

## PRACTICE PROBLEM SET 8

Now try these problems. The answers are in Chapter 21.

KEY

1. Find the equation of the tangent to the graph of  $y = 3x^2 - x$  at  $x = 1$ .

$$y = 5x - 3$$

2. Find the equation of the tangent to the graph of  $y = x^3 - 3x$  at  $x = 3$ .

$$y = 24x - 54$$

3. Find the equation of the normal to the graph of  $y = \sqrt{8x}$  at  $x = 2$ .

4. Find the equation of the tangent to the graph of  $y = \frac{1}{\sqrt{x^2 + 7}}$  at  $x = 3$ .

5. Find the equation of the normal to the graph of  $y = \frac{x+3}{x-3}$  at  $x = 4$ .

$$y = -3x + 4$$

6. Find the equation of the tangent to the graph of  $y = 4 - 3x - x^2$  at  $(0, 4)$ .

7. Find the equation of the tangent to the graph of  $y = 2x^3 - 3x^2 - 12x + 20$  at  $x = 2$ .

$$y = 0$$

8. Find the equation of the tangent to the graph of  $y = \frac{x^2 + 4}{x - 6}$  at  $x = 5$ .

$$y = -39x + 166$$

9. Find the equation of the tangent to the graph of  $y = \sqrt{x^3 - 15}$  at  $(4, 7)$ .

10. Find the equation of the tangent to the graph of  $y = (x^2 + 4x + 4)^2$  at  $x = -2$ .

11. Find the values of  $x$  where the tangent to the graph of  $y = 2x^3 - 8x$  has a slope equal to the slope of  $y = x$ .

12. Find the equation of the normal to the graph of  $y = \frac{3x+5}{x-1}$  at  $x = 3$ .

$$y = \frac{1}{2}x + 5.5$$

13. Find the values of  $x$  where the normal to the graph of  $(x-9)^2$  is parallel to the  $y$ -axis.

$$x = 9$$

14. Find the coordinates where the tangent to the graph of  $y = 8 - 3x - x^2$  is parallel to the  $x$ -axis.

15. Find the values of  $a$ ,  $b$ , and  $c$  where the curves  $y = x^2 + ax + b$  and  $y = cx + x^2$  have a common tangent line at  $(-1, 0)$ .

$$\left( -\frac{3}{2}, \frac{41}{4} \right)$$