

# Contents

<b>1</b>	<b>Section 10.1</b>	<b>1</b>
1.1	10.1.13 . . . . .	1
1.2	10.1.16 . . . . .	1
1.3	10.1.17 . . . . .	1
1.4	10.1.19 . . . . .	2
1.5	10.1.23 . . . . .	2
1.6	10.1.27 . . . . .	2
1.7	10.1.29 . . . . .	2

## 1 Section 10.1

### 1.1 10.1.13

Find the Laplace transform of the following function.

$$f(t) = t^5 - 8e^{8t}$$

$$\mathcal{L}\{f\}(s) = \frac{5!}{s^{5+1}} - \frac{8}{s-8}, \quad s > 8$$

### 1.2 10.1.16

Find the Laplace transform of the following function.

$$f(t) = \cos(8t) - \sin(8t)$$

$$F(s) = \frac{s}{s^2 + 8^2} - \frac{8}{s^2 + 8^2}$$

$$F(s) = \frac{s-8}{s^2 + 64}$$

### 1.3 10.1.17

Find the Laplace transform of the following function.

$$f(t) = \cos^2(5t)$$

$$f(t) = \cos^2(5t) = \frac{1 + \cos(10t)}{2}$$

$$F(s) = \frac{1}{2} \left( \frac{1}{s} + \frac{s}{s^2 + 100} \right), \quad s > 0$$

**1.4 10.1.19**

Find the Laplace transform of the following function.

$$f(t) = (3 + t)^2$$

$$f(t) = (3 + t)^2 = t^2 + 6t + 9$$

$$F(s) = \frac{2!}{s^3} + \frac{6}{s^2} + \frac{9}{s}$$

**1.5 10.1.23**

Use transforms to find the inverse Laplace transform of the following function.

$$F(s) = \frac{6}{s^2}$$

$$f(t) = 6t$$

**1.6 10.1.27**

Use transforms to find the inverse Laplace transform of the following function.

$$F(s) = \frac{19}{4s + 8}$$

$$F(s) = \frac{19}{4} \frac{1}{s + 2}$$

$$f(t) = \frac{19}{4} e^{-2t}$$

**1.7 10.1.29**

Use transforms to find the inverse Laplace transform of the following function.

$$F(s) = \frac{8 - 9s}{s^2 + 81}$$

$$F(s) = \frac{8}{s^2 + 81} - \frac{9s}{s^2 + 81}$$

$$f(t) = \frac{8}{9} \sin(9t) - 9 \cos(9t)$$