MATH141 - Worksheet
TRIGONOMETRY

This worksheet is to be used in conjunction with pages 1-26 to 1-29 in 'Notes for Mathematics 1C Part 1'.

1. In which of the four quadrants is:
   (a) $\sin\theta < 0$ (b) $\cos\theta > 0$ (c) $\tan\theta > 0$
   (d) $\tan\theta > 0$ and $\sin\theta > 0$ (e) $\cos\theta > 0$ and $\tan\theta < 0$ (f) $\cos\theta < 0$ and $\sin\theta < 0$
   (g) $\sin\theta < 0$ and $\tan\theta > 0$ (h) $\cos\theta > 0$ and $\sin\theta > 0$

2. State the quadrant in which each of the following angles lie:
   (a) $\frac{\pi}{3}$ (b) $\frac{3\pi}{4}$ (c) $\frac{4\pi}{3}$ (d) $\frac{5\pi}{6}$
   (e) $\frac{11\pi}{12}$ (f) $\frac{13\pi}{6}$ (g) $\frac{7\pi}{8}$ (h) $\frac{\pi}{12}$

3. If $\cos A = c$, express in terms of c:
   (a) $\sec A$ (b) $\cos(-A)$ (c) $\cos(\pi - A)$ (d) $\cos(2\pi + A)$
   (e) $\cos(\pi + A)$ (f) $\cos(2\pi - A)$

4. Find an exact value for each ratio:
   (a) $\tan\pi$ (b) $\sin\frac{3\pi}{2}$ (c) $\cos\frac{\pi}{4}$ (d) $\sin\frac{\pi}{6}$
   (e) $\cos\frac{2\pi}{3}$ (f) $\tan\frac{5\pi}{4}$ (g) $\sin\pi$ (h) $\sin\frac{\pi}{2}$
   (i) $\tan\frac{3\pi}{4}$ (j) $\sin\frac{2\pi}{3}$ (k) $\cos\frac{5\pi}{3}$ (l) $\sin\frac{4\pi}{3}$
   (m) $\sin\frac{5\pi}{6}$ (n) $\cos\frac{5\pi}{4}$ (o) $\tan\frac{4\pi}{3}$ (p) $\cos\left(-\frac{4\pi}{3}\right)$

5. If $0 \le x \le 2\pi$, find all the values of x which satisfy each of the following equations:
   (a) $\sin x = \frac{1}{2}$ (b) $\cos x = \frac{1}{\sqrt{2}}$ (c) $\tan x = \sqrt{3}$ (d) $2\cos x = -1$
   (e) $\tan^2 x = 1$ (f) $2\cos x = \sqrt{3}$ (g) $\sin^2 x = \frac{1}{2}$ (h) $\sqrt{3}\tan x = 1$
   (i) $\cos^2 x - \frac{1}{4} = 0$ (j) $(2\sin x + 4)(2\sin x - 1) = 0$ (k) $\sin x + \sqrt{3}\cos x = 0$

6. Find the ratio required, in surd form, given angle A is acute:
   (a) $\sin A = \frac{3}{5}$, find $\cos A$ (b) $\tan A = \frac{4}{5}$, find $\sin A$
   (c) $\cos A = \frac{3}{4}$, find $\tan A$ (d) $\sin A = 0.7$, find $\cos A$

7. (i) If $\cos\theta = \frac{1}{3}$ and $0 < \theta < \frac{\pi}{2}$, find the value of (a) $\sin\theta$ (b) $\tan\theta$.
   (ii) If $\tan\theta = \frac{7}{24}$ and $\pi < \theta < \frac{3\pi}{2}$, find the value of (a) $\sin\theta$ (b) $\cos\theta$.
   (iii) If $\tan\theta = -\frac{4}{3}$ and $\frac{\pi}{2} < \theta < \pi$, find the value of (a) $\cot\theta$ (b) $\sin\theta$ (c) $\cos\theta$.

You should also be familiar with the graphs of each of the trigonometric functions. See pages 1-29 to 1-30 in 'Notes for Mathematics 1C Part 1'.