Algebra/Trig you should know cold before you start calculus.

1. Factor completely:

   a) $4(x-2)^4 - 16(x-2)^2$ $= 4x(x-2)^2(x-4)$

   b) $x^2 - 2xy + y^2 - 16$ $= (x-y-4)(x-y+4)$

2. Simplify: Express as a simplified fraction with positive exponents only:

   a) $\left[\dfrac{-8^{1/3}y^{2/5}x^{-2}}{16y^{-2/5}x^{1/4}}\right] = \dfrac{-y^{4/5}}{8x^{9/4}}$

   b) $\dfrac{xy+1}{x^2 - y^{-2}} = \dfrac{y^2}{xy-1}$

3. Solve for *x:* $2x^{\frac{7}{3}} - 16x^{\frac{4}{3}} + 24x^{\frac{1}{3}} = 0$; x = 0, 2, and 6

4. Rationalize the denominator, ***expressing your answer in simplest radical form***:

$$\frac{2x}{\sqrt[4]{8x^3y}} = \frac{2^{1/4}x^{1/4}y^{3/4}}{y}$$

5. Solve explicitly for y in terms of *w*.

$$\frac{4y-3}{3y+5} = w;\ y = \frac{5w+3}{4-3w}$$

6. Evaluate the following:

   a) If $\log_a x = 3$, then $\log_a x^4 = 12$

   b) $\log_2\left(\sin\left(\dfrac{\pi}{6}\right)\right) = -1$

7. Graph one period of the function $f(x) = -5\cos\left(3x + \frac{\pi}{4}\right)$, labeling clearly all the *x*-intercepts, maximum and minimum points within that period. Also, identify the amplitude, period, and the phase shift.

Amplitude: 5

Period: $\frac{2\pi}{3}$; $\frac{-\pi}{12} \leq x \leq \frac{7\pi}{12}$

Phase Shift: $\frac{-\pi}{12}$

Input interpretation:

plot	$-5\cos\left(3x + \frac{\pi}{4}\right)$	$x = -\frac{\pi}{12}$ to $7 \times \frac{\pi}{12}$

Plot: