# Another 0C1/1C1 Practice 2nd In-Class Test, 2013

ID Number ..... NAME .....

Answer all 7 questions in the spaces provided
The test lasts 35 minutes
**THE USE OF ANY ELECTRONIC DEVICE DURING THIS TEST IS PROHIBITED**

**1.** Find all solutions to the equation $3x^2 + x - 10 = 0$

**2.** Find all solutions to the equation $\dfrac{2}{x-2} + \dfrac{1}{2x-7} = \dfrac{2}{x-3}$

**3.** A right angled triangle has hypothenuse of length $h$ and an angle $A$ with $\sin(A) = 3/7$. Find the length of the side opposite to the angle $A$.

**4.** Find $\cos(A)$ for the triangle in question 3 above.

**5.** Find the point of intersection of the lines $y = 4x - 11$ and $y = -2x + 7$.

**6.** Find the equation of the line through the points $(-1, -4)$ and $(2, 17)$.

**7.** Find the equation of the line through the point $(3, 2)$ which is parallel to the line $y = 4 - 2x$.

# Practice 2nd In-Class Test Solutions

1. Using the formula the solutions are
$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-1 \pm \sqrt{(-1)^2 - 4 \times (3)(-10)}}{6} = \frac{-1 \pm \sqrt{121}}{6} = -2, (5/3).$$

2.
$$\begin{aligned} \frac{2}{x-2} + \frac{1}{2x-7} = \frac{2}{x-3} \quad &\iff \quad 2(x-3)(2x-7) + (x-3)(x-2) = 2(x-2)(2x-7) \\ &\quad \text{(multiply both sides by } (x-3)(x-2)(2x-7)) \\ &\iff \quad 4x^2 - 26x + 42 + x^2 - 5x + 6 = 4x^2 - 22x + 28 \\ &\iff \quad x^2 - 9x + 20 = 0 \\ &\iff \quad (x-5)(x-4) = 0 \\ &\iff \quad x = 5, 4. \end{aligned}$$

3. $\frac{3}{7} = \sin(A) = \frac{\text{Opposite}}{\text{Hypothenuse}}$, so the length of the opposite side is $3h/7$.

4. $\cos^2(A) = 1 - \sin^2(A) = 1 - (3/7)^2 = 40/49$ so $\cos(A) = \sqrt{40/49} = 2\sqrt{10}/7$. Notice we take the positive square root since $0 \leq A \leq \pi/2$.

5. At the point $(x, y)$ at which the lines $y = 4x - 11$ and $y = -2x + 7$ cross both these equations must hold. Hence $4x - 11 = -2x + 7$, i.e. $x = 3$ and substituting this value for $x$ gives $y = 4 \times 3 - 11 = 1$. So the point of intersection is $(3, 1)$.

6. If the line $y = mx + c$ goes through the points $(-1, -4)$ and $(2, 17)$ we must have $-4 = -m + c$ and $17 = 2m + c$. Subtracting the first of these from the second gives $21 = 3m$ so $m = 7$ and then substituting this value of $m$ into the first equation gives $-4 = -1(7) + c$ so $c = 3$. Thus the required line is $y = 7x + 3$.

7. Since the gradient of the line $y = 4 - 2x$ is $-2$ if the parallel line is $y = mx + c$ we must have $m = -2$ (since it has the same gradient). Also if this line is to pass through the point $(3, 2)$ we must have
$$2 = (-2) \times 3 + c = -6 + c(\text{ since } m = -2),$$
so $c = 8$ and the equation of the required parallel is $y = -2x + 8$.