

SESSION 15: CONSOLIDATION: TRIGONOMETRY

X-ample Questions

Question 1

- (a) If $2 \tan \theta - 3 = 0$, then determine by means of a diagram and without using a calculator, the value of $13 \sin^2 \theta - \frac{2}{3} \tan \theta$, if it is given that $180^\circ < \theta < 360^\circ$. (6)

- (b) (i) If $\sin 18^\circ = t$, use a diagram to determine the following in terms of t :

$$\frac{\cos^2 18^\circ \cdot \tan^2 18^\circ}{\sin 18^\circ} \quad (6)$$

- (ii) By using identities, verify your answer. (3)

Question 2

Simplify the following without using a calculator:

(a) $\sin 150^\circ \cdot \cos 240^\circ \cdot \tan 315^\circ$ (5)

(b) $\frac{\sin(180^\circ + \theta)}{\cos 360^\circ \cdot \cos(360^\circ - \theta)}$ (4)

(c) $\sin^2 130^\circ + \sin^2 320^\circ$ (4)

Question 3

- (a) If $\tan A = p$, $p > 0$ and $A \in [0^\circ; 90^\circ]$ determine with the aid of a diagram the value of the following in terms of p .

(i) $\sin A$ (3)

(ii) $\cos A$ (1)

- (b) Simplify the following without using a calculator:

(i) $\frac{\tan(-480^\circ) \cdot \sin 300^\circ \cdot \cos 14^\circ \cdot \sin(-135^\circ)}{\sin 104^\circ \cdot \cos 225^\circ}$ (7)

(ii) $\tan(90^\circ + x) \cdot \sin(-x - 180^\circ)$ (6)

Question 4

Prove the following by using identities: $\frac{1 + \sin \theta}{\cos \theta} + \frac{\cos \theta}{1 + \sin \theta} = \frac{2}{\cos \theta}$ (5)

X-ercises

Question 1

(a) If $\frac{5 \sin A}{2} = \sqrt{6}$ and $A \in [90^\circ; 360^\circ]$ calculate without the use of a calculator and with the aid of a diagram the value of $5 \tan A \cdot \cos A$.

(b) If $\sin 32^\circ = m$, use a diagram to express the following in terms of m :

(i) $\sin 328^\circ$ (4)

(ii) $\cos 58^\circ$ (2)

(iii) $\tan 212^\circ$ (2)

Question 2

Simplify the following without using a calculator:

(a) $\frac{\cos 210^\circ \cdot \tan^2 315^\circ}{\sin 300^\circ \cdot \cos 120^\circ}$ (5)

(b) $\frac{\sin^2(180^\circ + \theta) \cdot \sin(360^\circ - \theta)}{\cos^2(90^\circ - \theta) \cdot \cos(90^\circ + \theta)}$ (5)

(c) $\cos^2(360^\circ - x) - \sin(180^\circ - x) \cos(90^\circ + x) - \cos^2(180^\circ + x)$ (5)

Question 3

(a) Simplify:

$$\frac{\tan(180^\circ + x) \cos(360^\circ - x)}{\sin(180^\circ - x) \cos(90^\circ + x) + \cos(540^\circ + x) \cos(-x)}$$
 (9)

(b) If $\cos 26^\circ = p$, express the following in terms of p :

$$\frac{\cos(-64^\circ) \tan(-244^\circ) \sin^2 334^\circ}{\cos 566^\circ}$$
 (8)

Question 4

Prove the following:

$$(a) \quad \cos^2 x \left[\frac{1}{\sin x - 1} + \frac{1}{\sin x + 1} \right] = 2 \quad (5)$$

$$(b) \quad \frac{1 - \cos^2 \theta}{\cos^2 \theta + 2 \cos \theta + 1} = \frac{1 - \cos \theta}{1 + \cos \theta} \quad (3)$$