Requirements

A. Requirements for Management Precalculus
The requirements for this module consist of mastery of the following precalculus or college algebra topics:

1. A review of algebra prerequisites: exponents, factoring, polynomials

2. Familiarity with algebraic errors such as: $\dfrac{1}{2x}+\dfrac{1}{3x}\neq\dfrac{1}{5x}$, $\left(x^2\right)^3 \neq x^5$

3. Graphical representation of data for various data applications

4. Graphs of equations: straight line, quadratic, linear depreciation

5. Solution of linear equations: ax+b=0 and equations with fractional expressions

6. Quadratic formula: height applications, revenue=xp

7. Linear equations y=mx+b: data and computation of slopes for comparison of earnings per share

8. Functions, inverse functions: development of P=R-C model

9. Quadratic function: maximum revenue, minimum cost

10. Polynomial division and rational functions: asymptotes and interpretations

11. Exponential and logarithmic functions: application to continuously compounding investment problems

12. Systems of two equations in two unknowns: break-even analysis, point of equilibrium

B. Pretest
A typical pretest for these topics follows:

1. Given the points (-2, 5) and (2, -3)
   a) find the slope intercept form of the equation of the straight line connecting them
   b) find the x and y intercepts of the straight line

2. a) Add and simplify $\dfrac{4x-1}{x^2+5x+6}+\dfrac{x+2}{x+3}$

   b) Simplify $\dfrac{x+2}{\left(x-1\right)^2}\div\dfrac{x^2+3x+2}{x^2+x-2}$

3. a) Factor $2x^3 - 4x^2 - 8x + 16$

   b) Simplify $\dfrac{\dfrac{x^2 y^3}{\sqrt{x}\, y^{-1}}}{\left(\dfrac{2}{3}\right)^2}$

4. a) Solve $\dfrac{2}{x-2} + \dfrac{4}{x+1} = 3$

   b) For the points (2, 6) and (4, 12), find the distance between them.

5. $f(x) = \sqrt{2x-4}$
   a) Find the domain and range.

   b) Find the inverse $f^{-1}(x)$, and its domain and range

6. $f(x) = \dfrac{2x^2 + 3}{x^2 - 9}$, find
   a) vertical asymptote(s)
   b) horizontal asymptote(s)
   c) the y intercept

7. $y = 2x^2 + 2x - 3$
   a) Use the quadratic formula to find the x intercepts. Simplify your result. (Do not write your answer in decimal form.)
   b) Find the (x, y) coordinates of the vertex.
   c) Graph the quadratic and indicate the x intercepts, vertex, and y intercept on your graph.

8. a) Expand $\ln\left[\dfrac{(x+1)(x+2)^3}{\sqrt{x-3}}\right]$

   b) Solve $\ln(x+1) + \ln(x-1) = 0$

9. a) $f(x) = x^2$ and $g(x) = 2x+1$. Evaluate
   i) $f(g(x))$. Note that an alternate notation for the composition is $(f \circ g)(x)$.
   ii) $f(-2)$
   iii) $g(f(x))$, i.e. $(g \circ f)(x)$

   b) Solve the system of equations
   $$3x - 2y = 8$$
   $$-x + 7y = 10$$

10. $3000 is invested for you at birth and compounded continuously. Assume the annual interest rate is 7.5%.
    a) What is the amount worth when you reach 65?
    b) What annual interest rate is required so that the accumulated amount at age 65 is $1,000,000?