1. §3.9, p.194, #34: Use differentials to estimate the amount of paint needed to apply a coat of paint 0.05 cm thick to a hemispherical dome with diameter 50 m.

2. §4.1, p.212, #62: Find the absolute maximum and minimum of \( f(x) = x - 2 \cos x \), on \([-2, 0]\).

3. §4.1, p.212, #64: An object with weight \( W \) is dragged along a horizontal plane by a force acting along a rope attached to an object. If the rope makes an angle \( \theta \) with the plane, then the magnitude of force is

\[
F = \frac{\mu W}{\mu \sin \theta + \cos \theta}
\]

where \( \mu \) is a positive constant called the coefficient of friction and where \( 0 \leq \theta \leq \pi/2 \). Show \( F \) is minimized when \( \tan \theta = \mu \).

4. §4.2, p.219, #14: Verify that the hypotheses of the Mean Value Theorem hold for \( f(x) = \frac{x}{x+2} \), over \([1, 4]\), then find all numbers \( c \) in the interval that satisfy the conclusion of the MVT.

5. §4.2, p.220, #18: Show that the equation \( 2x - 1 - \sin x = 0 \) has exactly one real root.