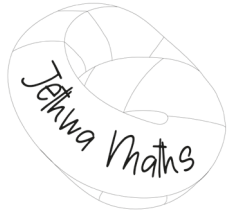


# A-Level Starter Activity



**Topic: Angles in All 4 Quadrants**

Chapter Reference: Pure 1, Chapter 10

**8  
minutes**

1. Solve  $\sin(x + 10) = \frac{\sqrt{3}}{2}$ , for  $0 \leq x \leq 180$

(3)

---

---

---

---

---

---

---

---

2. Solve  $\cos 2x = -0.9$ , for  $0 \leq x \leq 180$ , giving your answers to 1 decimal place.

(3)

---

---

---

---

---

---

---

---

3. Find all the values of  $x$ , to one decimal places, in the interval  $0 \leq x \leq 360$  for which  $\tan^2 x = 4$

(3)

---

---

---

---

---

---

---

---

## Solutions

1.

$\sin(x + 10) = \frac{\sqrt{3}}{2}$ $x + 10 = \sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$	<b>M1</b>
$x + 10 = 60$ $x = 50^\circ$	<b>M1</b>
$x + 10 = 180 - 60$ $x = 110^\circ$	<b>M1</b>

2.

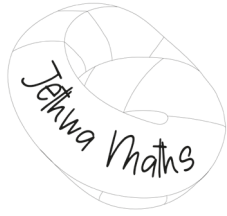
$2x = \cos^{-1}(-0.9)$	<b>M1</b>
$2x = 154.2^\circ$ $x = 77.1^\circ$	<b>M1</b>
$2x = 360 - 154.2$ $x = 102.9^\circ$	<b>M1</b>

3.

$\tan^2 x = 4$ $\tan x = \pm 2$	<b>M1</b>
$x = \tan^{-1}(2)$ $x = 63.4^\circ,$ $x = 180 + 63.4 = 243.4^\circ$	<b>M1</b>
$x = \tan^{-1}(-2)$ $x = -63.4^\circ,$ $x = 180 + -63.4 = 116.6^\circ$ $x = 360 + -63.4 = 296.6^\circ$	<b>M1</b>



# A-Level Starter Activity



**Topic: Solving Harder Trig Equations**

Chapter Reference: Pure 1, Chapter 9

**10  
minutes**

1. Solve,  $4\cos^2x + 7\sin x - 2 = 0$ , for  $0 \leq x < 360$ , giving your answers to 1 d.p.

(6)

---

---

---

---

---

---

2. Solve for  $\cos(x - 20) = -0.437$  for  $0 \leq x < 360$ , giving your answers to the nearest degree.

(5)

---

---

---

---

---

---

---

---

---

---

## Solutions

1.

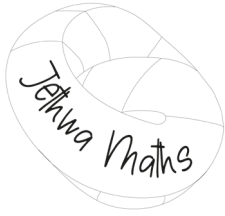
$4 \cos^2 x + 7 \sin x - 2 = 0$ $4(1 - \sin^2 x) + 7 \sin x - 2 = 0$	<b>M1</b>
$4 - 4\sin^2 x + 7 \sin x - 2 = 0$ $4 \sin^2 x + 7 \sin x - 2 = 0$	<b>M1</b>
Let $y = \sin x$ $4y^2 - 7y - 2 = 0$	<b>M1</b>
$\sin y = 2$ $\sin y = -\frac{1}{4}$	<b>M1</b>
$y = -14.47$ $y = 180 - (-14.477) = 194.5^\circ$	<b>M1</b>
$y = 360 + (-14.47) = 345.5^\circ$	<b>M1</b>

2.

Let $y = \sin x$ $5y^2 + 3y - 2 = 0$ $(5y - 2)(y + 1) = 0$	<b>M1</b>
$y = \frac{2}{5}$ $y = -1$	<b>M1</b>
$\sin x = 2.5$ $x = 23.6^\circ$	<b>M1</b>
$\sin x = -1$ $x = 270$	<b>M1</b>
$x = 180 - 23.6 = 156.4^\circ$	<b>M1</b>



# A-Level Starter Activity



**Topic: Solving Harder Trig Equations**

Chapter Reference: Pure 1, Chapter 9

**6  
minutes**

1. Show that the equation  $5 \cos^2 x = 3(1 + \sin x)$  can be written as  $5 \sin^2 x + 3 \sin x - 2 = 0$  (2)

---

---

---

---

---

---

---

---

2. Hence, solve the equation for  $0 \leq x < 360$ , giving your answers to 1 d.p. (5)

---

---

---

---

---

---

---

---

---

---

---

---

## Solutions

1.

$5 \cos^2 x = 3(1 + \sin x)$ $5(1 - \sin^2 x) = 3 + 3 \sin x$	<b>M1</b>
$5 - 5 \sin^2 x = 3 + 3 \sin x$ $5 \sin^2 x + 3 \sin x - 2 = 0$	<b>M1</b>

2.

Let $y = \sin x$ $5y^2 + 3y - 2 = 0$ $(5y - 2)(y + 1) = 0$	<b>M1</b>
$y = \frac{2}{5}$ $y = -1$	<b>M1</b>
$\sin x = 2.5$ $x = 23.6^\circ$	<b>M1</b>
$\sin x = -1$ $x = 270$	<b>M1</b>
$x = 180 - 23.6 = 156.4^\circ$	<b>M1</b>





## Solutions

1.

$D(65) = 5 + 2 \sin(195)$	<b>M1</b>
$= 4.48\text{m}$	<b>M1</b>

2.

$3.8 = 5 + 2 \sin 30t$	<b>M1</b>
$30t = \sin^{-1}(-0.6)$	<b>M1</b>
$t = -36.9$ $t = 360 - 36.9 = 323.1$ $t = 190 + 36.9 = 216.9$	<b>M1</b>
As $t$ cannot be negative and must be greater than 8.5, $t = \frac{323.1}{30} = 10.77$ $= 10.46 \text{ am}$	<b>M1</b>

