1. Factor.
   (a) $2x^5 + x^4 - 6x^3$  
   (b) $12x^3y^2 - 3xy^4$

2. Simplify.
   (a) $\frac{2}{x} - \frac{1}{x+1}$  
   (b) $(3^0 - 2^{-3})^{-2}$  
   (c) $\frac{(x^2y^3)^4(xy^4)^3}{(x^3y^2)^0(x^5y)^2}$

3. Expand $(x - 2)^3$.

4. Find the least common denominator, and subtract the fractions.
   \[
   \frac{x + 2}{x^2(x - 1)(x + 1)} - \frac{2x + 1}{x(x + 1)^2}
   \]

5. Solve:
   (a) $x^2 = 9$  
   (b) $x^2 = x + 2$
   (c) $x^2 > 9$  
   (d) $x^2 \leq x + 2$

6. (a) Use the quadratic formula to solve $x^2 - 6x + 3 = 0$.
   (b) Give a factorization (over the real numbers) of $x^2 - 6x + 3$.

7. Let $y = -x^2 + 4x - 3$.
   (a) Find the $x$- and $y$-intercepts.
   (b) Find the $x$- and $y$-coordinates of the vertex of the parabola.
   (c) Solve the equation $y \geq 0$.
   (d) Graph the parabola.
8. If $\tan(\theta) = \frac{3}{4}$ and $\sin(\theta) < 0$, find $\cos(\theta)$.

9. Find every angle $\theta$ with $0 \leq \theta \leq 2\pi$ radians, and $2\sin^2(\theta) + \cos(\theta) = 2$.

10. Solve for $x$ if $y = \frac{2x}{x - 3}$.

11. Solve for $r$ if $A = P \left(1 + \frac{r}{n}\right)^{nt}$.

12. Give the vertical and horizontal asymptotes of $y = \frac{3x^4}{2x^4 - 16x}$.

13. Use long division to rewrite $\frac{4x^3 - 3x - 1}{2x^2 + 3x + 2}$.

14. A conical funnel has a radius of 3 inches and a height of 6 inches. Oil fills the funnel to a height of 2 inches. Find the volume of the oil.

15. A college is building a track in the shape of a rectangle with a semicircle at each end. The perimeter is $200\pi$ feet and the area of the rectangular region is $5000\pi$ square feet. Find the length and width of the rectangular region.