Differentiation of Trigonometric Functions - Homework

Take the derivatives of the following functions. Identify the form of the problem and rewrite with parentheses.

1. $y = \sin 3x$

2. $y = x \sin x$

3. $y = \cos\left(\frac{\pi}{2} - x\right)$

4. $y = \frac{\sin x}{x}$

5. $y = \frac{x}{\sin x}$

6. $y = x^3 \sin^2 x$

7. $y = \cos 2x - \sin 3x$

8. $y = \cos^4 x^4$

9. $y = \sin^2 x + \cos^2 x$

10. $y = \sqrt{\sin x + 2}$

11. $y = \tan\sqrt{3x - 1}$

12. $y = \sec\left(x^2 - 2x + 3\right)$

13) $y = \cot^4\left(\frac{x}{2}\right)$

14) $y = \frac{\sin x}{1 + \cos^2 x}$

15) $y = \sin(\cos x)$

Find the equation of the tangent line to the following curves at the indicated point. Confirm by calculator.

16) $y = \sin x \cos x$ at $(0,0)$

17) $y = \frac{2x}{\cos x}$ at $(0,0)$

18) $y = \sin x(\sin x + \cos x)$ at $\left(\frac{\pi}{4}, 1\right)$