Polynomial & Exponential Derivatives

While working in a group make sure you:

• Expect to make mistakes but be sure to reflect/learn from them!
• Are civil and are aware of your impact on others.
• Assume and engage with the strongest argument while assuming best intent.

1. Use the properties discussed in class to find the following:

\[
\frac{d}{dx}(x^4 - 6x^2 + 4) \quad \left(\frac{3}{4}x^8 + x^\pi\right)'
\]

\[
\left(\left(\frac{1}{2}x\right)^5\right)' \quad \frac{d}{dx}\left(\frac{x^2 - 2\sqrt{x}}{x}\right)
\]

2. For what values of \(x\) does the graph of \(f(x) = x^4 - 6x^2 + 4\) have a horizontal tangent?
3. For each $f$ defined below, find $f'(x)$.

\[ f(x) = x^4 + 2 \sin(x) \quad f(x) = \cos(x) - \frac{5}{\sqrt{x}} \]

4. Consider $\alpha(x) = x^4 + 2e^x$. Find the equation of the line tangent to the graph of $\alpha$ at the point $(0,2)$.

5. At what point on the curve of $y = 1 + 2e^x - 3x$ is the tangent line parallel to the line $3x - y = 5$?