

MATHFS541/0C1/1C1 TAKE HOME COURSEWORK 2

This homework is to be handed in by **Friday 2nd December** 2011, to the Foundation Year room C5 between 12.00 and 1.00 for 0C1 students and to the Reception (by the front doors) in the Alan Turing Building by 4.00 for 1C1 students.

Submit your answers on A4 paper printing your full name and course (0C1 or 1C1) clearly at the head of each page. This homework will be marked and returned to you. The mark awarded will contribute towards the end of semester examination in January 2012. For details of the marking regime see the *MATHFS541 0C1/1C1 Course Notes* on these web pages.

In answering these questions you should show your working. The use of calculators in this test (and the January exam) is prohibited.

1. Solve the following. (Find *all* solutions.)

(i) $x^2 + 3x - 18 = 0$

(ii) $2x^2 - x - 2 = 0$

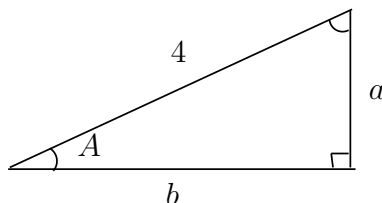
(iii) $\frac{x-5}{3} + \frac{x+1}{5} = -2$

(iv) $\frac{2}{x+3} + \frac{1}{12-2x} = \frac{1}{2}$

(v) $\frac{x-1}{3-x} = \frac{x}{x+3}$

(vi) $9^x - 10(3^x) + 9 = 0$

2. The right angled triangle below has hypotenuse of length 4 and $\sin(A) = 1/3$.



Find: (i) a (ii) $\cos(A)$ (iii) b (iv) $\cos(2A)$.

3. Let \mathcal{E} be the line $y = 3x + 2$.

(i) Is the point $(-3, -4)$ on the line \mathcal{E} ?

(ii) At what point (x, y) does \mathcal{E} intersect the line $y = -2x + 7$?

(iii) Write down the equation of the line through the point $(3, 3)$ which is parallel to \mathcal{E} .

(iv) Write down the equation of the line through the point $(3, 3)$ which is normal (i.e. perpendicular) to \mathcal{E} .

(v) Write down the equation of the line through the points $(-1, 2)$ and $(3, 6)$.