

S5 SUBSIDIARY MATHEMATICS HOLIDAY WORK

Attempt all the questions

1. Show that $\sec^2\theta + \operatorname{cosec}^2\theta = \sec^2\theta\operatorname{cosec}^2\theta$
2. Solve the equation $3\sin^2\theta + \cos\theta + 1 = 0$ for the values of θ from 0° to 180° inclusive.
3. Solve the equation $1 + \cos\theta = 2\sin^2\theta$ for values of θ between 0° and 360° .
4. Solve : $2\cos^2 x = \sin x + 1$ for $0^\circ \leq x \leq 360^\circ$
5. Solve the equation $\operatorname{cosec}\theta + 2\cot^2\theta = 1$, for $0^\circ \leq \theta \leq 90^\circ$
6. By eliminating θ from the equations $x = a\sec\theta$ and $y = b + K\cos\theta$, show that $x(y - b) = Ka$.
7. Solve the equation $\cos\theta = \sin 2\theta$ for values of θ from 0° to 360° .
8. Show that $\frac{1 - \cos^2\theta}{\sec^2\theta - 1} = \cos^2\theta$ Hence, solve the equation $\frac{1 - \cos^2\theta}{\sec^2\theta - 1} = \frac{3}{4}$, for $0^\circ \leq \theta \leq 90^\circ$
9. Triangle OAB is such that angle $AOB = 90^\circ$, angle $ABO = \beta$, $\overline{OB} = 14.4$ cm and $\overline{OA} = 6$ cm. Find $\sin \beta + \cot \beta$.
10. A box contains 4 red and 7 black pens. Two pens are picked at random one after the other without replacement. Find the probability that:
 - i) both pens are red.
 - ii) the pens are of a different colours.

(use a graph book for this question)
11. The table below shows the time in hours spent on social media and watching television during one week by 11 students.

Social media	2	9	18	6	28	14	7.5	27	22	19.5	13
Television	25	23	18.5	27.5	12	16	17	9	15	11	20

- a) Find the average time spent on
 - i) social media
 - ii) watching television
- b) Draw a scatter diagram for the data.
- c) What type of correlation is shown on the scatter diagram?
- d) On your scatter diagram, draw a line of best fit
- e) Another student spent 21 hours watching television. Use the line of best fit to estimate the time this student spent on social media.