

## Solutions

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Each answer shows the steps, then the **result**.

### 2.1

- $\mu = e^{\int 3 dx} = e^{3x}$

### 2.2

- $m^2 - m - 6 = 0$

### 3.1 B

- Auxiliary  $m^2 + 4 = 0 \Rightarrow m = \pm 2i$ , giving  $A \cos 2x + B \sin 2x$

### 3.2

- $\mu = e^{\int (1/x) dx} = e^{\ln x} = x$ ;  $\frac{d}{dx}(xy) = x^3$ ;  $xy = \frac{1}{4}x^4 + C$ ;  $y = 1$  at  $x = 1$ :  $1 = \frac{1}{4} + C \Rightarrow C = \frac{3}{4}$ ;  $y = \frac{1}{4}x^3 + \frac{3}{4x}$

### 3.3

- auxiliary  $m^2 - 3m + 2 = 0 \Rightarrow m = 1, 2$ , so CF =  $Ae^x + Be^{2x}$ ; try PI  $y = ax + b$ :  $-3a + 2(ax + b) = 4x \Rightarrow 2a = 4$ ,  $-3a + 2b = 0$ ;  $a = 2$ ,  $b = 3$ ; general solution  $y = Ae^x + Be^{2x} + 2x + 3$