1. Find the derivative of \( f(x) = \sqrt{3x - 2} \) using the limit definition of the derivative.

\[
f'(x) = \lim_{h \to 0} \frac{\sqrt{3(x + h) - 2} - \sqrt{3x - 2}}{h} = \lim_{h \to 0} \frac{\sqrt{3(x + h) - 2} - \sqrt{3x - 2}}{h} \cdot \frac{\sqrt{3(x + h) - 2} + \sqrt{3x - 2}}{\sqrt{3(x + h) - 2} + \sqrt{3x - 2}}
\]

\[
= \lim_{h \to 0} \frac{3(x + h) - 2 - (3x - 2)}{h(\sqrt{3(x + h) - 2} + \sqrt{3x - 2})} = \lim_{h \to 0} \frac{3h}{h(\sqrt{3(x + h) - 2} + \sqrt{3x - 2})} = \frac{3}{2\sqrt{3x - 2}}
\]

2. Use the sum/difference, constant multiple, and power rules to evaluate the following.

(a) \( (2\sqrt{x} - e + \frac{1}{3}x^4 - x + x^{3/5})' \)

This is equivalent to \( (2x^{1/3} - e + \frac{1}{3}x^{-4} - x + x^{3/5})' = \frac{2}{3}x^{-2/3} - 0 - \frac{4}{3}x^{-5} - 1 + \frac{3}{5}x^{-2/5} \).

Re-written: The derivative is \( \frac{2}{3\sqrt[3]{x^2}} - \frac{4}{3x^5} - 1 + \frac{3}{5\sqrt[5]{x^2}} \).

(b) \( \frac{d}{dx} \left( \frac{x(2x + 3)}{x^{1/2}} \right) \)

This is equivalent to \( \frac{d}{dx} (x^{1/2} (2x + 3)) = \frac{d}{dx} (2x^{3/2} + 3x^{1/2}) \)
\[
= 3x^{1/2} + \frac{3}{2} x^{-1/2} = 3\sqrt{x} + \frac{3}{2\sqrt{x}}
\]

3. Find the equation of the tangent line at \( x = 4 \) on the function \( f(x) = \frac{x(2x + 3)}{x^{1/2}} \)

\[
f(4) = \frac{4(11)}{2} = 22
\]
\[
f'(4) = 3 \cdot 2 + \frac{3}{4} = 6\frac{3}{4}
\]

So, the tangent line through \( x = 4 \) is \( y - 22 = 6\frac{3}{4} (x - 4) \)