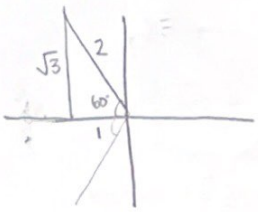
| S | A |
|---|---|
| T | C |

MCR 3U

**U3L4 Trig Equations Handout** MCR3U

1. Solve for $\theta$, if $0º \le \theta \le 360º$. **(NO CALCULATORS!)**

a) $\cos\theta = -\frac{1}{2}$ x r in Q2 or 3



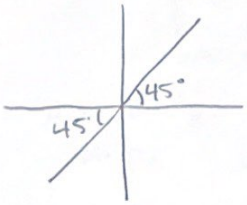

$\theta_1 = 120°$

$\theta_2 = 240°$

b) $2\tan\theta = 2$ in Q1 or 3

$\tan\theta = 1$

$\theta = 45°$




$\theta_1 = 45°$

$\theta_2 = 225°$

c) $\sqrt{2}\sin\theta - 1 = 0$

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

$\theta = 45°$ in Q1 or Q2

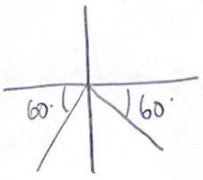
$\theta_1 = 45°$

$\theta_2 = 135°$

d) $2\sin\theta = -\sqrt{3}$

$\sin\theta = -\frac{\sqrt{3}}{2}$

$\theta = 60°$ in Q3 or Q4



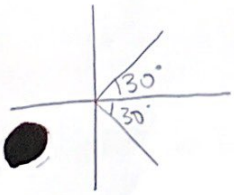

$\theta_1 = 240°$

$\theta_2 = 300°$

e) $2\cos\theta = \sqrt{3}$

$\cos\theta = \frac{\sqrt{3}}{2}$

$\theta = 30°$ in Q1 or Q4




$\theta_1 = 30°$

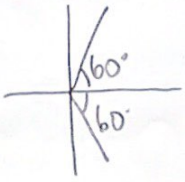
$\theta_2 = 330°$

f) $\cos\theta - 1 = -\cos\theta$

$2\cos\theta = 1$

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

$\theta = 60°$ in Q1 or Q4




$\theta_1 = 60°$

$\theta_2 = 300°$

S | A
T | C

**MCR 3U**

g) $3\sin\theta = \sin\theta + 1$

$2\sin\theta = 1$

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

$\theta = 30°$ in Q1 or Q2

$\theta_1 = 30°$

$\theta_2 = 150°$

h) $5\cos\theta + \sqrt{3} = 3\cos\theta$

$2\cos\theta = -\sqrt{3}$

$\cos\theta = -\frac{\sqrt{3}}{2}$

$\theta = 30°$ in Q2 or Q3

$\theta_1 = 150°$

$\theta_2 = 210°$

i) $4\sin\theta + 1 = 2\sin\theta$

$2\sin\theta = -1$

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

$\theta = 30°$ in Q3 or Q4

$\theta_1 = 210°$

$\theta_2 = 330°$

j) $3\sec\theta = -6$

$\sec\theta = -\frac{6}{3}$

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

$\theta = 60°$ in Q2 & Q3

$\theta_1 = 120°$

$\theta_2 = 240°$

**EXTRA CHALLENGE**

k) $\csc^2\theta + \csc\theta = 2$

recall: $x^2 + x - 2 = 0$

$(x+2)(x-1) = 0$

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

$\csc\theta = -2$

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

$\theta = 30°$ in Q3 or Q4

$\theta_1 = 210°$

$\theta_2 = 330°$

$\csc\theta = 1$

$\sin\theta = \frac{+y}{r}$

$\theta_3 = 90°$

l) $\sec\theta\tan\theta - 2\tan\theta + \sec\theta - 2 = 0$

$\tan\theta(\sec\theta - 2) + 1(\sec\theta - 2) = 0$

$(\sec\theta - 2)(\tan\theta + 1) = 0$

$\sec\theta = 2$

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

$\theta = 60°$ in Q1 & 4

$\tan\theta = -1$

$\theta = 45°$ in Q2 or 4

$\theta_1 = 60°$

$\theta_2 = 300°$

$\theta_3 = 135°$

$\theta_4 = 315°$

l) a) 120°, 240° b) 45°, 225° c) 45°, 135° d) 240°, 300° e) 30°, 330° f) 60°, 300° g) 30°, 150° h) 150°, 210° i) 210°, 330° j) 120°, 240° k) 90°, 210°, 330° l) 60°, 135°, 300°, 315°

Pg. 299 2) b) $r = \sqrt{73}$ $\sin\theta = \frac{3\sqrt{73}}{73}$ $\cos\theta = -\frac{8\sqrt{73}}{73}$ $\tan\theta = -\frac{3}{8}$ c) $r = \sqrt{89}$ $\sin\theta = -\frac{8\sqrt{89}}{89}$ $\cos\theta = -\frac{5\sqrt{89}}{89}$ $\tan\theta = \frac{8}{5}$