[Indeterminate Forms and L'Hospital’s Rule]

(1) Find the limit.
   (a) \[ \lim_{x \to -2} \frac{x^3 + 8}{x + 2} \]

(b) \[ \lim_{x \to \pi/2} \frac{1 - \sin x}{1 + \cos 2x} \]
(c) \[ \lim_{x \to 0} \frac{e^x - 1 - x}{x^2} \]

(d) \[ \lim_{x \to 0^+} \left( \frac{1}{x} - \frac{1}{e^x - 1} \right) \]
(e) \( \lim_{x \to 0^+} (4x + 1)^{\cot x} \)
[Optimization Problems]

(2) The top and bottom margins of a poster are each 9 cm and the side margins are each 6 cm. The area of printed material on the poster is fixed at 864 cm$^2$. Find the dimensions of the printed area that minimize the area of the whole poster.
(3) Find the dimensions of the rectangle of largest area that has its base on the $x$-axis and its other two vertices above the $x$-axis and lying on the parabola $y = 6 - x^2$. 
(4) Find the point on the line $5x + y = 7$ that is closest to the point $(-2, 1)$. 
[Antiderivatives]

(5) Find the most general antiderivative of the function.

(a) \( f(x) = 6x^5 - 8x^4 - 9x^2 \)

(b) \( f(x) = (x - 5)^2 \)
(c) $g(t) = \frac{1 + t + t^2}{\sqrt{t}}$

(d) $g(x) = 2 \cos x - \frac{3}{\sqrt{1 - x^2}}$
(6) Find $f$.

(a) $f''(x) = 2x^3 - 12x^2 + 6x$

(b) $f''(x) = 1/x^2$
(c) \( f'(x) = 5x^4 - 3x^2 + 4, \quad f(-1) = 2 \)

(d) \( f''(\theta) = \sin \theta + \cos \theta, \quad f(0) = 3, \quad f'(0) = 4 \)
(e) $f''(x) = 4 + 6x + 24x^2$, $f(0) = 3$, $f(1) = 10$
(7) A stone was dropped off a cliff and hit the ground with a speed of 120 ft/s. What is the height of the cliff?