School of Mathematics
MATH 0111
Elementary Differential Calculus

Examples 4 – Trigonometric Functions

These examples count towards the assessment of the module and should be handed in on Monday 3rd November. Do not use a calculator.


1. (a) Convert to radians: $240^\circ$, $18^\circ$, $720^\circ$. (b) Convert to degrees: $\pi/12$, $4\pi/5$, $9\pi/4$.

2. In each of the following questions, the triangle ABC is a right-angled triangle (drawn below, but not to scale) with the right angle at B. Given the information provided, find all the missing sides and angles. You need not use a calculator: leave expressions like $\sin 50^\circ$ in your answer.
   (a) angle $A = 35^\circ$ and $AC = 13\text{cm}$; (b) angle $A = 3\pi/8$ and $BC = 5\text{cm}$.

3. Find all solutions for $\theta$ in the given range:
   (a) $\cos \theta = \sqrt{3}/2$, $0 \leq \theta \leq 4\pi$;
   (b) $\sin \theta = -\frac{1}{2}$, $-\pi \leq \theta \leq \pi$; (c) $\tan \theta = -1$, $0 \leq \theta \leq 2\pi$.

See overleaf for practice examples . . .
PRACTICE EXERCISES, NOT TO BE HANDED IN

1. (a) Convert to radians: $120^\circ, 225^\circ, 330^\circ$. (b) Convert to degrees: $\pi/8, 3\pi/4, 5\pi/3$.

2. In each of the following questions, the triangle ABC is a right-angled triangle (drawn below, but not to scale) with the right angle at B. Given the information provided, find all the missing sides and angles. You need not use a calculator: leave expressions like $\sin 50^\circ$ in your answer.
   
   (a) angle $A = 50^\circ$ and $AC = 11$ cm;  
   (b) angle $A = \pi/8$ and $BC = 3$ cm.

3. Find all solutions for $\theta$ in the given range:
   
   (a) $\sin \theta = \sqrt{3}/2, 0 \leq \theta \leq 3\pi$;
   (b) $\cos \theta = 1, -\pi \leq \theta \leq \pi$;
   (c) $\tan \theta = -1/\sqrt{3}, -\pi \leq \theta \leq 2\pi$. 

---

A

B

C