1. (2 Points) What is the Maple command to define \( f \) as the function \( f(x) = \frac{x^2 - 3}{3 + 2 \sin(x)} \)?

**Solution:**
\[
f := x \rightarrow (x^2 - 3)/(3 + 2 \sin(x));
\]

2. (3 Points) What is the Maple command to plot the above function on the domain \([-10, 10]\) and a restricted range of \([-10, 10]\)? Do so and draw the result below.

**Solution:**
\[
\text{plot}(f(x), x=-10..10, y=-10..10);
\]

![Graph](image)

3. (3 Points) What is the Maple command to plot the function \( f(x) = x^{1/3} \) on the domain \([-10, 10]\)? Do so and draw the result below.

**Solution:**
\[
\text{plot}(\text{surd}(x, 3), x=-10..10);
\]

![Graph](image)

4. (2 Points) What are the exact solutions to the equation \( x^3 - x^2 - 3x + 2 = 0 \)? Also state the Maple command(s) you used to find them.

**Solution:**
The command is \texttt{solve(x^3-x^2-3*x+2,x)}; and the solutions are \( 2, -\frac{1}{2} + \frac{\sqrt{3}}{2} \text{ and } -\frac{1}{2} - \frac{\sqrt{3}}{2} \).

5. (2 Points) Give approximations to the solutions of \( x^3 - x^2 - 3x + 2 = 0 \) to at least 15 decimal places. Also state the Maple command(s) you used to find them.

**Solution:**
The approximations are 2, 0.6180339887498950 and \( -1.618033988749895 \). The Maple command was \texttt{evalf(%,16)};

6. (2 Points) State the Maple command you would use to find \( \lim_{x \to \frac{\pi}{3}} \csc^3(x) \). What is the limit?

**Solution:**
The command is \texttt{limit(csc(x)^3, x=Pi/3)}; and the result was \( \frac{8\sqrt{3}}{9} \).
7. (2 Points) State the Maple command you would use to find \( \lim_{x \to \infty} \frac{\sqrt{x^3 - 3x^2 - x + 1}}{7x^2 - 2x + 8} \). What is the limit?

Solution: The command is `limit(sqrt(x^3-3*x^2-x+1)/(7*x^2-2*x+8), x=infinity)`; and the result was 0.

8. (3 Points Each) Using the definition of the derivative, \( \lim_{h \to 0} \frac{f(x + h) - f(x)}{h} \), use Maple to find the derivative of the following functions. Also state the Maple commands you used to find them.

(a) \( f(x) = \frac{1}{x^2 + 2} \)

Solution: The commands were `f:=x->1/(x^2+2);` followed by `limit((f(x+h)-f(x))/h, h=0);` resulting in \(-\frac{2x}{(x^2 + 2)^2} \).

(b) \( f(x) = \sqrt{x} \)

Solution: The commands were `f:=x->sqrt(x);` followed by `limit((f(x+h)-f(x))/h, h=0);` resulting in \(\frac{1}{2\sqrt{x}} \).

9. (3 Points) State the Maple command you would use to find \( \lim_{x \to 3} \frac{\sqrt{12 - x} - 3}{\sqrt{4 - x} - 1} \). What is the limit?

Solution: The command is `limit((sqrt(12-x)-3)/(sqrt(4-x)-1), x=3);` and the result was \(\frac{1}{3} \).