Why:
To become familiar with the various capabilities of MathCad. This is a powerful mathematics software which will enable you to quickly solve difficult problems.

Learning Objectives:
1. Use symbolic operators to factor and solve a polynomial.
2. Find the derivative of a function.
3. Determine the area under a curve by integration.

Performance Criteria:
1. Can correctly solve the given problems.
2. Can neatly print the solutions.

Resources:
1. MathCad Help files.
2. MathCad handouts found on the Handouts and Other Resources page.
3. Other students.
4. The instructor.

Plan:

1. Find the values of p that solve the expression \( p^2 - 3p - 28 = 0 \).
   a. Factor the polynomial using the factor operator. \( \text{factor} \rightarrow \)
   b. Solve for the values of p using the solve operator. \( \text{solve}, p \rightarrow \)
   c. For kicks, check your answer for b using the quadratic equation.

2. The motion of a particle is defined by the relation \( x = 4t^4 - 6t^3 + 2t - 1 \), where \( x \) and \( t \) are expressed in meters and seconds respectively. Determine the position, the velocity, and the acceleration of the particle when \( t = 2 \) s. \( v(t) = \frac{dx}{dt} \) and \( a(t) = \frac{dv(t)}{dt} \).

3. The motion of a particle is defined by the relation \( x = 3t^3 - 6t^2 - 12t + 5 \). Determine when the velocity of the particle is zero. Graph your velocity function to check your solution.

4. Find the area between the x-axis and \( y = 2x + 7 \) and between \( x = 0 \) and \( x = 10 \).
   a. Use a definite integral from 0 to 10 as shown below:

\[
\int_{0}^{10} (2x + 7) \, dx = \text{(Ans. 170)}
\]

5. The maximum deflection for a simple beam having a uniform load across its length is given by the equation
\[
\Delta = \frac{5wL^4}{384EI}
\]
   a. Solve the above expression for \( I \).
   b. Create the following variables: \( L = 20 \) ft, \( w = 1200 \) lbf/ft, \( E = 29000000 \) psi, \( \Delta = .75 \) in.
   c. Assign the resulting expression to variable \( I \) using the \( I := \). Display the value of \( I \) with units of in\(^4\). (Ans. 198.621 in\(^4\))