Name_____

Equation of Tangent and Normal

Date_____

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.

1) $y = -\cos(2x)$ at $(\pi, -1)$

2) $y = \ln(-x + 2)$ at $(-4, \ln 6)$

3) $y = 2x^2 - 8x + 8$ at $(2, 0)$

4) $y = -2\cos(2x)$ at $(\pi, -2)$

5) $y = -\dfrac{x^2}{2} - 4x - 10$ at $(-2, -4)$

6) $y = -\tan(2x)$ at $\left(\dfrac{\pi}{2}, 0\right)$

7) $y = \cos(2x)$ at $\left(-\dfrac{\pi}{2}, -1\right)$

8) $y = -\ln(-x + 2)$ at $(0, -\ln 2)$

9) $y = -x^3 + 4x^2 - 6$ at $(3, 3)$

10) $y = -2\cos(x)$ at $(\pi, 2)$

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-intecept form.

11) $y = x^2 + 8x + 13$ at $(-3, -2)$

12) $y = \cos(x)$ at $\left(\dfrac{\pi}{2}, 0\right)$

13) $y = e^{x-1}$ at $\left(-1, \dfrac{1}{e^2}\right)$

14) $y = -e^{x-2}$ at $\left(0, -\dfrac{1}{e^2}\right)$

15) $y = -2\cot(2x)$ at $\left(-\dfrac{3\pi}{4}, 0\right)$

16) $y = x^2 - 6x + 5$ at $(0, 5)$

17) $y = e^{-x+2}$ at $(1, e)$

18) $y = \ln(-x + 2)$ at $(-1, \ln 3)$

19) $y = -x^2 - 2x$ at $(-1, 1)$

20) $y = e^{x+2}$ at $(-1, e)$

Answers to Equation of Tangent and Normal

1) $y = -1$

2) $y = -\dfrac{1}{6}x + \dfrac{3\ln 6 - 2}{3}$

3) $y = 0$

4) $y = -2$

5) $y = -2x - 8$

6) $y = -2x + \pi$

7) $y = -1$

8) $y = \dfrac{1}{2}x - \ln 2$

9) $y = -3x + 12$

10) $y = 2$

11) $y = -\dfrac{1}{2}x - \dfrac{7}{2}$

12) $y = x - \dfrac{\pi}{2}$

13) $y = -e^2 x + \dfrac{-e^4 + 1}{e^2}$

14) $y = e^2 x - \dfrac{1}{e^2}$

15) $y = -\dfrac{1}{4}x - \dfrac{3\pi}{16}$

16) $y = \dfrac{1}{6}x + 5$

17) $y = \dfrac{1}{e} \cdot x + \dfrac{e^2 - 1}{e}$

18) $y = 3x + \ln 3 + 3$

19) Normal line is vertical line at $x = -1$

20) $y = -\dfrac{1}{e} \cdot x + \dfrac{e^2 - 1}{e}$