

Tangent to a curve

I. Find the derivative of each function.

1. $f(x) = x^2 + 5$

2. $f(x) = 2x^6 + 8x^3 + 4x - 120$

3. $f(x) = \frac{1}{2}x^4$

4. $f(x) = \frac{x^{12} - 2x^9 + 5x^{-7}}{4}$

5. $f(x) = 0.6x^4 - 0.4x^2 - 0.8$

6. $f(x) = \frac{2}{x^2} - 11$

7. $f(x) = \frac{4}{3}\pi r^3 + 4x$

8. $f(x) = \frac{x^2 - 8x + 3}{x}$

9. $f(x) = 0.3x^3 - 4x^2 + 5$

10. $f(x) = \frac{4}{x^2} + \frac{2}{x^3} + 4$

11. $f(x) = -4x^5 + 7x^3 + x$

12. $f(x) = \frac{3}{x^4} + x^2 - \frac{6}{13}$

II. Find the slope of the line tangent to the graph of each function at the given point.

13. $y = 2x^2$; $(-2, 8)$

14. $y = \frac{1}{2}x^2 + 12$; $(-3, 16\frac{1}{2})$

15. $y = -2x^2 + 3x + 10$; $(1, 11)$

16. $y = 0.5x^2 - 0.4x - 0.5$; $(1, -0.4)$

17. $y = x^2 + \frac{1}{6}x + 1$; $(\frac{1}{2}, \frac{4}{3})$

18. $y = \frac{x^3 - 4}{6}$; $(2, \frac{2}{3})$

III. Find the equation of the line tangent to the graph of each function at the given point. Write the equation in slope-intercept form.

19. $y = x^2 - 3$; $x = 3$

20. $y = x^2 - 3x + 2$; $x = 1$

21. $y = -x^2 - x + 2$; $x = 0.5$

22. $y = \frac{3}{x^4} - \frac{5}{x^2} + 6$; $(-1, 4)$

23. $y = \frac{6x^4 - 8x^3 + 2}{3x}$; $(-1, \frac{16}{3})$

24. $y = -3x^{-2} + x + 5$; $(1, 3)$

25. Find $f'(x)$ and $f''(x)$ if $f(x) = x^4 + x^3 - 2x^2 + x - 5$.