(20 pts) Evaluate those limits that exist

a) \( \lim_{x \to 4} (3x^{3/2} + 20\sqrt{x})^{1/3} \)

b) \( \lim_{x \to 2} \frac{x^2 - 4}{x^3 + x - 6} \)

c) \( \lim_{h \to 0} \frac{\sqrt{x+h} - \sqrt{x}}{h} \)

d) \( \lim_{x \to 1} \frac{x^2 + 1}{(x-1)^2} \)
(15 pts) Find the trigonometric limits

a) \( \lim_{\Theta \to 0} \frac{(\sin 2\Theta)^2}{3\Theta^2 \cos \Theta} \)

b) \( \lim_{x \to 0} \frac{x - \tan x}{\sin x} \)

c) \( \lim_{x \to 0} \frac{(1 - \sec^2 x) \sin x}{5x^3} \)
(10 pts) Solve the given inequality for \( x \)

\[
\frac{x^2 - 3x}{(x + 1)^2} < 0.
\]
(10 pts) Sketch the graph and classify the discontinuities (if any) as being a removable discontinuity, a jump discontinuity, or an infinite discontinuity

\[ h(x) := \begin{cases} 
1, & x \leq 0 \\
x^2, & 0 < x < 1 \\
1, & 1 \leq x < 2 \\
x, & 2 \leq x 
\end{cases} \]
(15 pts) Find the derivatives of the functions

a) \( f(x) = (2x^3 - 3)(17x^4 - 6x + 2) \)

b) \( g(z) = \frac{1}{2z} - \frac{1}{3z^2} \)

c) \( \psi(x) = \frac{3x}{x^4 + 7x - 5} \)
(10 pts) Find equations for the tangent and normal lines to the graph of

\[ f(x) = \frac{1}{x + 3} \]

at the point \((a, f(a))\) for \(a = -1\).