

## Assignment : Equation of tangent and normal

Date \_\_\_\_\_

For each problem, find the derivative of the function at the given value.

1)  $y = -x^2 + 2x - 3$  at  $x = 3$

2)  $y = \frac{2}{x^2 - 1}$  at  $x = 2$

3)  $y = -\frac{x^2}{4x + 4}$  at  $x = -2$

4)  $y = -x^3 + 3x^2 - 6$  at  $x = -1$

For each problem, find the slope of the function at the given value.

5)  $y = -(2x - 2)^{\frac{2}{3}}$  at  $x = -1$

6)  $y = (2x - 2)^{\frac{1}{3}}$  at  $x = 2$

7)  $y = -\tan(x)$  at  $x = 0$

8)  $y = \ln(x + 1)$  at  $x = 2$

For each problem, find the equation of the line tangent to the function at the given point. Your answer should be in slope-intercept form.

9)  $y = -\frac{3}{x^2 - 1}$  at  $(-2, -1)$

10)  $y = (-2x + 4)^{\frac{1}{2}}$  at  $(0, 2)$

For each problem, find the equation of the line normal to the function at the given point. If the normal line is a vertical line, indicate so. Otherwise, your answer should be in slope-intercept form.

11)  $y = -\frac{x^2}{2x + 2}$  at  $\left(2, -\frac{2}{3}\right)$

12)  $y = -x^3 + x^2 - 2$  at  $(-1, 0)$

## Answers to Assignment : Equation of tangent and normal

$$1) \left. \frac{dy}{dx} \right|_{x=3} = -4$$

$$2) \left. \frac{dy}{dx} \right|_{x=2} = -\frac{8}{9}$$

$$3) \left. \frac{dy}{dx} \right|_{x=-2} = 0$$

$$4) \left. \frac{dy}{dx} \right|_{x=-1} = -9$$

$$5) \frac{2\sqrt[3]{2}}{3}$$

$$6) \frac{\sqrt[3]{2}}{3}$$

$$7) -1$$

$$8) \frac{1}{3}$$

$$9) y = -\frac{4}{3}x - \frac{11}{3}$$

$$10) y = -\frac{1}{2}x + 2$$

$$11) y = \frac{9}{4}x - \frac{31}{6}$$

$$12) y = \frac{1}{5}x + \frac{1}{5}$$

