Higher Grade - Paper 1 2007/2008

ANSWERS - Section A

1	D
2	B
3	C
4	C
5	B
6	D
7	A
8	C
9	D
10	B
11	B
12	C
13	D
14	A
15	D
16	C
17	C
18	D
19	B
20	A

	A	B	C	D
1	▭	▭	▭	■
2	▭	■	▭	▭
3	▭	▭	■	▭
4	▭	▭	■	▭
5	▭	■	▭	▭
6	▭	▭	▭	■
7	■	▭	▭	▭
8	▭	▭	■	▭
9	▭	▭	▭	■
10	▭	■	▭	▭
11	▭	■	▭	▭
12	▭	▭	■	▭
13	▭	▭	▭	■
14	■	▭	▭	▭
15	▭	▭	▭	■
16	▭	▭	■	▭
17	▭	▭	■	▭
18	▭	▭	▭	■
19	▭	■	▭	▭
20	■	▭	▭	▭

	Give 1 mark for each •	Illustration(s) for awarding each mark
21(a)	ans: proof (3 marks)	
	•1 finds expressions for 2 areas •2 adds 4 to area of triangle and equates •3 reorganises to given form	•1 $A_{rect} = x(2k-2)$; $A_{tri} = x(x+k)$ •2 $x(x+k)+4 = x(2k-2)$ •3 $x^2+(2-k)x+4=0$
(b)	ans: $k = 6$ (3 marks)	
	•1 knows condition for equal roots •2 substitutes values •3 solves and discards	•1 $b^2-4ac=0$ [stated or implied] •2 $(2-k)^2-4\times1\times4=0$ •3 $(k+2)(k-6)=0; k=-2$ or 6; $k=6$
(c)	ans: $x = 2$; 20cm^2; 16cm^2 (3 marks)	
	•1 substitutes value of k to form quadratic •2 solves to x •3 finds areas	•1 $x^2-4x+4=0$ •2 $(x-2)^2=0; x=2$ •3 $A_{rect}=20cm^2; A_{tri}=16cm^2$
22(a)	ans: $3y + x = -30$ (2 marks)	
	•1 identifies required gradient •2 substitutes into general equation	•1 $m_{CB} = -\frac{1}{3}$ •2 $y+11=-\frac{1}{3}(x-3)$ [or equivalent]
(b)	ans: D(-3,-9) (3 marks)	
	•1 knows to use systems of equations •2 finds value for x •3 finds value for y and states coordinates	•1 evidence •2 $x = -3$ •3 $y = -9$; (-3,-9)
(c)	ans: C(-9,-7) (1 mark)	
	•1 states coordinates of C	•1 C(-9,-7)
(d)	ans: $(x+3)^2+(y-1)^2=100$ (4 marks)	
	•1 identifies diameter •2 finds centre •3 finds radius or r^2 •4 subs into general equation	•1 AC is diameter [$\angle$ADC is right-angled] •2 midpoint of AC is (-3,1) •3 $r = 10$ or $r^2 = 100$ •4 $(x+3)^2+(y-1)^2=100$

	Give 1 mark for each •	Illustration(s) for awarding each mark
23(a)	**ans:** $(x-4)^2 - 15$; $p = -4$, $q = -15$ **(4 marks)**	
	• 1 finds derivative • 2 starts to complete square • 3 completes • 4 states values of p and q	• 1 $f(x) = x^2 - 8x + 1$ • 2 $(x-4)^2$ ..... • 3 ..... -15 • 4 $p = -4$, $q = -15$
(b)	**ans:** **-15 when $x = 4$** **(2 marks)**	
	• 1 states minimum rate of change • 2 states value of x	• 1 rate of change is -15 • 2 $x = 4$
24	**ans:** $\frac{2\pi}{3}$, 0 **(5 marks)**	
	• 1 collects terms to LHS and equates to 0 • 2 factorises quadratic • 3 finds values for $\cos a$ • 4 finds one value for a • 5 finds second value for a	• 1 $2\cos^2 a - \cos a - 1 = 0$ • 2 $(2\cos a + 1)(\cos a - 1) = 0$ • 3 $\cos a = -\frac{1}{2}$ or $\cos a = 1$ • 4 $\frac{2\pi}{3}$ • 5 0
		Total: 30 marks