MAS051 — Example Sheet 7

To be handed in: Friday, November 8, 2002

Remember to give your Tutorial Group, along with your name, on the assignment. Only the *asterisked* (starred) questions will be marked.

1. Express the following angles in radians (in terms of π; e.g. $180^\circ = \pi$):

(a) 360° (c) 30° (e)* 300° (g) 405°

(b) 90° (d)* 40° (f)* 135° (h)* -60°

2. Express the following angles in degrees, working to 2 decimal places where exact answers are not possible:

(a) $\frac{\pi}{2}$ (c) $\frac{2\pi}{5}$ (e)* $\frac{7\pi}{3}$ (g) 0.3

(b)* $\frac{\pi}{5}$ (d)* $\frac{9\pi}{8}$ (f) $-\frac{\pi}{4}$ (h)* -3.1

3. Use trigonometric identities to simplify the following:

(a) $\cos\theta \tan\theta$ (c) $\frac{(1-\sin^2\theta)}{\sin\theta}$ (e) $\frac{\sin(\theta+2\pi)}{\cos(-\theta)}$

(b)* $\frac{(1-\sin^2\theta)}{\cos\theta}$ (d)* $\frac{\sin(\pi-\theta)}{\cos(\pi-\theta)}$ (f)* $\frac{\cos(\frac{\pi}{2}-\theta)}{\sin(\frac{\pi}{2}-\theta)}$

4. Expand the following (do not use a calculator or convert to decimals).

(a)* $\cos(\frac{2\pi}{3})$; (d) $\sin(x-\frac{\pi}{6})$; (g) $\tan(\frac{\pi}{4}+\frac{\pi}{6})$;

(b)* $\cos(x+\frac{2\pi}{3})$; (e)* $\sin(\frac{\pi}{3}+\frac{\pi}{4})$; (h) $\tan(x+\frac{\pi}{3})$;

(c) $\cos(x-\frac{\pi}{6})$; (f)* $\sin(x-\frac{\pi}{4})$; (i)* $\tan(x-\frac{\pi}{6})$.

5. A triangle has sides of length a, b and c, opposite angles A, B and C respectively. C is a right angle $(\frac{\pi}{2})$. Solve the triangle in each of the following cases, giving answers correct to 2 decimal places. (I.e. Provide the missing lengths and/or angles in each case. All angles are given in radians.)

(a) $c = 5,\ A = 0.3$ (b) $a = 2,\ b = 3$ (c) $a = 3,\ B = 0.4$

(d)$*$ $c = 10.3,\ A = 1.1$ (e)$*$ $b = 7,\ c = 12$ (f)$*$ $a = 4,\ A = 0.7$

6. A triangle has sides of length a, b and c, opposite the angles A, B and C respectively. Solve the triangle in each of the following cases, using the sine and cosine rules as appropriate. (I.e. Provide the missing lengths and/or angles in each case. All angles are given in radians.) Give all answers correct to 2 decimal places.

(a) $a = 4.8,\ b = 6.3,\ A = 0.56$ (b)$*$ $a = 4.2,\ A = 0.7,\ B = 0.35$

(c)$*$ $a = 3,\ b = 4.6,\ c = 5.7$ (d) $b = 6.3,\ c = 5,\ A = 0.81$

(e)$*$ $a = 10.3,\ b = 4.9,\ A = 0.52$ (f) $a = 4,\ b = 5.8,\ c = 7.7$