www.m4+hs.com

Core Mathematics C2

Advanced Subsidiary

Practice Paper 2

Time: 1 hour 30 minutes

(1) (a) Find the remainder when $f(x) = 2x^3 - 7x^2 + 2x + 3$ is divided by $(x-1)$	(2 marks)
(b) Hence or otherwise solve the equation $f(x) = 0$	(4 marks)
(c) State the maximum number of stationary points of graph $y = f(x)$	(1 mark)
(2) (a) Using the triangle below show that $\cos^2(x) + \sin^2(x) \equiv 1$	(3 marks)
3 5 x 4	
(b) Given $0 < x < 90^{\circ}$ write down the value of $tan(x)$	(1 mark)
(c) Solve the equation $2\sin^2(x) - 5\cos(x) + 1 = 0$ for $0 < x < 360^\circ$	(6 marks)
(3) Fred invests £2000 in a bank account that pays 4% compound interest at the end of each year. (a) Show that at the end of the 3^{rd} year his investment will be worth less than £2500.	(2 marks)

(b) Find the number of years it will take for Fred's investment to be worth more than £6200. (5 marks)

(4) A circle has equation $(x-3)^2 + (y-2)^2 = 20$. The circle has centre *C* and crosses the *x* axis at the points *A* and *B*.

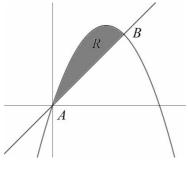
(a) Write down the coordinates of C.	(1 mark)
(b) Find the coordinates of A and B.	(4 marks)
(c) Find the size of angle <i>ACB</i> giving your answer in radians to 3 significant figures.	(4 marks)

(5) (a) Solve the equation
$$\log_6(x+3) = 1 - \log_6(x-2)$$
 (5 marks)

(b) Using the substitution $p = 2^x$ or otherwise solve the equation $2^x - 2 = \frac{8}{2^x}$ (5 marks)

(6) Find the stationary points on the curve $y = 2x^3 + 7x^2 - 12x + 3$ and determine their nature. (7 marks)

(7) The diagram below shows part of the curve $y = 3x - x^2$ and the line x = y. The curve and the line intersect at the points *A* and *B*. The shaded region *R* is the area bound by the line x = y and the curve $y = 3x - x^2$.



(a) Find the coordinates of A and B.

(b) Show the area of the shaded region R is $\frac{4}{3}$.

(8) Find the coefficient of term in x^3 in the expansion of $(1+x)^2(2-x)^5$

(9) (a) Sketch the graphs of $y = \sin(x)$ and $y = \cos(x)$ for $0 \le x \le 2\pi$ on the same set of axis showing any points of intersection with the coordinate axis. (4 marks)

(b) State with a reason the number of solutions to the equation sin(x) = cos(x) for $0 \le x \le 2\pi$ (2 marks)

(c) Solve the equation $\sin(x) = \cos(x)$ for $0 \le x \le 2\pi$ giving your answers in terms of π . (4 marks)

End of Questions

(4 marks)

(5 marks)

(6 marks)