Are you Ready for Calculus?

1. Simplify each of the following:

   a. $\dfrac{x^3 - 9x}{x^2 - 7x + 12}$

   b. $\dfrac{x^2 - 2x - 8}{x^3 + x^2 - 2x}$

   c. $\dfrac{\frac{1}{x} - \frac{1}{5}}{\frac{1}{x^2} - \frac{1}{25}}$

2. Rationalize the denominator in each expression:

   a. $\dfrac{2}{\sqrt{3} + \sqrt{2}}$

   b. $\dfrac{4}{1 - \sqrt{5}}$

3. Factor each expression completely:

   a. $x^6 - 16x^4$

   b. $4x^3 - 8x^2 - 25x + 50$

   c. $8x^3 + 27$

4. Find the domain of each function:

   a. $f(x) = \dfrac{5x - 3}{2x + 1}$

   b. $f(x) = \sqrt{x - 1}$

5. Given $f(x) = \sqrt{x}$ *and* $g(x) = x^2 - 1$ find the composite functions:

   a. $f(g(1))$

   b. $g(f(0))$

   c. $f(g(x))$

   d. $g(f(x))$

6. Evaluate $\dfrac{f(x + h) - f(x)}{h}$ for the following functions:

   a. $f(x) = 2x + 3$

   b. $f(x) = \dfrac{1}{x + 1}$

   c. $f(x) = x^2$

7. Without using a calculator, evaluate the following:

   a. $\cos 210^o$

   b. $\sin \dfrac{5\pi}{4}$

   c. $\cos \dfrac{9\pi}{4}$

   d. $\tan \dfrac{7\pi}{6}$

   e. $\sin 225^o$

8. Determine the quadrant in which θ lies:

   a. $\sin \theta > 0$ *and* $\cos \theta < 0$

   b. $\sec \theta > 0$ *and* $\cot \theta < 0$

9. Find two solutions of each equation. Express results in radians ($0 \le \theta \le 2\pi$). Do not use a calculator.

   a. $\cos \theta = \dfrac{\sqrt{2}}{2}$

   b. $\cos \theta = -\dfrac{\sqrt{3}}{2}$

   c. $\tan \theta = 1$

   d. $\cot \theta - \sqrt{3}$