Derivative - Combining rules - Answers

Differentiate the following functions.

1. $h(x) = x^6 \sqrt{5x^2 - x}$ $h'(x) = \dfrac{70x^7 - 13x^6)}{2\sqrt{5x^2 - x}}$

2.
$f(x) = (x^2 - 4x - 15)\sqrt{25 - x^2}$

$f'(x) = (2x - 4)\sqrt{25 - x^2} - \dfrac{x}{\sqrt{25 - x^2}}(x^2 - 4x - 15)$

3. $g(x) = \dfrac{\sqrt{25 - x^2}}{x}$ $g'(x) = -\dfrac{25}{x^2\sqrt{25 - x^2}}$

4. $y = \dfrac{\sqrt{x + 5}}{x^2}$ $\dfrac{dy}{dx} = \dfrac{-3x - 20}{2x^3\sqrt{x + 5}}$

5. $f(x) = \dfrac{x^2 - 3x}{\sqrt{x + 1}}$ $f'(x) = \dfrac{3x^2 + x - 6}{2\sqrt{(x + 1)^3}}$

6. $h(x) = \dfrac{x^2}{\sqrt{x^2 + 5}}$ $h'(x) = \dfrac{x(x^2 + 10)}{\sqrt{(x^2 + 5)^3}}$

7. $y = \dfrac{\sqrt{x}}{(1 - 2x)^2}$ $y = \dfrac{6x + 1}{2\sqrt{x}(1 - 2x)^3}$

8. Find the equation of the tangent line to $f(x) = \dfrac{(x - 2)^{\frac{1}{3}}}{(x^3 + 4x - 1)^2}$ at $x = 1$

$y = \dfrac{23}{96}x - \dfrac{29}{96}$

9. Find the equation of the tangent line to $f(x) = (x^2 - 4x + 5)\sqrt{25 - x^2}$ at $(3, 8)$

$y = \dfrac{13}{2}x - \dfrac{23}{2}$