**IB Math SL Year 1 – More Exam Review KEY**

**1.** (a) C has equation *x* = 2*y* (A1)
*ie* *y* = log2 *x* (A1) (C2)

 **OR** Equation of B is *x* = log2*y* (A1)
 Therefore equation of C is *y* = log2 *x* (A1) (C2)

(b) Cuts *x*-axis  log2 *x* = 0
 *x* = 2° (A1)
 *x* = 1
Point is (1, 0) (A1) (C2)

[4]

 **2.** (a) evidence of appropriate approach M1

*eg* 3 = 

*r* =13.5 (cm) A1 N1

(b) adding two radii plus 3 (M1)

perimeter = 27+3 (cm) (= 36.4) A1 N2

(c) evidence of appropriate approach M1

*eg* 

area = 20.25 (cm2) (= 63.6) A1 N1

[6]

**3.** (a) I

(b) III

(c) IV

**Note:** Award (C4) for 3 correct, (C2) for 2 correct, (C1) for 1 correct.

[4]

**4.** (*g* ° *f* ) (*x*) = 0  2 cos *x* + 1 = 0 (M1)
  cos *x* = – (A1)
 *x* =  (A1)(A1) (C4)

**Note:** Accept 120°, 240°.

[4]

**5.** (7 – *x*)(1 + *x*) = 0 (M1)
 *x* = 7 or *x* = –1 (A1) (C1)(C1)
*B:* *x* =  = 3;(A1)
*y* = (7 – 3)(l + 3) = 16 (A1) (C2)

[4]

**6.** **METHOD 1**

Using ***a*** **** ***b*** = *ab* cos ** (may be implied) (M1)

  (A1)

 Correct value of scalar product  (A1)

 Correct magnitudes  (A1)(A1)

  (A1) (C6)

 **METHOD 2**

 **** (A1)

 **** (A1)

 **** (A1)

 Using cosine rule (M1)

  (A1)

  (A1) (C6)

[6]

**7.** **METHOD 1**

Evidence of correctly substituting into *l* = *r* A1

Evidence of correctly substituting into *A* =  A1

For attempting to solve these equations (M1)

eliminating one variable correctly A1

*r* = 15 ** = 1.6 (= 91.7) A1A1 N3

**METHOD 2**

Setting up and equating ratios (M1)

 A1A1

Solving gives *r* = 15 A1

*r* = 24  A1

 ** = 1.6 (= 91.7) A1

*r* = 15 ** = 1.6 (= 91.7) N3

[6]

**8.** 4*x*2 + 4*kx* + 9 = 0
Only one solution  *b*2 – 4*ac* = 0 (M1)
16*k*2 – 4(4)(9) = 0 (A1)
*k*2 = 9
*k* = 3 (A1)
But given *k* > 0, *k* = 3 (A1) (C4)

 **OR**

 One solution  (4*x*2 + 4*kx* + 9) is a perfect square (M1)
4*x*2 + 4*kx* + 9 = (2*x*  3)2 by inspection (A2)
given *k* > 0, *k* = 3 (A1) (C4)

[4]

**9.** ***Note****: Throughout this question, do* ***not*** *accept methods which involve
finding  .*

(a) Evidence of correct approach A1

*eg* sin ** = 

sin ** =  AG N0

(b) Evidence of using sin 2** = 2 sin ** cos ** (M1)

 =  A1

 =  AG N0

(c) Evidence of using an appropriate formula for cos 2** M1

*eg* 

cos 2** =  A2 N2

[6]

**10.** (a) ln *a*3*b* = 3ln *a* + ln *b* (A1)(A1)

ln *a*3*b* = 3*p* + *q* A1 N3

(b) ln  ln *a*  ln *b* (A1)(A1)

ln  *p*  *q* A1 N3

[6]

**11.** 1.023*t* = 2 (M1)
 *t* =  (M1)(A1)
= 30.48...
30 minutes (nearest minute) (A1) (C4)

**Note:** Do not accept 31 minutes.

[4]

**12.** (a) period =  A1 N1

(b)



 A1A1A1 N3

**Note:** Award A1 for amplitude of 3, A1 for **their**
 period, A1 for a sine curve passing through
 (0, 0) and (0, 2).

(c) evidence of appropriate approach (M1)

 *eg* line *y* = 2 on graph, discussion of number of solutions in
the domain

4 (solutions) A1 N2

[6]

