1) Find the equation of the line tangent to \( y = \sin^{-1}(2x) \) at the point where \( x = -\frac{\sqrt{3}}{4} \).

2) Find the absolute minimum value of the function \( f(x) = x + \frac{2}{x} \) on the interval \( [\frac{1}{2}, 6] \).

3) Determine the linear approximation of \( f(x) = \sin x \) at the point \( a = \frac{\pi}{6} \).

4) Water is evaporating from a conical cup at the rate of 0.5 \( cm^3/h \). The height of the cup is 10 \( cm \), and the diameter of the top is 6 \( cm \). How fast is the water level dropping when the water is 5 \( cm \) deep? (the volume of the cone is \( V = \frac{1}{3}\pi r^2 h \).)

5) Find \( y'(x) \) at \( (2, -1) \), if \( 3(x^2 + 4y) = y^2 + 2x - 4 \)

6) The graph of the derivative \( f'(x) \) of \( f(x) \) is given below. Find all points where the graph of \( f(x) \) has a local maximum.

7) For the function \( f(x) = \frac{3x^2 - 12x}{(x - 1)^2} \)
   a) find all critical and extremum points;
   b) find the intervals where the function is increasing and decreasing;
   c) find all horizontal and vertical asymptotes.

8) Find the derivative of \( y = (\arctan(3x^2))^\log_4 x \)

9) Evaluate the limit:
   \[
   \lim_{x \to 1^+} \left( \frac{1}{x - 1} \right)^{\ln x}
   \]

10) Evaluate the limit:
    \[
    \lim_{x \to 0} \frac{x \arctan(2x)}{(e^{3x} - 1) \sin x}
    \]