

## 2021 Worksheet 10

### Year 13 Mathematics

Write the answers in your Exercise Book.

1. Sketch the graph of the polynomial shown below. Clearly show the **y-intercept**, **x-intercepts**, **turning points** and the **inflection point** on the  $x$ -axis.

$$y = x^3(x-1)^2(x-3)$$

2. Using the identity

$$\tan(A-B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

show that  $\tan 15^\circ = 2 - \sqrt{3}$  **(2 marks)**

4. Let  $\sqrt{3}\sin\theta - \cos\theta = R\sin(\theta - \alpha)$

- (a) Find the value of  $R$ . **(1 mark)**
- (b) Determine the value of  $\alpha$  using  $\sin(A-B) = \sin A \cos B - \cos A \sin B$  **(1 mark)**

5. Consider the function:

$$y = \sin 4\theta + 1$$

- (a) State the **amplitude** of this function. **(1/2 mark)**
- (b) What is the **period** of this graph? **(1 mark)**
- (c) Sketch the graph for  $0^\circ \leq \theta \leq 360^\circ$  **(2 marks)**