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 3.

Question 2 [3.2]

B



= -13.5

Question 3 [3.2]

C

7(-2)2 – 4(3)3 = 7(4) – 4(27)   
 = -80

Question 4 [3.3]

A



Question 5 [3.4]

B

2*x* + 7*y* – 2*z –* (4*x* – 3*y* + *z*) = 2*x* – 4*x* + 7*y* + 3*y* – 2*z* – *z*

= -2*x* + 10*y* – 3*z*

Question 6 [3.5]

D

Question 7 [3.5]

A

Question 8 [3.6]

D

-5*mn*(*m*2 – 9*n*) = -5*mn* × *m*2 – -5*mn* × 9*n*

= -5*m*3*n* + 45*mn*2

Question 9 [3.6]

B

2*g*(3*g* + 4) – 3(*g*2 + 8)

= 6*g*2 + 8*g* – 3*g*2 – 24

= 3*g*2 + 8*g* – 24

Question 10 [3.7]

C

4*ab*2 – 16*abc* = 2 × 2 × *a* × *b* × *b* – 2 × 2 × 2 × 2 × *a* × *b* × *c*

= 4*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 *a* – 2*b* + 5*a* + 6*b* is simplified to 6*a* + 4*b*, you have collected *like terms*.

Question 12 3 marks [3.2]

|  |  |
| --- | --- |
|  | Correct solution  6*ab* – 2*b*  = 6 × -3 × 5 – 2 × 5  = -90 – 10  = -100 |

Question 13 5 marks [3.2]

(a) 2 × 2 × -5 = -20

(b) -5(2 + 3) = -5 × 5

= -25

(c) (2 × 2 – -5)(-5 – 2 × 3) = (4 + 5)(-5 – 6)  
 = 9 × -11  
 = -99

Question 14 3 marks [3.3]

(a) *E* = × 55 × 122 = 3960

(b) By trial and error:   
*m* = 50, *E* = × 50 × 102 = 2500  
*m* = 75, *E* = × 75 × 102 = 3750

Question 15 3 marks [3.4]

(a) 11*r* – 7*r* – 9 = 4*r* – 9

(b) 24*d* – 8*h* + 2*d* + 12*h* = 26*d* + 4*h*

(c) 12*x* + 2 – (13 – 9*x*) = 12*x* + 2 – 13 + 9*x*

= 21*x* – 11

Question 16 5 marks [3.5]

(a) -6*a* × 2*b* × 7*a* = -84*a*2*b*

(b) × 28*hk* = -2*h* × 28*hk* = -56*h*2*k*

(c) 36*x*2y2 ÷ 4*xy* + -11*y* × 3*x* = + -33*xy*

= 9*xy* – 33*xy*

= -24*xy*

Question 17 5 marks [3.6]

(a) -3(7*r* – 5)  
= -3 × 7*r* – 3 × -5  
= -21*r* + 15

(b) 8*x*(*y* – 4) – 6*xy*   
= 8*x* × *y* + 8*x* × -4 – 6*xy*= 8*xy* – 32*x* – 6*xy*   
= 2*xy* – 32*x*

(c) 5*m*2(2*n* – 5) – 12*m*(3*m* + *n*)  
*=* 5*m*2 × 2*n +* 5*m*2 × -5 – 12*m* × 3*m* – 12*m* × *n*= 10*m*2*n* – 25*m*2 – 36*m*2 – 12*mn*= 10*m*2*n* – 61*m*2 – 12*mn*

Question 18 3 marks [3.4, 3.5]

(a) 5*a* + 3*a* + 2*a* + *a* + 3*a* + 2*a* = 16*a*

(b) 3*a* × 5*a* – *a* × 3*a* = 15*a*2 – 3*a*2 = 12*a*2OR  
3*a* × 2*a* + 2*a* × 3*a* = 6*a*2 + 6*a*2 = 12*a*2

Question 19 5 marks [3.7]

(a) 3*xy* – 21*y*2= 3 × *x × y* –3 × 7 × *y × y*   
= 3*y*(*x* – 7*y*)

(b) 52*b*3*c* – 24*bc  
=* 4 × 13 *× b × b × b × c* – 4 × 6 × *b × c*= 4*bc*(13*b*2 – 6)

(c) 10*cd*2 + 18*c*2*d* *–* 48*c*3*d*2*=* 2 × 5 × *c* × *d* × *d +* 2 × 9 × *c × c × d* – 2 × 24 × *c* × *c* × *c* × *d* × *d*= 2*cd*(5*d* + 9*c –* 24*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* = 6, *B* = 2 × 6 + 1 = 13  
*n* = 7, *B* = 2 × 7 + 1 = 15

(ii) By trial and error:  
*n* = 50, *B* = 2 × 50 + 1 = 101  
*n* = 60, *B* = 2 × 60 + 1 = 121  
*n* = 63, *B* = 2 × 63 + 1 = 127

(b) *n* = 3, *J* = 4 × 3 + 1 = 13

*n* = 7, *J* = 4 × 7 + 1 = 29

(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* + 8; 2(*n* + 8)

Question 22 10 marks [3.1, 3.4, 3.6]

(a) Area = length × width  
 = *x*(*x* + 10)  
 = *x*2 + 10*x*

(b) (i) New length = 175% × (*x* + 10)  
 = 1.75(*x* + 10)  
 = 1.75*x* + 17.5  
New width = 150% × *x* = 1.5*x*

(ii) New area = 1.5*x*(1.75*x* + 17.5)  
 = 2.625*x*2 + 26.25*x*

(iii) Increase in area = 2.625*x*2 + 26.25*x* – (*x*2 + 10*x*)  
= 2.625*x*2 – *x*2 + 26.25*x* – 10*x*= 1.625*x*2 + 16.25*x*= 1.625(*x*2 + 10*x*)

(c) (i) Perimeter of new rectangle = 2(1.75*x* + 17.5) + 2(1.5*x*)  
= 3.5*x* + 35 + 3*x*= 6.5*x* + 35  
By trial and error:  
*x* = 10, *P* = 6.5 × 10 + 35 = 100

(ii) Perimeter of original rectangle = 2(*x* + 10) + 2*x*= 2*x* + 20 + 2*x*= 4*x* + 20  
When *x* = 10, *P* = 4 × 10 + 20   
*P* = 60

Extended answer total marks: 22

TOTAL test marks: 67