**IB SL Review Trig MS**

**1.** ***Note:*** *Award (M1) for identifying the largest angle*.

cos  =  (M1)  
= – (A1)  
  = 101.5° (A1)

**OR** Find other angles first

 = 44.4°  = 34.0° (M1)

  = 101.6° (A1)(A1) (C4)

**Note:** Award (C3) if not given to the correct accuracy.

[4]

**2.** *AB* = *r*  
=  (M1)(A1)  
= 21.6 ×  (A1)  
= 8 cm (A1)

**OR**  × (5.4)2** = 21.6  
 ** =  (= 1.481 radians) (M1)  
*AB* = *r* (A1)  
= 5.4 ×  (M1)  
= 8 cm (A1) (C4)

[4]

**3.** (a)  = 6  *A* is on the circle (A1)  
 = 6  *B* is on the circle. (A1)  
  
=   
= 6  *C* is on the circle. (A1) 3

(b)   
=  (M1)  
=  (A1) 2

(c)  (M1)  
=   
=  (A1)  
=  (A1)

**OR**  (M1)(A1)  
=  as before (A1)

**OR** using the triangle formed by  and its horizontal and  
vertical components:

 (A1)  
 (M1)(A1) 3

**Note:** The answer is 0.289 to 3 sf

(d) A number of possible methods here  
  
=  (A1)  
=  (A1)  
*BC*  =   
*ABC* =  (A1)  
=  (A1)

**OR** *ABC* has base *AB* = 12 (A1)  
and height =  (A1)  
 area =  (A1)  
=  (A1)

**OR** Given   
 (A1)(A1)(A1)  
=  (A1) 4

[12]

**4.** tan2 *x* =  (M1)  
 tan *x* =  (M1)  
 *x* = 30° or *x* = 150° (A1)(A1) (C2)(C2)

[4]

**5.** sin *A* =   cos *A* =  (A1)  
But *A* is obtuse  cos *A* = – (A1)  
sin 2*A* = 2 sin *A* cos *A* (M1)  
= 2 ×   
= – (A1) (C4)

[4]

**6.** (a)(i) & (c)(i)

 (A3)

**Notes:** The sketch does **not** need to be on graph paper. It should have the correct shape, and the points (0, 0), (1.1, 0.55), (1.57, 0) and (2, –1.66) should be indicated in some way.  
Award (A1) for the correct shape.  
Award (A2) for 3 or 4 correctly indicated points, (A1) for 1 or 2 points.

(ii) Approximate positions are  
positive *x*-intercept (1.57, 0) (A1)  
maximum point (1.1, 0.55) (A1)  
end points (0, 0) and (2, –1.66) (A1)(A1) 7

(b) *x*2 cos *x* = 0 *x* ≠ 0 ⇒ cos *x* = 0 (M1)  
  *x* =  (A1) 2

**Note:** Award (A2) if answer correct.

(c) (i) see graph (A1)

(ii) cos *x* d*x* (A2) 3

**Note:** Award (A1) for limits, (A1) for rest of integral correct (do not penalize missing dx).

(d) Integral = 0.467 (G3)

**OR**

Integral =  (M1)  
=  – [0 + 0 – 0] (M1)  
=  – 2 (exact) **or** 0.467 (3 sf) (A1) 3

[15]

**7.** **Method 1**



0 (C2)  
1.80 [3 sf] (G2) (C2)  
2.51 [3 sf] (G2) (C2)

**Method 2**

3*x* = ±0.5*x* + 2 (*etc.*) (M1)  
 3.5*x* = 0, 2, 4 **or** 2.5*x* = 0, 2, 4 (A1)  
7*x* = 0, 4, (8) **or** 5*x* = 0, 4, (8) (A1)  
 *x* *=* 0,  **or** *x* *=* 0,  (A1)(A1)(A1)  
 *x* *=* 0, ,  (C2)(C2)(C2)

[6]

**8.** (a) (i) cos , sin  (A1)  
therefore cos  = 0 (AG)

(ii) cos *x* + sin *x* = 0  1 + tan *x* = 0  
 tan *x* = –l (M1)  
*x* =  (A1)

**Note:** Award (A0) for 2.36.

**OR***x* =  (G2) 3

(b) *y* = e*x*(cos *x* + sin *x*)  
 = e*x*(cos *x* + sin *x*) + e*x*(–sin *x* + cos *x*) (M1)(A1)(A1) 3  
 = 2e*x* cos *x*

(c)  = 0 for a turning point  2e*x* cos *x* = 0 (M1)  
 cos *x* = 0 (A1)  
 *x* *=* **  *a* *=* ** (A1)  
*y* *=* e(cos ** *+* sin **) = e  
*b* *=* e (A1) 4

**Note:** Award (M1)(A1)(A0)(A0) for a = 1.57, b = 4.81.

(d) At D, = 0 (M1)  
2e*x* cos *x* – 2e*x*sin *x* = 0 (A1)  
2e*x* (cos *x* – sin *x*) = 0  
 cos *x* – sin *x* = 0 (A1)  
 *x* =  (A1)  
 *y* = e(cos ** *+* sin **) (A1)  
 = e (AG) 5

(e) Required area = (cos *x* + sin *x*)d*x* (M1)  
 = 7.46 sq units (G1)  
**OR**Αrea = 7.46 sq units (G2) 2

**Note**: Award (M1)(G0) for the answer 9.81 obtained if the calculator is in degree mode.

[17]