Pre Course Questions: Non Calculator

1. Expand and simplify:

a. $3(a - b) - 4(a + b)$ (2marks)

b. $(2x - 4)(x - 3)$ (2marks)

c. $(2 - 4x)(x + 1)(5 - 2x)$ (3marks)

2. Factorise these expressions.

a. $x^2 - 9x + 20$ (2marks)

b. $2x^2 + 3x + 1$ (2marks)

3. Simplify these fractions

a) $\frac{2x^2 + x}{x}$ (1mark)

b) $\frac{x^2 + 3x + 2}{x + 2}$ (2marks)

4. Make x the subject of each formula.

a. $y = 3x - 4$ (2marks)

b. $3(x + y) = ax$ (3marks)

5. Find the value of the unknown in the formula.

a) $I = \frac{PTR}{100}, P = 160, T = 3, R = 5$; find I (2marks)

6. Solve these equations

a. $\frac{x}{2} = \frac{2x}{3} + 2$ (3marks)

b. $3(2x + 1) - 11(x - 2) = 0$ (3marks)

7. Solve these simultaneous equations,:

$$x + 3y = 23$$
$$2x - 4y = -24$$ (4marks)

8. Plot both equations below on a diagram. Use your diagram to solve the simultaneous equations, finding values for x and y.

A: $y = x^2 + 2$

B: $y = x + 4$ (3marks)

9. Solve by completing the square, giving your answers in surd form as appropriate:

a. $x^2 + 6x - 5 = 0$ (2marks)

b. $3x^2 - 12x + 10 = 0$ (3marks)

10.

a. Simplify $6\sqrt{2}$ x $5\sqrt{3}$ - $\sqrt{24}$ (3 marks)

b. Express $(2 - 3\sqrt{5})^2$ in the form $a + b\sqrt{5}$, where a and b are integers. (3 marks)

11. Find a, given that $a^3 = 64x^{12}y^3$

(2 marks)

12.

Given that $\sin\theta = \frac{\sqrt{3}}{4}$, find in surd form, one possible value of $\tan\theta$.

Hint: A right angled triangle may help.

(3 marks)

Total: 50 marks