Trigonometry Equations and Identities – Section Test (Answers)

1)

$\cos\theta = 0.3$

The solutions are in the 1st and 4th quadrants.

$\theta = 72.5°$ and

$\theta = 360° - 72.5° = 287.5°$

The solutions are 72.5° and 287.5° (1 d.p.)

2)

$\tan\theta = 0.5$

The solutions are in the 1st and 3rd quadrants.

$\theta = 26.6°$ and $\theta = 180° + 26.6° = 206.6°$

The solutions are 26.6° and 206.6°.

3)

$2\sin\theta + 1 = 0$

$\sin\theta = -\frac{1}{2}$

The solutions are in 3rd and 4th quadrants.

$\theta = 180° + 30° = 210°$ and $\theta = 360° - 30° = 330°$

The solutions are 210° and 330°.

4)

$3\tan\theta - 2 = 0$

$\tan\theta = \frac{2}{3}$

The solutions are in the 1st and 3rd quadrants.

$\theta = 33.7°$ and $\theta = 33.7° - 180° = -146.3°$

The solutions are 33.7° and -146.3°.

5)

$2\cos\theta - \sin\theta = 0$

$2\cos\theta = \sin\theta$

$$2 = \frac{\sin\theta}{\cos\theta} = \tan\theta$$

The solutions are in the 1st and 3rd quadrants.

$\theta = 63.4°$ and $\theta = 180° + 63.4° = 243.4°$

The solutions are 63.4° and 243.4°.

6)

$(2\cos\theta+1)(\cos\theta-2)=0$

$\cos\theta=-\frac{1}{2}$ or 2

For $\cos\theta=-\frac{1}{2}$, solutions are in the 2nd and 3rd quadrants.

$\theta=180^\circ-60^\circ=120^\circ$ and $\theta=180^\circ+60^\circ=240^\circ$

There are no real solutions for $\cos\theta=2$.

The solutions are 120° and 240°.

7)

$2\sin^2\theta-\sin\theta-1=0$

$(2\sin\theta+1)(\sin\theta-1)=0$

$\sin\theta=-\frac{1}{2}$ or 1

For $\sin\theta=-\frac{1}{2}$, solutions are in the 3rd and 4th quadrants

$\theta=180^\circ+30^\circ=210^\circ$ and $\theta=360^\circ-30^\circ=330^\circ$

For $\sin\theta=1$, the only solution is $\theta=90^\circ$.

Solutions are 90°, 210° and 330°.

8)

$2\sin\theta\cos\theta-\sin\theta=0$

$\sin\theta(2\cos\theta-1)=0$

$\sin\theta=0$ or $\cos\theta=\frac{1}{2}$

For $\sin\theta=0$, $\theta=0^\circ, 180^\circ$ and 360°

For $\cos\theta=\frac{1}{2}$, solutions are in the 1st and 4th quadrants.

$\theta=60^\circ$ and $\theta=360^\circ-60^\circ=300^\circ$

The solutions are 0°, 60°, 180°, 300° and 360°.

9)

$\tan^2\theta-1=0$

$\tan^2\theta=1$

$\tan\theta=1$ or -1

For $\tan\theta=1$, solutions are in the 1st and 3rd quadrants

$\theta=45^\circ$ and $180^\circ+45^\circ=225^\circ$

For $\tan\theta=-1$, solutions are in the 2nd and 4th quadrants

$\theta=135^\circ$ and $360^\circ-45^\circ=315^\circ$

The solutions are 45°, 135°, 225° and 315°.

10)

$\cos^2\theta + \cos\theta = \sin^2\theta$

$\cos^2\theta + \cos\theta = 1 - \cos^2\theta$

$2\cos^2\theta + \cos\theta - 1 = 0$

$(2\cos\theta - 1)(\cos\theta + 1) = 0$

$\cos\theta = \frac{1}{2}$ or -1

For $\cos\theta = \frac{1}{2}$, solutions are in the 1st and 4th quadrants

$\theta = 60^\circ$ and 300°

For $\cos\theta = -1$, solution is $\theta = 180^\circ$.

The solutions are 60°, 180° and 300°.