Multiple-choice section

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

Question 1 [3.1]

B

Look for the number beside *x*. The number is -5.

Question 2 [3.2]

B



= -11

Question 3 [3.2]

C

3(-3)2 – 4(2)3 = 3(9) – 4(8)  
 = 27 – 32

= -5

Question 4 [3.3]

A



Question 5 [3.4]

B

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

= *x* + 8*y* – 12*z*

Question 6 [3.5]

D

24*abc*

Question 7 [3.5]

A

Question 8 [3.6]

D

-3*mn*(*m*2 – 4*n*) = -3*mn* × *m*2 – -3*mn* × 4*n*

= -3*m*3*n* + 12*mn*2

Question 9 [3.6]

B



= 15*g*2 + 25*g* + 3*g*2 - 21

= 18*g*2 + 25*g* – 21

Question 10 [3.7]

C

2*ab*2 – 8*abc* = 2 × *a* × *b* × *b* – 2 × 2 × 2 × *a* × *b* × *c*

= 2*ab*(*b* – 4*c*)

Multiple-choice total marks: 10

Short answer section

Question 11 3 marks

(a) Writing an expression with a common factor and brackets is called *factorising*  
an expression.

(b) Using the distributive law to write an expression without brackets is called *expanding* an expression.

(c) When 3*a* – 4*b* + 5*a* + 6*b* is simplified to 8*a* + 2*b*, you have collected *like terms*.

Question 12 3 marks [3.2]

|  |  |
| --- | --- |
|  | Correct solution  4*ab* – 5*a*  = 4 × -3 × 5 – 5 × 5  = -60 – 25  = -85 |

Question 13 5 marks [3.2]

(a) 2 × 1 × -3 = -6

(b) -3(1 + 5) = -3 × 6  
 = -18

(c) (2 × 1 – -3)(-3 – 2 × 5) = (2 + 3)(-3 – 10)  
 = 5 × -13  
 = -65

Question 14 3 marks [3.3]

(a) *E* = × 50 × 152 = 5625

(b) By trial and error:   
*m* = 50, *E* = × 50 × 52 = 625  
*m* = 75, *E* = × 75 × 52 = 937.5  
*m* = 100, E = × 100 × 52 = 1250

Question 15 3 marks [3.4]

(a) 8*r* – 2*r* – 9 = 6*r* – 9

(b) 7*d* – 3*h* + 4*d* + 4*h* = 11*d* + *h*

(c) 7*x* + 2 – (5 – 6*x*) = 7*x* + 2 – 5 + 6*x* = 13*x* – 3

Question 16 5 marks [3.5]

(a) -5*a* × 3*b* × 6*a* = -90*a*2*b*

(b) × 2*hk* = -2*h* × 2*hk* = -4*h*2*k*

(c) 63*x*2*y*2 ÷ 9*xy* + -4*y* × 5*x* = + -20*xy*  
 = 7*xy* – 20*xy* = -13*xy*

Question 17 5 marks [3.6]

(a) -3(6*r* – 4)  
= -3 × 6*r* – 3 × -4  
= -18*r* + 12

(b) 3*x*(*y* – 5) – 4*xy*   
= 3*x* × *y* + 3*x* × -5 – 4*xy*   
= 3*xy* – 15*x* – 4*xy*   
= -*xy* – 15*x*

(c) 2*m*2(4*n* – 5) – 10*m*(*m* + 2*n*)  
*=* 2*m*2 × 4*n +* 2*m*2 × -5 – 10*m* × *m* – 10*m* × 2*n*= 8*m*2*n* – 10*m*2 – 10*m*2 – 20*mn*= 8*m*2*n* – 20*m*2 – 20*mn*

Question 18 3 marks [3.4, 3.5]

(a) 3*a* + 2*a* + 2*a* + *a* + *a* + *a* = 10*a*

(b) 3*a* × 2*a* – *a* × *a* = 6*a*2 – *a*2 = 5*a*2

Question 19 5 marks [3.7]

(a) 3*xy* – 6*y*2= 3 × *x × y* –3 × 2 × *y × y*   
= 3*y*(*x* – 2*y*)

(b) 42*b*3*c* – 18*bc  
=* 6 × 7 *× b × b × b × c* – 6 × 3 × *b × c*= 6*bc*(7*b*2 – 3)

(c) 8*cd*2 + 10*c*2*d* *–* 32*c*3*d*2*=* 2 × 4 × *c* × *d* × *d +* 2 × 5 × *c × c × d* – 2 × 2 × 2 × 2 × 2 × *c* × *c* × *c* × *d* × *d*= 2*cd*(4*d* + 5*c –* 16*c*2*d*)

Short answer total marks: 35

Extended answer section

Question 20 9 marks [3.2, 3.4, 3.6, 3.7]

(a) (i) *n* = 3, *B* = 2 × 3 + 1 = 7  
*n* = 5, *B* = 2 × 5 + 1 = 11

(ii) By trial and error:  
*n* = 50, *B* = 2 × 50 + 1 = 101  
*n* = 60, *B* = 2 × 60 + 1 = 121  
*n* = 69, *B* = 2 × 69 + 1 = 138

(b) *n* = 2, *J* = 4 × 2 + 1 = 9  
*n* = 5, *J* = 4 × 5 + 1 = 21

(c) (i) *B* + *J* = 2*n* + 1 + 4*n* + 1  
 = 6*n* + 2

(ii) 6*n* + 2 = 2 × 3 × *n* + 2  
 = 2(3*n* + 1)

(d) *B* × *J* = (2*n* + 1)(4*n* + 1)  
 = 2*n*(4*n* + 1) + 1(4*n* + 1)  
 = 8*n*2 + 2*n* + 4*n* + 1  
 = 8*n*2 + 6*n* + 1

Question 21 3 marks [3.1]

|  |  |
| --- | --- |
| (a) 3*n* | (b) 3*n* + 5; 2(*n* + 5) |

Question 22 10 marks [3.1, 3.4, 3.6]

(a) Area = length × width  
 = *x*(*x* + 8)  
 = *x*2 + 8*x*

(b) (i) New length = 150% × (*x* + 8)  
 = 1.5(*x* + 8)  
 = 1.5*x* + 12  
New width = 120% × *x* = 1.2*x*

(ii) New area = 1.2*x*(1.5*x* + 12)  
 = 1.8*x*2 + 14.4*x*

(iii) Increase in area = 1.8*x*2 + 14.4*x* – (*x*2 + 8*x*)  
 = 1.8*x*2 – *x*2 + 14.4*x* – 8*x* = 0.8*x*2 + 6.4*x* = 0.8(*x*2 + 8*x*)

(c) (i) Perimeter of new rectangle = 2(1.5*x* + 12) + 2(1.2*x*)  
 = 3*x* + 24 + 2.4*x* = 5.4*x* + 24  
By trial and error:  
*x* = 10, *P* = 5.4 × 10 + 24 = 78

(ii) Perimeter of original rectangle = 2(*x* + 8) + 2*x* = 2*x* + 16 + 2*x* = 4*x* + 16  
If *x* = 10, *P* = 4 × 10 + 16   
*P* = 56 cm

Extended answer total marks: 22

TOTAL test marks: 67