Calculus Name_____ ID: 1

Normal and Tangent Lines - TRIG Practice

Date_____ Period____

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

1) $y = -2\sin(x)$ at $x = \frac{3\pi}{4}$

2) $y = \cot(2x)$ at $x = -\frac{2\pi}{3}$

3) $y = -\csc(2x)$ at $x = \frac{5\pi}{6}$

4) $y = -\tan(x)$ at $x = -\frac{\pi}{6}$

5) $y = \tan(2x)$ at $x = \frac{5\pi}{6}$

6) $y = \sec(2x)$ at $x = -\frac{\pi}{2}$

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.

7) $y = -2\cot(2x)$ at $\left(\frac{\pi}{4}, 0\right)$

8) $y = -2\sin(x)$ at $(\pi, 0)$

9) $y = -\csc(x)$ at $\left(-\frac{2\pi}{3}, \frac{2\sqrt{3}}{3}\right)$

10) $y = \sec(x)$ at $(\pi, -1)$

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) $y = \sin(2x)$ at $\left(-\frac{\pi}{4}, -1\right)$

12) $y = -2\cot(2x)$ at $\left(\frac{\pi}{6}, -\frac{2\sqrt{3}}{3}\right)$

13) $y = 2\csc(2x)$ at $\left(\frac{5\pi}{6}, -\frac{4\sqrt{3}}{3}\right)$

14) $y = -\tan(x)$ at $\left(-\frac{\pi}{4}, 1\right)$

Answers to Normal and Tangent Lines - TRIG Practice (ID: 1)

1) $\left.\frac{dy}{dx}\right|_{x=\frac{3\pi}{4}} = \sqrt{2}$

2) $\left.\frac{dy}{dx}\right|_{x=-\frac{2\pi}{3}} = -\frac{8}{3}$

3) $\left.\frac{dy}{dx}\right|_{x=\frac{5\pi}{6}} = \frac{4}{3}$

4) $\left.\frac{dy}{dx}\right|_{x=-\frac{\pi}{6}} = -\frac{4}{3}$

5) $\left.\frac{dy}{dx}\right|_{x=\frac{5\pi}{6}} = 8$

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

7) $y = 4x - \pi$

8) $y = 2x - 2\pi$

9) $y = -\frac{2}{3}x + \frac{6\sqrt{3} - 4\pi}{9}$

10) $y = -1$

11) Normal line is vertical line at $x = -\frac{\pi}{4}$

12) $y = -\frac{3}{16}x + \frac{-64\sqrt{3} + 3\pi}{96}$

13) $y = \frac{3}{8}x + \frac{-64\sqrt{3} - 15\pi}{48}$

14) $y = \frac{1}{2}x + \frac{8 + \pi}{8}$