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Additional Math with Ali Hashir

Trigonometry – Mixed Hard Practice

Worksheet 4 — Answers

Q1. (i) $\theta = 63.4^\circ, 123.7^\circ, 243.4^\circ, 303.7^\circ$. (ii) See sketch of $y = \tan \theta$ with these four points marked.

Q2. (i) $\tan \theta + \cot \theta = \frac{25}{12}$. (ii) The line $y = -\frac{3}{5}$ meets $y = \cos \theta$ twice in $0^\circ - 360^\circ$ (near 126.9° and 233.1°); only 233.1° is reflex.

Q3. (i) $x = 60^\circ, 180^\circ, 300^\circ$. (ii) e.g. $x = 420^\circ$ (or $x = -300^\circ$).

Q4. (i) $a = 5, b = 2, c = 2$. (ii) $(135^\circ, -3)$ and $(315^\circ, -3)$. (iii) Range $0 \leq y \leq 7$.

Q5. (i) $\sec \theta + \tan \theta = 4$. (ii) $\sec \theta = \frac{17}{8}, \tan \theta = \frac{15}{8}, \sin \theta = \frac{15}{17}, \cos \theta = \frac{8}{17}$. (iii) $\sin \theta + \cos \theta = \frac{23}{17}$.

Q6. (i) $x = 92.5^\circ, y = 47.5^\circ$. (ii) $92.5 + 47.5 = 140$ and $\tan(92.5 - 47.5)^\circ = \tan 45^\circ = 1$, as required.

Q7. (a) Proof (see solutions). (b) $\theta = 60^\circ, 300^\circ$.

Q8. (i) 2 solutions. (ii) Quadrants I and III, since $|\cos x| \geq 0$ forces $\tan x \geq 0$.

Q9. (i) $\theta = 16.6^\circ, 163.4^\circ$. (ii) 16.6° in Quadrant I ($\cot \theta > 0$); 163.4° in Quadrant II ($\cot \theta < 0$).

Q10. (i) $a = 4, b = 2$. (ii) Shown (see solutions). (iii) $x = 49.3^\circ, 310.7^\circ$. (iv) Range $0 \leq y \leq 6$.