**Cubic polynomials**

1. Given a cubic polynomial, . If , , and , find the value of .
2. **Method 1**

 Let .

∴

∴

∴

**Method 2**

Let .

∴

**Method 3**

Let

Note that , , and

∴

1. Find a cubic polynomial whose graph has horizontal tangents at and .

**2. Method 1**

 Let the polynomial be

Since and are on ,

 Hence,

 Differentiate ,

Since has horizontal tangents at and ,

 ∴ The polynomial is

**Method 2**

 Let the polynomial be

 Note that is on and

 Now is on ,

 Differentiate ,

 Since has horizontal tangents at and ,

 Therefore,

 and

 Solving (3) and (4), and

 ∴ The polynomial is

**Method 3**

 Let the polynomial be

 Note that is on and

 Now is on ,

 Differentiate ,

Since has horizontal tangents at and ,

 Therefore,

 and

 ∴ The polynomial is

**Method 4**

 Let the polynomial be .

 Since has horizontal tangents at and and has turning points there,

 Since and are on ,

Hence,

 ∴ The polynomial is

**Yue Kwok Choy**

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