ALL ABOUT TANGENT LINES

1. Find the equation of the tangent line to the graph of $f(x) = 2x^3 - 3x^2 + 2x + 4$ at $x = -2$. Provide the exact answer in the slope-intercept form.

2. Find the equation of the tangent line to the graph of $y = 2\sqrt{x^2 + 11}$ at $x = 5$. Provide the exact answer in the slope-intercept form.

3. Find the exact $x$-coordinates of the points on the graph of $f(x) = -3x(x^2 - 1)^3$ at which the tangent line is horizontal. Provide the exact answer.

4. Find the points on the graph of $f(x) = 2x^3 - x^2 - 2x + 1$ at which the slope of the tangent line is equal to six. Provide the exact answers.

5. Find the exact points on the graph of $y = \frac{3x - 4}{x^2 + 1}$ at which the tangent line is horizontal.

6. Find the exact $x$-coordinates of the points on the graph of $f(x) = -3(2x - 1)^3 (3x + 4)^2$ at which the tangent line is horizontal.

7. Find the exact points on the graph of $f(x) = x\sqrt{2 - 3x^2}$ at which the tangent line is horizontal.

8. Find the exact points on the graph of $y = \frac{x}{\sqrt{x^2 - 1}}$ at which the tangent line has a slope of $-1/8$.

9. Find the exact $x$-coordinates of the points on the graph of $y = 2x^2 e^{-2x}$ at which the tangent line is horizontal.

10. Find the exact $x$-coordinates of the points on the graph of $f(x) = \frac{2}{3x} + \frac{x^3}{4}$ at which the slope of the tangent line is equal to $17/6$. DO NOT guess the answer, but work it by hand.

11. Find the exact points on the graph of $f(x) = x^2 \ln(2x)$ at which the tangent line is horizontal.
FINAL ANSWERS:

1. \( y = 38x + 48 \)

2. \( y = \frac{5}{3}x + \frac{11}{3} \)

3. \( x = \pm 1, \pm 1/\sqrt{7} \)

4. \((-1, 0) \text{ and } (4/3, 35/27)\)

5. \((-1/3, -9/2) \text{ and } (3,1/2)\)

6. \(x = -4/3, -3/5, 1/2\)

7. \((-1/\sqrt{3}, -1/\sqrt{3}) \text{ and } (1/\sqrt{3}, 1/\sqrt{3})\)

8. \((-\sqrt{5}, -\sqrt{5}/2) \text{ and } (\sqrt{5}, \sqrt{5}/2)\)

9. \(x = 0, 1\)

10. \(x = \pm 2\)

11. \(\left( \frac{1}{2\sqrt{e}}, -\frac{1}{8e} \right)\)