Multiple choice section

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

Question 1 [12.1]

A

The equation must not be of the form .

Question 2 [12.4] [10A]

D

36= (62)

= 6

Question 3 [12.3]

**C**

8x4 × 2x6 = 8 × 2 × x4 + 6

= 16x10

Question 4 [12.3]

**D**

(4x6)3 = 41 × 3x6 × 3

= 43x18

= 64x18

Question 5 [12.5] [10A]

A

(32) = (25)

= 5(2)

= 5

Question 6 [12.5] [10A]

**D**

= 

= (52)

= 2(5)

= 2

Question 7 [12.1]

D

As the value of x becomes very large, 5-x becomes very small and the value of y approaches 3, a horizontal asymptote.

Question 8 [12.1]

B

The general hyperbola y =  + k has a horizontal asymptote at y = k and a vertical asymptote at x = h.

The equation is y =  – 7

So x = 4 , y = -7

Question 9 [12.2]

**B**

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

Multiple-choice results: 9

Short answer section

Question 10 2 marks [12.3]

In the term 5x6, the ‘6’ is known as the exponent or index of x.

Question 11 1 marks [12.5] [10A]

(243) = 5 because 3 raised to the power 5 is 243.

Question 12 2 marks [12.4] [10A]

 = 

= 

= 

Question 13 4 marks [12.4] [10A]

|  |  |
| --- | --- |
| (a) 5 ×  = 5 ×  =5 × 2 = 10 | (b) |

Question 14 2 marks [12.3]

=   
= 

Question 15 6 marks [12.5] [10A]

|  |  |  |
| --- | --- | --- |
| (a) (x) = 5 x = 35 = 243 | (b) (1000 ) = 410 000 = x4 104 = x4x = 10 | (c) 2(x) + 4 = 12 2(x) = 8 (x) = 4 x = 34= 81 |

Question 16 4 marks [12.6] [10A]

2(2) + (125) – (5)

= (22) + (53) – (5)

=  ()

= (100)

= (102)

= 2(10)

= 2

Question 17 3 marks [12.1]

(a) (i) y = 2x + 1

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| x | 0 | 1 | 2 | 3 | 4 | 5 |
| y | 1 | 3 | 5 | 9 | 17 | 33 |

(ii) y = 3x − 64

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| x | 0 | 1 | 2 | 3 | 4 | 5 |
| y | -63 | -61 | -55 | -37 | 17 | 179 |

(b) Both equations have the same y-value of 17 for 4. The point of intersection is (4, 17)

Question 18 8 marks [12.2]

(a) (x + 1)2 + (y – 5)2 = 81 needs to be moved 3 units to the right and 9 units down

(b) x + 3 represents a translation of 3 units to the left  
+ 5 represents a translation of 5 units up  
Therefore y = 2x needs to be moved 3 units to the left and 5 units up

(c) x – 1 represents a translation of 1 unit to the right  
+ 4 represents a translation of 4 units down  
Therefore  needs to be moved 1 unit to the right and 4 units 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) = (6, 5)

(ii) radius = 4

(iii) (x – 6)2 + (y – 5)2 = 16

(iv) a shift of 10 units up

(b)(x + 6)2 + (y – 5)2 = 16

(c) If (x – 6)2 + (y + 5)2 = 16 is reflected in the y-axis it becomes (x + 6)2 + (y + 5)2 = 16.  
If it is now reflected in the x-axis, it becomes (x + 6)2 + (y – 5)2 = 16.

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

Question 20 8 marks [12.1]

(a) 24 = 25k + 20  
 4 = 25k  
 22 = 25k  
  k =   
 k = 0.4

(b) When ,  


(c) When ,  


Temperature increase = 36 – 21 = 15 °C

(d) (10, 24), (0, 21), (20, 36)

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) (32) = (25)  
= 5 (2)  
≈ 5 × 0.3010  
= 1.5050

(b) (15) = (5) + (3)  
≈ 0.6990 + 0.4771  
= 1.1761

(c)  = (5) − (3)  
≈ 0.6990 − 0.4771  
= 0.2219

(d) (20) = (5 × 22)  
= (5) + 2(2)≈ 0.6990 + 0.6020  
= 1.3010

(e) (22.5)  
=  ()  
=  ()  
=  ()  
= (5) + 2(3) − (2)  
≈ 0.6990 + 2 × 0.4771 – 0.3010  
= 1.3522

Extended answer total: 34

TOTAL test results: 75