Composition Review

Break the following functions into a composition of functions:

1. $\sin(\cos(\tan(x)))$
2. $(1+\sin^2(x))^3$
3. $\sqrt{x^2+5}$
4. $\tan^3\sqrt{\cot(7x)}$

Chain Rule

1. $y=(3x+1)^2$
2. $y=\sqrt{4x+5}$
3. $y=\sqrt{13x^2-5x+8}$
4. $y=(1-4x+7x^5)^{30}$
5. $y=(4x+x^{-5})^{\frac{1}{3}}$
6. $y=\sin(5x)$
7. $y=3\tan\sqrt{x}$
8. $y=\left(\frac{8x-x^6}{x^3}\right)^{-\frac{4}{5}}$

Here are some more difficult problems:

1. $y = \cos^2(x^3)$
2. $y = \frac{1}{5}\sec^{-4}(4 + x^3)$
3. $y = 10(1 + (2 - (6 + 7x^4)^9)^3)^5$
4. $y = \tan^3\sqrt{\cot(7x)}$
5. $y = \left(\frac{x+4}{(x^2+1)^{\frac{1}{2}}}\right)^3$
6. $y = (1 + 4x)^5(3 + x - x^2)^8$

Implicit Differentiation

1. $y = 3x^2 + 5x + 6$
2. $0 = xy$
3. $x^2 + y^2 = 16$
4. $x^3 + y^3 = 6xy$
5. $\sin(x + y) = y^2\cos x$
6. $5x^3 + xy^2 = 5x^3y^3$
7. $x^2 = (4x^2y^3 + 1)^2$
8. $\sin 2x^2y^3 = 3x^3 + 1$