1. Find the equation of the tangent line of the slope $m = 0$ to the graph of the function: $f(x) = -3-4x-2x^2$
2. Find the equation of the tangent line of the slope $m = -5$ to the graph of the function: $f(x) = 5+5x+2x^2$
3. Find the equation of the tangent line of the slope $m = 3$ to the graph of the function: $f(x) = 5-2x-x^2$
4. Find the equation of the tangent line of the slope $m = 1$ to the graph of the function: $f(x) = -4-4x-4x^2$
5. Find the equation of the tangent line of the slope $m = 0$ to the graph of the function: $f(x) = -3x-2x^2$
6. Find the equation of the tangent line of the slope $m = -1$ to the graph of the function: $f(x) = -2+4x^2$
7. Find the equation of the tangent line of the slope $m = 5$ to the graph of the function: $f(x) = -1-2x-3x^2$
8. Find the equation of the tangent line of the slope $m = -5$ to the graph of the function: $f(x) = -3-2x+5x^2$
9. Find the equation of the tangent line of the slope $m = -4$ to the graph of the function: $f(x) = -4+3x+2x^2$
10. Find the equation of the tangent line of the slope $m = -2$ to the graph of the function: $f(x) = 5-5x-4x^2$

Answers:

1. $y = -1$
2. $y = -5x + \frac{-15}{2}$
3. $y = 3x + \frac{45}{4}$
4. $y = x + \frac{-39}{16}$
5. $y = \frac{9}{8}$
6. $y = -x + \frac{-33}{16}$
7. $y = 5x + \frac{37}{12}$
8. $y = -5x + \frac{-69}{20}$
9. $y = -4x + \frac{-81}{8}$
10. $y = -2x + \frac{89}{16}$

Solutions:

1. $f'(x) = \dfrac{\mathrm{d}}{\mathrm{d}x}(-3-4x-2x^2) = -4-4x$ ◀ Find the first derivative of the function.

$0 = -4-4x$ ◀ Use $m = f'(x)$

$x_1 = \dfrac{0-(-4)}{2(-2)} = -1$ ◀ Find the x value of the point of tangency.

$y_1 = -3-4\,(-1)-2\,(-1)^2 = -1$ ◀ Find the y value of the point of tangency.

$y-(-1) = 0\,[x-(-1)]$ ◀ Use the Point-Slope formula: $y-y_1 = m(x-x_1)$ ▶ Then simplify:

$y = -1$

2. $f'(x) = \dfrac{\mathrm{d}}{\mathrm{d}x}(5+5x+2x^2) = 5+4x$ ◀ Find the first derivative of the function.

$-5 = 5+4x$ ◀ Use $m = f'(x)$

$x_1 = \dfrac{-5-(5)}{2(2)} = \dfrac{-5}{2}$ ◀ Find the x value of the point of tangency.

$y_1 = 5+5\left(\dfrac{-5}{2}\right)+2\left(\dfrac{-5}{2}\right)^2 = 5$ ◀ Find the y value of the point of tangency.

$y-(5) = -5\left[x-\left(\dfrac{-5}{2}\right)\right]$ ◀ Use the Point-Slope formula: $y-y_1 = m(x-x_1)$ ▶ Then simplify:

$y = -5x+\dfrac{-15}{2}$

3. $f'(x) = \dfrac{\mathrm{d}}{\mathrm{d}x}(5-2x-x^2) = -2-2x$ ◀ Find the first derivative of the function.

$3 = -2-2x$ ◀ Use $m = f'(x)$

$x_1 = \dfrac{3-(-2)}{2(-1)} = \dfrac{-5}{2}$ ◀ Find the x value of the point of tangency.

$y_1 = 5-2\left(\dfrac{-5}{2}\right)-\left(\dfrac{-5}{2}\right)^2 = \dfrac{15}{4}$ ◀ Find the y value of the point of tangency.

$y-\left(\dfrac{15}{4}\right) = 3\left[x-\left(\dfrac{-5}{2}\right)\right]$ ◀ Use the Point-Slope formula: $y-y_1 = m(x-x_1)$ ▶ Then simplify:

$y = 3x+\dfrac{45}{4}$

4. $f'(x) = \dfrac{\mathrm{d}}{\mathrm{d}x}(-4-4x-4x^2) = -4-8x$ ◀ Find the first derivative of the function.

$1 = -4-8x$ ◀ Use $m = f'(x)$

$x_1 = \dfrac{1-(-4)}{2(-4)} = \dfrac{-5}{8}$ ◀ Find the x value of the point of tangency.

$y_1 = -4-4\left(\dfrac{-5}{8}\right)-4\left(\dfrac{-5}{8}\right)^2 = \dfrac{-49}{16}$ ◀ Find the y value of the point of tangency.

$y-\left(\dfrac{-49}{16}\right) = 1\left[x-\left(\dfrac{-5}{8}\right)\right]$ ◀ Use the Point-Slope formula: $y-y_1 = m(x-x_1)$ ▶ Then simplify:

$y = x+\dfrac{-39}{16}$

5. $f'(x) = \dfrac{\mathrm{d}}{\mathrm{d}x}(-3x - 2x^2) = -3 - 4x$ ◀ Find the first derivative of the function.

