Show work for all answers.

1. **(3 points)** If $y = 3\sqrt{t} - \frac{4}{t^3} + 5t$, calculate $\frac{dy}{dt}$.

2. **(4 points)** Calculate the second derivative $\frac{d^2}{dx^2}\left(e^x + 2\sin x - x^4\right)$.

3. **(4 points)** If $f(q) = \frac{q^3+e^q}{q^2-3q}$, calculate $f'(q)$.

4. **(5 points)** Calculate $\frac{d}{dx}\frac{x\sin x}{x^2-1}$.

5. **(4 points)** Find the equation of the tangent line to the curve $y = 2x^3 - 3x$ at the point $(2, 10)$.

6. **(2 point bonus)** Find, on the back of this sheet, a general formula for $\frac{d^3}{dx^3}[f(x)g(x)]$.