Name: _____

Student number:_____

MAT 186
Quiz 2

1. Solve for x if

$$\frac{2x^3 + 3x^2 + x - 4}{2x - 3} \leq 2$$

I messed up on this one. The factoring for the numerator does not work.

There will be plenty more opportunities to demonstrate your knowledge on the attributes attached to this question, so we just used the question to see if we could find a few marks for (a) showing attempts at factoring and (b) knowing to bring the two sides together and then take a common denominator, rather than multiplying.

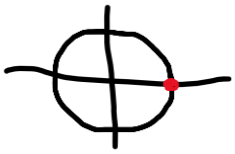
The marks for question 1 will not have a negative effect on anyone's grades.

2. Solve for all θ for which $\cos(2\theta) = 1$. **AB5**

There are two options here.

Method I: Solve for 2θ.

We can use the unit circle, with $x = 1$ because we are looking at cosine.



This gives us $2\theta = 2\pi k$.

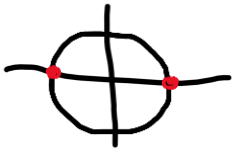
Dividing by two, we get our answer:

$$\theta = \pi k, k \in \mathbb{Z}$$

Method II: Double-angle formula.

The given equation becomes $2\cos^2\theta - 1 = 1$ (or we can use $1 - 2\sin^2\theta = 1$)

This simplifies to $\cos^2\theta = 1$, or $\cos\theta = \pm 1$.



Returning to the unit circle, we have all of the multiples of π, which is the same as the answer above.

Continued on back

AB1	AB3

3. Solve for x if $\log_5(3x+2) = 1 - \log_5(2x+1)$.

It's probably best to get the two logarithms together.

$$\log_5(3x+2) + \log_5(2x+1) = 1$$

$$\log_5(3x+2)(2x+1) = 1$$

$$(3x+2)(2x+1) = 5^1$$

$$6x^2 + 7x + 2 = 5$$

$$6x^2 + 7x - 3 = 0$$

$$(3x-1)(2x+3) = 0$$

$x = 1/3$ or $x = -3/2$ are the results, but the second one needs to be removed, as it leads to logarithms of negative numbers. So, $x = 1/3$ is the only solution.