$0 = -3 - 4x$ ◀ Use $m = f'(x)$

$x_1 = \dfrac{0 - (-3)}{2(-2)} = \dfrac{-3}{4}$ ◀ Find the x value of the point of tangency.

$y_1 = -3\left(\dfrac{-3}{4}\right) - 2\left(\dfrac{-3}{4}\right)^2 = \dfrac{9}{8}$ ◀ Find the y value of the point of tangency.

$y - \left(\dfrac{9}{8}\right) = 0\left[x - \left(\dfrac{-3}{4}\right)\right]$ ◀ Use the Point-Slope formula: $y - y_1 = m(x - x_1)$ ▶ Then simplify:

$y = \dfrac{9}{8}$

6. $f'(x) = \dfrac{\mathrm{d}}{\mathrm{d}x}(-2 + 4x^2) = 8x$ ◀ Find the first derivative of the function.

$-1 = 8x$ ◀ Use $m = f'(x)$

$x_1 = \dfrac{-1 - (0)}{2(4)} = \dfrac{-1}{8}$ ◀ Find the x value of the point of tangency.

$y_1 = -2 + 4\left(\dfrac{-1}{8}\right)^2 = \dfrac{-31}{16}$ ◀ Find the y value of the point of tangency.

$y - \left(\dfrac{-31}{16}\right) = -1\left[x - \left(\dfrac{-1}{8}\right)\right]$ ◀ Use the Point-Slope formula: $y - y_1 = m(x - x_1)$ ▶ Then simplify:

$y = -x + \dfrac{-33}{16}$

7. $f'(x) = \dfrac{\mathrm{d}}{\mathrm{d}x}(-1 - 2x - 3x^2) = -2 - 6x$ ◀ Find the first derivative of the function.

$5 = -2 - 6x$ ◀ Use $m = f'(x)$

$x_1 = \dfrac{5 - (-2)}{2(-3)} = \dfrac{-7}{6}$ ◀ Find the x value of the point of tangency.

$y_1 = -1 - 2\left(\dfrac{-7}{6}\right) - 3\left(\dfrac{-7}{6}\right)^2 = \dfrac{-11}{4}$ ◀ Find the y value of the point of tangency.

$y - \left(\dfrac{-11}{4}\right) = 5\left[x - \left(\dfrac{-7}{6}\right)\right]$ ◀ Use the Point-Slope formula: $y - y_1 = m(x - x_1)$ ▶ Then simplify:

$y = 5x + \dfrac{37}{12}$

8. $f'(x) = \dfrac{\mathrm{d}}{\mathrm{d}x}(-3 - 2x + 5x^2) = -2 + 10x$ ◀ Find the first derivative of the function.

$-5 = -2 + 10x$ ◀ Use $m = f'(x)$

$x_1 = \dfrac{-5 - (-2)}{2(5)} = \dfrac{-3}{10}$ ◀ Find the x value of the point of tangency.

$y_1 = -3 - 2\left(\dfrac{-3}{10}\right) + 5\left(\dfrac{-3}{10}\right)^2 = \dfrac{-39}{20}$ ◀ Find the y value of the point of tangency.

$y - \left(\dfrac{-39}{20}\right) = -5\left[x - \left(\dfrac{-3}{10}\right)\right]$ ◀ Use the Point-Slope formula: $y - y_1 = m(x - x_1)$ ▶ Then simplify:

$y = -5x + \dfrac{-69}{20}$

9. $f'(x) = \dfrac{\mathrm{d}}{\mathrm{d}x}(-4 + 3x + 2x^2) = 3 + 4x$ ◀ Find the first derivative of the function.

$-4 = 3 + 4x$ ◀ Use $m = f'(x)$

$x_1 = \dfrac{-4 - (3)}{2(2)} = \dfrac{-7}{4}$ ◀ Find the x value of the point of tangency.

$y_1 = -4 + 3\left(\dfrac{-7}{4}\right) + 2\left(\dfrac{-7}{4}\right)^2 = \dfrac{-25}{8}$ ◀ Find the y value of the point of tangency.

$y - \left(\dfrac{-25}{8}\right) = -4\left[x - \left(\dfrac{-7}{4}\right)\right]$ ◀ Use the Point-Slope formula: $y - y_1 = m(x - x_1)$ ▶ Then simplify:

$y = -4x + \dfrac{-81}{8}$

10. $f'(x) = \dfrac{\mathrm{d}}{\mathrm{d}x}(5 - 5x - 4x^2) = -5 - 8x$ ◀ Find the first derivative of the function.

$-2 = -5 - 8x$ ◀ Use $m = f'(x)$

$x_1 = \dfrac{-2 - (-5)}{2(-4)} = \dfrac{-3}{8}$ ◀ Find the x value of the point of tangency.

$y_1 = 5 - 5\left(\dfrac{-3}{8}\right) - 4\left(\dfrac{-3}{8}\right)^2 = \dfrac{101}{16}$ ◀ Find the y value of the point of tangency.

$y - \left(\dfrac{101}{16}\right) = -2\left[x - \left(\dfrac{-3}{8}\right)\right]$ ◀ Use the Point-Slope formula: $y - y_1 = m(x - x_1)$ ▶ Then simplify:

$y = -2x + \dfrac{89}{16}$

