1. \( y' = 0 \)
2. \( y' = 3x^2 + 5 \)
3. \( y' = \frac{3}{4}x^{-\frac{1}{4}} + 2.5x^{1.5} - 1 \)
4. \( y' = 8x^7 + 12x^5 + 28x^3 + 15x^2 \)
5. \( y' = \frac{-35}{3}x^{-6} \)
6. \( y = 7x - 5x^{-1} + 2x^{-2} \)
   \( y' = 7 + 5x^{-2} - 4x^{-3} \)
7. \( y' = \frac{x^4 - 15x^2 - 4x}{(x^2 - 5)^2} \)
8. \( y' = \frac{x^3 \cdot f'(x) - 3x^2 - 3x^2 \cdot f(x)}{x^3} \)
9. \( y - \frac{14}{5} = \frac{21}{25} (x - 2) \)
10. \( x = -4, x = 2 \)
11. \( (\frac{2}{5}, 10) \) and \( (2, -2) \)
12. \( k'(x) = \begin{cases} 3x^2 - 2 & \text{if } x < 2 \\ 2x + 5 & \text{if } x > 2 \end{cases} \)
13. \( k'(x) = \begin{cases} 3x^2 - 10 & \text{if } x < 3 \\ 6x - 1 & \text{if } x > 3 \end{cases} \)

   \( k(x) \) is not continuous at \( x = 3 \), thus \( k'(3) \) does not exists.

14. (a) at \( x = 2 \) and \( x = 4 \)
    (b) \( (0, 2) \cup \langle 4, \infty \rangle \)
    (c) 44 meters
    (d) 36 meters
15. (a) \( \frac{36}{5} \)
    (b) \( \frac{2}{5} \)
    (c) 0
    (d) \( \frac{2}{3} \)
16. \( y' = \sec(x) \tan(x) - \sin(x) \)
17. \( f'(x) = 4x^3 \sin(x) + x^4 \cos(x) \)
18. \( f'(x) = \frac{(1 + \cos(x)) \sec^2(x) + \tan(x) \sin(x)}{(1 + \cos(x))^2} \)
19. \( y' = -\csc(x) \cot(x) + 5 \csc^2(x) \)
20. \( y - 1 = 3\sqrt{3}(x - \frac{x}{3}) \)