Multiple choice section

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

Question 1 [12.1]

D

The equation must not be of the form .

Question 2 [12.4] [10A]

D

81= (92)

= 9

Question 3 [12.3]

B

5x5 × 8x3 = 5 × 8 × x5 + 3

= 40x8

Question 4 [12.3]

A

(2x5)4 = 24x5 × 4

= 16x20

Question 5 [12.5] [10A]

C

(1000) = (103)

= 3(10)

= 3

Question 6 [12.5] [10A]

D

= 

= (32)

= -2(3)

= -2

Question 7 [12.1]

C

As the value of x becomes very large, 2-x becomes very small and the value of y approaches 3, a horizontal asymptote.

Question 8 [12.1]

D

The general equation for a hyperbola y =  + k has a horizontal asymptote at y = k and  
a vertical asymptote at x = h. x = 3, y = -2

Question 9 [12.3]

D

 has centre at (2, 0) and has a radius of 1.

Multiple-choice results: 9

Short answer section

Question 10 2 marks [12.3]

In the term 5x6, the ‘x’ is known as the base and 5 is known as the coefficient.

Question 11 1 marks [12.5] [10A]

(81) = 4 because 3 raised to the power 4 equals 81.

Question 12 2 marks [12.4] [10A]

 = 

= 

= 

Question 13 4 marks [12.4] [10A]

|  |  |
| --- | --- |
| (a) 3 ×  = 3 ×  = 3 × 2 = 6 | (b)  =  = 23 = 8 |

Question 14 2 marks [12.3]

= 

= 

Question 15 6 marks [12.5] [10A]

|  |  |  |
| --- | --- | --- |
| (a) (x) = 4 x = 34 = 81 | (b) (1000) = 3 1000 = x3 103 = x3  x = 10 | (c) 2 + 5 = 11 2 = 6  = 3 x = 33 = 27 |

Question 16 4 marks [12.6] [10A]

2(2) + (75) – (3)

= (22) + (75) – (3)

= 

= (100)

= (102)

= 2(10)

= 2

Question 17 3 marks [12.1]

(a) (i) 

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| x | 0 | 1 | 2 | 3 | 4 | 5 |
| y | -2 | -1 | 1 | 5 | 13 | 29 |

(ii) 

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| x | 0 | 1 | 2 | 3 | 4 | 5 |
| y | -21 | -19 | -13 | 5 | 59 | 221 |

(b) Both equations have the same y-value, 5, for . The point of intersection is (3, 5)

Question 18 8 marks [12.2]

(a) (x + 2)2 + (y – 3)2 = 25 is translated 5 units right and 4 units down

(b) x – 1 represents a translation of 1 unit to the right  
 + 2 represents a translation of 2 units up  
Therefore y = 3x needs to be moved 1 unit to the right and 2 units up

(c) x – 5 represents a translation of 5 units to the right  
– 1 represents a translation of 1 unit down  
Therefore  needs to be moved 5 units to the right and 1 unit down.

Short answer total: 32

Extended answer section

Question 19 8 marks [12.2]

(x – 6)2 + (y + 5)2 = 16

(a) (i) The reflected circle centre is at (h, -k) = (3, -4)

(ii) radius = 5

(iii) (x – 3)2 + (y + 4)2 = 25

(iv) a shift of 8 units down

(b) (x + 3)2 + (y + 4)2 = 25

(c) If (x – 3)2 + (y − 4)2 = 25 is reflected in the y-axis it becomes (x + 3)2 + (y − 4)2 = 25  
If it is now reflected in the x-axis, it becomes (x + 3)2 + (y + 4)2 = 25.

(d) No, the equations will be the same.

Question 20 8 marks [12.1]

(a) 22 = 210k + 18  
 4 = 210k  
210k = 22  
10k = 2  
 k = 0.2

(b) When ,  


(c) When ,  
  
Temperature increase  
= 34 – 19   
= 15 °C

(d) (10, 22), (0, 19), (20, 34)

Question 21 8 marks [12.2]

(a) y = 4

(b) x = 1

(c) y-intercept is at (0, 3).  
y = + 4  
y = -1 + 4  
y = 3

Therefore the equation is y = + 4.

(d) x-intercept occurs where y = 0.  
0 = + 4  
-4 =   
-4x + 4 = 1  
-4x = -3  
x =   
Therefore the x-intercept is (, 0).

Question 22 10 marks [12.6] [10A]

(a) (8)=  23  
= 3 (2)  
≈ 3 × 0.3010   
= 0.9030

(b) (8) = (2) + (3)  
≈ 0.3010 + 0.4771  
= 0.7781

(c) (1.5) =   
= (3) – (2)   
= 0.4771 – 0.3010  
= 0.1761

(d) (12) =  (22 × 3)  
=  + (3)  
= 2 × 0.3010 + 0.4771  
= 1.0791

|  |  |
| --- | --- |
|  | =  =  = (3) + 2(5) − (2) = 1.5741 |

Extended answer total: 34

TOTAL test results: 75