**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

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**20-12-2016**