1. Simplify the expression
$$\frac{4}{1-x} + \frac{x}{1+x}.$$

2. What is
$$\lim_{x \to 0} \frac{\sin(2x)}{x}?$$

3. What is the derivative of
$$f(x) = xe^{x^3}?$$

4. Where does the function $x^4 + x^3$ attain its minimum value?

5. What is the antiderivative of the function $\cos(2x)$?

6. For which values of x is
$$e^{\ln(x)} = x?$$

7. What is the acceleration of a particle whose position is given by
$$s(t) = t^3 - t?$$

8. Write a definite integral that gives the area under the curve $y = \sin(x^2)$ over the interval $1 \le x \le 2$.