

EXERCISE 6B

#3, 4, 5bd, 6-8

3

$$y = x^2 + 5$$

$$P(x, y)$$

$$y = x^2 + 5$$

$$x^2 = 4$$

$$x = -2 \text{ or } 2$$

$$m = 2x$$

$$m_1 = \underline{-4}$$

$$m_2 = \underline{4}$$

4 a

$$y = x^2, x = 2, y = 4$$

$$m = 2x = 4$$

$$y - 4 = 4(x - 2)$$

$$y = \underline{4x - 4}$$

5 b

$$y = x^2 + 1, x = -2, y = 5$$

$$m = 2(-2) = -4$$

$$m_n = \frac{1}{4}$$

$$y - 5 = \frac{1}{4}(x + 2)$$

$$y = \frac{1}{4}x + 5.5$$

d

$$y = x^2 - 2, y = -2, x = 0$$

$$m = 0$$

$$y + 2 = 0$$

$$y = \underline{-2}$$

d

$$y = x^2 + c, x = \sqrt{c}, y = 2c$$

$$m = 2\sqrt{c} \quad m_n = \frac{-1}{2\sqrt{c}}$$

$$y - 2c = \frac{-1}{2\sqrt{c}}(x - \sqrt{c})$$

$$y = \frac{-1}{2\sqrt{c}}x + \frac{1}{2} + 2c$$

6

$$y = x^2, m = 3, m_n = -\frac{1}{3}$$

$$m = 2x$$

$$3 = 2x$$

$$x = \frac{3}{2}, y = \frac{9}{4}$$

Eq. of normal line @ P

$$y - \frac{9}{4} = -\frac{1}{3}\left(x - \frac{3}{2}\right)$$

$$y = -\frac{1}{3}x + \frac{1}{2} + \frac{9}{4}$$

$$y = -\frac{1}{3}x + \frac{11}{4}$$

8

$$y = x^2$$

$$\text{at } (2, 4) \quad m = 2 \cdot 2 = 4$$

$$m_n = -\frac{1}{4}$$

$$y - 4 = -\frac{1}{4}(x - 2)$$

$$y = -\frac{1}{4}x + \frac{1}{2} + 4$$

$$y = -\frac{1}{4}x + \frac{9}{2}$$

$$y = x^2$$

$$-\frac{1}{4}x + \frac{9}{2} = x^2$$

$$4x^2 + x - 18 = 0$$

$$(4x + 9)(x - 2) = 0$$

$$x = -\frac{9}{4}, x = 2 \quad y = 4 \quad (2, 4)$$

$$y = \frac{81}{16}$$

$$\left(-\frac{9}{4}, \frac{81}{16}\right)$$

7

$$y = x^2 + 1, m_n = -1, m_t = 1$$

$$m = 2x$$

$$1 = 2x$$

$$x = \frac{1}{2}, y = \frac{1}{4} + 1 = \frac{5}{4}$$

Eq. of tangent

$$y - \frac{5}{4} = x - \frac{1}{2}$$

$$y - x - \frac{1}{2} + \frac{5}{4}$$

$$y = x + \frac{3}{4}$$