Perth Academy **National 5 Applications** **Homework 8**

1. Do these without a calculator. Show all working.

(a) $1\frac{1}{2}+2\frac{1}{3}$ (b) $3\frac{1}{5}-2\frac{3}{4}$ (c) $0\cdot5+0\cdot4\times2$

(d) $1-(0\cdot6)^2$ (e) 2^3+3^2 (f) $\frac{1}{2}\times\frac{3}{4}\times2$

2. Evaluate, without a calculator,

(a) $6\cdot2-\ 4\cdot53-1\cdot1$ (b) $\frac{2}{5}$ of $3\frac{1}{2}+\frac{4}{5}$

3. Simplify $\frac{3}{m}+\frac{4}{m+1}$. $m\neq0,\ -1.$

4. Sketch the graphs of the following functions:

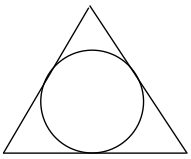
(a) $y=5\cos12t^\circ$ $(0\leq t\leq30)$ (b) $y=10+5\cos12t^\circ$ $(0\leq t\leq30)$

(c) $y=10\sin6x^\circ$ $(0\leq x\leq60)$ (d) $y=10\sin6x^\circ-10$ $(0\leq x\leq60)$

5. A ship leaves port P and steams for 50km on a bearing of 060°. It then changes course and steams on a bearing of 130° for 80km, reaching port R.

(a) Calculate the direct distance from port P to port R.
(b) Calculate the bearing of P from R.

6. The diagram shows a circle of radius 8cm inscribed in an equilateral triangle.
Calculate the perimeter of the triangle.

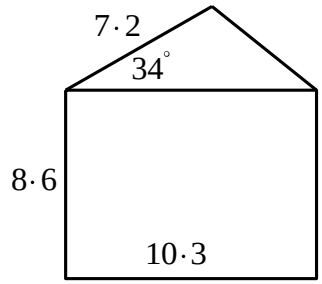


7. On a £500 holiday a company offers an easy payment scheme.
£100 is repaid on the 15th of each month.
Interest is charged at a rate of $2\cdot5\%$ per month on the amount outstanding at the end of each month.
The first payment is to be made in May.
Find the amount outstanding at the beginning of August.

8. Solve, for $0\leq x\leq360$:

(a) $3\cos x^\circ=-2$ (b) $\tan x^\circ=1+\sin39^\circ$

9. Find the area of the figure sketched below. The units are cm.



10. A rectangular piece of plastic measuring 100cm by 18 cm is folded to make a gutter, as shown below.

(a) Express w in terms of x and show that the volume, V cubic centimetres, of the gutter is given by $V = 1800x - 200x^2$.

(b) Find, algebraically, the dimensions for a maximum volume, and also the maximum volume.

11. A fishing boat leaver port P and sails 20km in the direction 057°. It then changes course and sails due west until it is due north of port P.

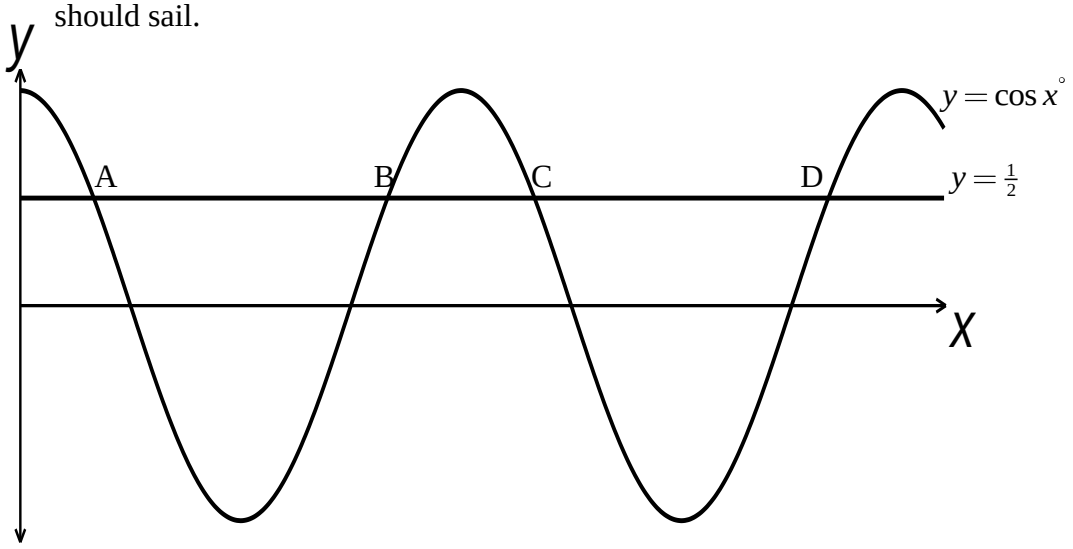
(a) How far north of port P is the fishing boat?

The boat now sails 15km in the direction 320° to another port Q.

(b) Calculate the direct distance between the ports P and Q.

(c) If the fishing boat wishes to return to port P calculate the bearing of the course on which it should sail.

12.



The diagram above shows the graph of the curve $y = \cos x^\circ$ and the straight line $y = \frac{1}{2}$.
Find, algebraically, the coordinates of points A, B, C and D, where the line and curve intersect.