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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)
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- (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 3rd 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 ACB 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 $y = 3x - x^2$.
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- (a) Find the coordinates of A and B . (4 marks)
 (b) Show the area of the shaded region R is $\frac{4}{3}$. (5 marks)
- (8) Find the coefficient of term in x^3 in the expansion of $(1+x)^2(2-x)^5$ (6 marks)
- (9) (a) Sketch the graphs of $y = \sin(x)$ and $y = \cos(x)$ for $0 \leq x \leq 2\pi$ 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 $0 \leq x \leq 2\pi$ (2 marks)
 (c) Solve the equation $\sin(x) = \cos(x)$ for $0 \leq x \leq 2\pi$ giving your answers in terms of π . (4 marks)

End of Questions