

Solutions to Quizz II

Math1060-02

**Problem 1.** (4 points) Find all the solutions of the equations:

(a)  $2 \cos x + 1 = 0$

Two possible solutions in one period are  $\pm \frac{2\pi}{3}$  so all the solutions are  $x = \pm \frac{2\pi}{3} + 2k\pi$ , where  $k$  is an integer.

(b)  $\tan 3x = 1$

We have that  $3x = \frac{\pi}{4} + k\pi$  so that  $x = \frac{\pi}{12} + \frac{k\pi}{3}$ , where  $k$  is an integer.

**Problem 2.** (4 points) Find the exact value of :

(a)  $\cos 15^\circ = \cos(45 - 30) = \cos 45^\circ \cos 30^\circ + \sin 45^\circ \sin 30^\circ = \frac{\sqrt{2}}{2}(\frac{\sqrt{3}}{2} - \frac{1}{2})$ .

(b)  $\cos 15^\circ \cos 60^\circ + \sin 15^\circ \sin 60^\circ = \cos(60^\circ - 15^\circ) = \cos 45^\circ = \frac{\sqrt{2}}{2}$

**Problem 3.** (4 points) Find the exact value of the trigonometric function given that  $\sin u = \frac{5}{13}$ ,  $\cos v = -\frac{3}{5}$  and both  $u$  and  $v$  are in *Quadrant II*. In this case we have that  $\cos u = -\frac{12}{13}$  and  $\sin v = \frac{4}{5}$  so we have that

$$\sin(u + v) = \sin u \cos v + \sin v \cos u = -\frac{5}{13} \frac{3}{5} - \frac{4}{5} \frac{12}{13} = -\frac{63}{65}$$