

ADDITIONAL MATHEMATICS
S.4 MID OF TERM2-2012
TIME:2HRS 30MINS

Attempt eight questions.

1.(a) Simplify

(i) $\sqrt{512} + \sqrt{128} + \sqrt{32}$

(ii) $\left(\frac{27}{8}\right)^{-\frac{4}{3}}$

(b) The equation $4x^2 + 8x - 1 = 0$ has roots α, β . Find the value of $(\alpha - \beta)^2$.

2.(a) Calculate the area of the triangle formed by the line $3x - 7y + 4 = 0$ and the axes.

(b) The straight line $x - y - 6 = 0$ cuts the curve $y^2 = 8x$ at P and Q. Calculate the length of PQ.

3. Find the equation of the tangent and the normal to the curve $y = x^2(x - 3)$ at the point where it cuts the x-axis. Sketch the curve.

4. Give the expansion of $(1 + x)^{\frac{1}{3}}$ up to and including the term in x^2 . Hence by putting $x = \frac{1}{8}$, calculate the cube root of 9 giving your answer to three decimal places.

5.(a) Find the sum of even numbers up to and including 100.

(b) The fifth term of an A.P is 17 and the third term is 11. Find the sum of the first seven terms.

6.(a) Solve the equation $3\tan^2 \theta + 5 = 7\sec \theta$, giving values of θ from 0° to 360° inclusive.

(b) Eliminate θ from the following equations.
 $x = a \cos \theta, y = b \sin \theta$.

- 7.(a) If $\sin A = \frac{4}{5}$ and $\cos B = \frac{12}{13}$, where A is obtuse and B is acute. Find without using tables the values of $\tan(A - B)$.
- (b) Solve the equation $\cos 2\theta + \cos \theta + 1 = 0$ for values of θ from 0° to 360° inclusive.
- 8.(a) Find the area enclosed by $y = 4x - x^2$, $x = 1$, $x = 2$ and the x-axis.
- (b) Find the area enclosed by that part of $y = x^2$ for which x is positive, the y-axis, $y = 1$ and $y = 4$.
- 9.(a) Differentiate with respect to x .
- (i) $x(x^2 + 1)^4$ (ii) $\frac{1 - x^2}{1 + x^2}$
- (b) A 5% error is made in measuring the radius of a sphere. Find the percentage error in surface area.
10. The expression $ax^2 + bx + c$ is divisible by $x - 1$, has remainder 2 when divided by $x + 1$, and has remainder 8, when divided by $x - 2$. Find the values of a, b, c .