: $700 × (100% − 10%) = $700 × 90%  
 = $700 × 0.9

= $630

**(c)** They are the same because multiplication is commutative and the order of the inputs does not affect the result. The two percentage discounts can be converted to an equivalent discount by multiplying 90% by 70% = 63%. The price paid is 63% of the marked price, the combined discount (100 – 63)% = 37%.

Question 37 3 marks [9.2]

The mean will be the only measure of central tendency, as the removal of the 2 will affect both the sum of the data values and the total number of data values.

Mean (including 2) = 

= 

= 31

Mean (excluding 2) = 

= 

= 35.14

Median (including 2) = 4.5th score = 24

Median (excluding 2) = 4th score = 24

Mode (including 2) = 24

Mode (excluding 2) = 24

Question 38 4 marks [9.6]

Sample space = 9 × 9 = 81

Mixed numbers can occur in two different throws, for example 20 and 19 is a different combination to 19 and 20 due to the fact that the darts are independent of each other.

Combinations whose sum is 30 or more:

20 and 20; 20 and 19; 19 and 20; 19 and 19; 19 and 18; 18 and 19; 18 and 18, 20 and 10; 10 and 20; 19 and 11; 11 and 19; 20 and 11; 11 and 20; 20 and 18, 18 and 20

Pr(30 or more) = 

Extended answer total marks: 12

TOTAL test marks: 105