

4. BASIC TRIGONOMETRY

4.1 RADIAN MEASURE

(a) 270°

(b) 150°

(c) $\frac{11\pi}{6}$

4.2 EXACT VALUES

(a) $\cos(150) = -\cos(30)$
 $= -\frac{\sqrt{3}}{2}$

\checkmark S	A
T	C

(b) $\sin(315) = -\sin(45)$
 $= -\frac{1}{\sqrt{2}}$

S	A
T	C \checkmark

(c) $\tan(240) = +\tan(60)$
 $= \sqrt{3}$

S	A
\checkmark T	C

4.3 MULTIPLE ANGLE EQUATIONS

(a) $\cos 4x = \frac{1}{3}$

RA = 70.53°

S	A \checkmark
T	C \checkmark

$4x = 70.53^\circ, 289.47^\circ$

$x = 17.63^\circ, 72.37^\circ$

$107.63^\circ, 162.37^\circ$

$197.63^\circ, 252.37^\circ$

$287.63^\circ, 342.37^\circ$

period = 90°

$$(b) \quad \sin(3x) = -\frac{3}{5}$$

$$RA = 36.87^\circ$$

S	A
✓T	C ✓

$$3x = 216.87^\circ, 323.13^\circ$$

$$x = 72.29^\circ, 107.71^\circ$$

$$192.29^\circ, 227.71^\circ$$

$$312.29^\circ, 347.71^\circ$$

period 120°

$$x = 1.26^\circ, 1.88^\circ$$

$$3.36^\circ, 3.97^\circ$$

$$\underline{\underline{5.45^\circ, 6.07^\circ}}$$

$$(c) \quad \cos(2x) = \frac{3}{7}$$

$$RA = 64.62^\circ$$

S	A ✓
T	C /

$$2x = 64.62^\circ, 295.38^\circ$$

$$x = 32.31^\circ, 147.69^\circ$$

$$\underline{\underline{212.31^\circ, 327.69^\circ}}$$

period = 180

4.4 COMPOUND ANGLE EQUATIONS

$$(a) \quad RA = 70.53^\circ$$

S	A ✓
T	C ✓

$$x - 50 = 70.53^\circ, 289.47^\circ$$

$$x = \underline{\underline{120.53^\circ, 339.47^\circ}}$$

$$(b) \quad \sin(3x - 90) = -\frac{2}{5}$$

$$RA = 23.58^\circ$$

S	A
√T	C ✓

$$3x - 90 = 203.58^\circ, 336.32^\circ$$

$$3x = 293.58^\circ, 426.32^\circ$$

$$x = 97.86^\circ, 142.11^\circ$$

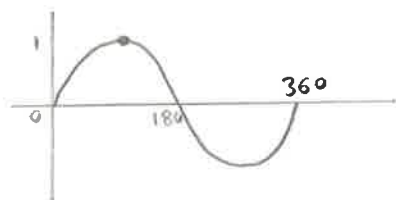
$$217.86^\circ, 262.11^\circ$$

$$337.86^\circ, \frac{382.11}{-360}$$

$$\underline{\underline{22.11^\circ}}$$

period = 120°

$$(c) \quad \sin\left(3x - \frac{4\pi}{3}\right) = 1$$



$$3x - 240 = 90$$

$$3x = 330^\circ$$

$$x = 110^\circ$$

$$= \underline{\underline{1.92^\circ}}$$

4.5 QUADRATIC TRIG EQUATIONS

$$(a) \quad \cos^2 x = \frac{1}{2}$$

$$\cos x = \pm \sqrt{\frac{1}{2}}$$

$$= \pm \frac{1}{\sqrt{2}}$$

$$RA = 45^\circ$$

√S	A ✓
√T	C ✓

$$\underline{\underline{x = 45^\circ, 135^\circ, 225^\circ, 315^\circ}}$$

$$\begin{aligned} \text{(b)} \quad \sin^2(x) &= \frac{3}{4} \\ \sin x &= \pm \sqrt{\frac{3}{4}} \\ &= \pm \frac{\sqrt{3}}{2} \end{aligned}$$

$$RA = 60^\circ$$

✓ S ✓	A ✓
T ✓	C ✓

$$\underline{\underline{x = 60^\circ, 120^\circ, 240^\circ, 300^\circ}}$$

$$\text{(c)} \quad 3\cos^2 x + 2\cos x - 1 = 0$$

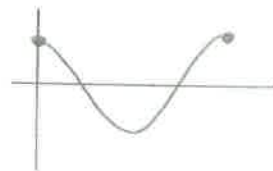
$$(3\cos x - 1)(\cos x + 1) = 0$$

$$\cos x = \frac{1}{3}$$

$$RA = 70.53$$

S	A ✓
T	C ✓

$$\cos x = -1$$



$$x = 0^\circ, \cancel{360^\circ}$$

$$x = 70.53^\circ, 289.47^\circ$$

$$\underline{\underline{x = 0^\circ, 1.23^\circ, 5.05^\circ}}$$