Edexcel A level Mathematics Trigonometry

Section 1: Working with radians

Section test

1. Convert 50° to radians.

   (a) $\dfrac{5}{18}$ rads

   (b) $\dfrac{18}{5}$ rads

   (c) $\dfrac{18\pi}{5}$ rads

   (d) $\dfrac{5\pi}{18}$ rads

2. Convert $\dfrac{3\pi}{2}$ to degrees.

3. Convert $247°$ to radians, giving your answer to 3 s.f.

4. How many degrees are equivalent to 1.6 radians? Give your answer correct to 3 significant figures.

5. What is the value of $\cos\dfrac{3\pi}{4}$?

   (a) $\dfrac{1}{\sqrt{2}}$

   (b) $-\dfrac{1}{\sqrt{2}}$

   (c) $\dfrac{\sqrt{3}}{2}$

   (d) $-\dfrac{\sqrt{3}}{2}$

6. What is the value of $\tan\dfrac{7\pi}{6}$?

   (a) $\dfrac{1}{\sqrt{3}}$

   (b) $-\dfrac{1}{\sqrt{3}}$

   (c) $\sqrt{3}$

   (d) $-\sqrt{3}$

7. Solve the equation $\sin\theta = 0.5$ for $0 \le \theta \le 2\pi$, giving your answers in terms of π.

8. Solve the equation $2\cos\theta = 0.2$ for $0 \le \theta \le 2\pi$.

9. Solve the equation $\tan\theta = \sqrt{3}$ for $-\pi \le \theta \le \pi$, giving your answers in terms of π.

10. Solve the equation $3\cos\theta = 2\sin^2\theta$ for $0 \le \theta \le 2\pi$, giving your answers in terms of π.

Edexcel A level Trigonometry 1 section test solutions

Solutions to section test

1. $50° = 50 \times \dfrac{\pi}{180} = \dfrac{5\pi}{18}$ radians.

2. $\dfrac{3\pi}{2}$ radians $= \dfrac{3\pi}{2} \times \dfrac{180}{\pi} = 270°$

3. $247° = 247 \times \dfrac{\pi}{180} = 4.31$ radians (3 s.f.)

4. 1.6 radians $= 1.6 \times \dfrac{180}{\pi} = \underline{91.7°}$ (3 s.f.)

5. $\dfrac{3\pi}{4}$ is in the second quadrant, where cos is negative.

    $\cos\dfrac{3\pi}{4} = -\cos\dfrac{\pi}{4} = -\dfrac{1}{\sqrt{2}}$

6. $\dfrac{7\pi}{6}$ is in the third quadrant, where tan is positive.

    $\tan\dfrac{7\pi}{6} = \tan\dfrac{\pi}{6} = \dfrac{1}{\sqrt{3}}$

7. $\sin\theta = 0.5$
    The solutions are in the 1st and 2nd quadrants.
    $\theta = \dfrac{\pi}{6}$ and $\theta = \pi - \dfrac{\pi}{6} = \dfrac{5\pi}{6}$
    The solutions are $\dfrac{\pi}{6}$ and $\dfrac{5\pi}{6}$

8. $2\cos\theta = 0.2$

    $\cos\theta = 0.1$
    The solutions are in the 1st and 4th quadrants.
    $\theta = 1.47$ rads and $\theta = 2\pi - 1.47 = 4.81$ rads
    The solutions are 1.47 rads and 4.81 rads.

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9. $\tan\theta = \sqrt{3}$

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

    $\theta = \dfrac{\pi}{3}$ and $\theta = \dfrac{\pi}{3} - \pi = -\dfrac{2\pi}{3}$

    The solutions are $\dfrac{\pi}{3}$ and $-\dfrac{2\pi}{3}$.

10. $3\cos\theta = 2\sin^2\theta$

    $3\cos\theta = 2(1 - \cos^2\theta)$

    $3\cos\theta = 2 - 2\cos^2\theta$

    $2\cos^2\theta + 3\cos\theta - 2 = 0$

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

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

    There are no real solutions to $\cos\theta = -2$

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

    $x = \dfrac{\pi}{3}$ and $\dfrac{5\pi}{3}$