

**Dr Oliver Mathematics**  
**Applied Mathematics: Partial Fractions**

The total number of marks available is 20.

You must write down all the stages in your working.

1. Express (3)

$$\frac{x^2 + 3}{x(1 + x^2)}$$

in partial fractions.

2. Express (4)

$$\frac{8}{x(x + 2)(x + 4)}$$

in partial fractions.

3. Express (4)

$$y = \frac{4x - 3}{x(x^2 + 3)}, \quad x \neq 0,$$

in partial fractions.

4. Express (3)

$$\frac{3x}{(x + 1)^2}$$

in partial fractions.

5. Express (3)

$$\frac{1}{x^2 + x}$$

in partial fractions, where  $x$  is neither 0 nor  $-1$ .

6. Express (3)

$$\frac{1}{1 - y^2}$$

in partial fractions.