1. 

2. \( f(x) = -x^4 + x^3 + 7x^2 - 13x + 6 \)

3. a) Increasing on (-.333, 5)  
    Decreasing on \((-\infty, -.333) \cup (5, \infty)\)  
   b) Local maximum (5, 39)  
   Local minimum (-.333, -36.85)

4. a) \( \pm \frac{2}{3}, \pm 2, \pm 1, \pm \frac{1}{3} \)  
   b) \( x = 1, 2, -\frac{1}{3} \)

5. a) \( x \neq \pm 3 \)  
   b) x-intercepts (2,0)  
   c) y-intercept \( 0, -\frac{2}{9} \)  
   d) vertical asymptotes \( x = -3 \), hole at \( (\frac{3}{18}, \frac{1}{18}) \)  
   e) \( y = \frac{1}{3} \)

6. \( y = x - 7 \)

7. a) \((-\infty, -3) \cup [-1, \infty)\)  
   b) \( x = -3 \)  
   c) (-1, 0)  
   d) \( y = 1 \)

8. a) 7 + i  
   b) 7 - i  
   c) \( \frac{1 + 7i}{2} \)

9. \( f(x) = x^3 - x^2 + 9x - 9 \)
10. $x = 2$
   $x = \pm 3i$

11. (6,7)

12. $f(x) = \frac{2x^2 - 3x - 4}{x - 2}$

13. The surface area of a cylinder is the sum of the surface area of the circles that make up the base and the top, along with the lateral surface area of the cylinder. If the side of the cylinder is “unrolled”, the lateral surface area is actually the area of a rectangle with height, $h$, and length $2\pi r$.

The total surface area of a cylinder is $2\pi r^2 + 2\pi rh$. Since $V = 3000 = \pi r^2h$, or $h = \frac{3000}{\pi r^2}$, then

Total Surface Area $= 2\pi r^2 + 2\pi r \left(\frac{3000}{\pi r^2}\right) = 2\pi r^2 + \frac{6000}{r}$

Graph the function to determine the minimum value which occurs when $r \approx 30.9$ cm the surface area $\approx 388.3$ cm²