**13.** (a) (i) 7 A1 N1

(ii) 1 A1 N1

(iii) 10 A1 N1

(b) (i) evidence of appropriate approach M1

*eg* 

*A* = 8 AG N0

(ii) *C* = 10 A2 N2

(iii) **METHOD 1**

period = 12 (A1)

evidence of using B  period = 2 (accept 360) (M1)

*eg* 12 = 

** A1 N3

**METHOD 2**

evidence of substituting (M1)

*eg* 10 = 8 cos 3*B* + 10

simplifying (A1)

*eg* cos 3*B* = 0 

** A1 N3

(c) correct answers A1A1

*eg* *t* = 3.52, *t* = 10.5, between 03:31 and 10:29 (accept 10:30) N2

[11]

**14.** Identifying the required term (seen anywhere) M1

*eg *

** = 45 (A1)

4*y*2, 2  2, 4 (A2)

*a* = 180 A2 N4

[6]

**15.** (a) evidence of dividing two terms (M1)

*eg* 

***r*** *=*  0.6 A1 N2

(b) evidence of substituting into the formula for the 10th term (M1)

*eg* *u*10 = 3000( 0.6)9

*u*10 = 30.2 (accept the exact value 30.233088) A1 N2

(c) evidence of substituting into the formula for the infinite sum (M1)



*S* = 1875 A1 N2

[6]

**16.** (a) For finding second, third and fourth terms correctly (A1)(A1)(A1)

 Second term  third term 
fourth term 

 For finding first and last terms, **and** adding them to **their**
three terms (A1)

 


 
 N4

(b) 
 (A1)

 Adding gives 2e4 + 12 + 
 A1 N2

[6]

**17.** (a)  = 0 (M1)(M1)
 2*x*(*x* + 1) + (*x* – 3)(5) = 0 (A1)
 2*x*2 + 7*x* – 15 = 0 (C3)

(b) **METHOD 1**

 2*x*2 + 7*x* – 15 = (2*x* – 3)(*x* + 5) = 0
 *x* =  or *x* = –5 (A1) (C1)

 **METHOD 2**

 *x* = 
 *x* =  or *x* = –5 (A1) (C1)

[4]

 **18.** (a) 3, 6, 9 A1 N1

(b) (i) Evidence of using the sum of an AP M1

*eg *

 A1 N1

(ii) **METHOD 1**

Correct calculation for  (A1)

*eg* 

Evidence of subtraction (M1)

*eg* 15150  630

 A1 N2

**METHOD 2**

Recognising that first term is 63, the number of terms is 80 (A1)(A1)

*eg* 

 A1 N2

[6]

**19.** (a) Finding correct vectors,  =   =  A1A1

 Substituting correctly in the scalar product
 = 4(–3) + 3(1) A1
 = –9 AG 3

(b) || = 5 || =  (A1)(A1)
Attempting to use scalar product formula cos BAC =  M1
= –0.569 (3 s.f) AG 3

[6]

**20.** (a) Value = 1500(1.0525)3 (M1)
 = 1748.87 (A1)
 = 1749 (nearest franc) (A1) 3

(b) 3000 = 1500(1.0525)*t*  2 = 1.0525*t* (M1)
*t* =  = 13.546 (A1)
It takes 14 years. (A1) 3

(c) 3000 = 1500(1 +*r*)10 or 2(1 +*r*)10 (M1)
  = 1 + *r* or log 2 = 10 log (1 + *r*) (M1)

  *r* =  – 1 or *r* =  – 1 (A1)
*r* = 0.0718 [or 7.18%] (A1) 4

[10]

**21.** (a) Evidence of using the cosine rule (M1)

*eg* cos  =  cos 

Correct substitution A1

*eg* 

 cos  =  (A1)

  = 55.8 (0.973 radians) A1 N2

(b) Area = sin 

For substituting correctly  sin 55.8 A1

 = 9.92 (cm2) A1 N1

[6]

**22.** (a) At *t* = 2, *N* = 10e0.4(2) (M1)
*N* = 22.3 (3 sf)
Number of leopards = 22 (A1)

(b) If *N* = 100, then solve 100 = 100e0.4*t*
10 = e04*t*
ln 10 = 0.4*t*
*t* =  ~ 5.76 years (3 sf) (A1)

[4]