

Math 29  
PAL Worksheet 10

1. Find the roots, both real and complex, of the function  $f(x) = x^3 - 8x^2 + 25x - 26$ .
2. Find a polynomial with real coefficients of degree 3 that has  $2 + 3i$  and  $\frac{2}{3}$  as roots. Write your answer in the form  $f(x) = a_3x^3 + a_2x^2 + a_1x + a_0$ .

3. Consider the rational function

$$f(x) = \frac{2(x+4)^2(x+3)(x-2)^3(x-3)^2}{5(x+5)(x+3)^2(x-2)(x-3)^2(x-4)^2}$$
$$= \frac{2x^8 - 8x^7 - 70x^6 + 336x^5 + 630x^4 - 4536x^3 + 1134x^2 + 19440x - 23328}{5x^8 - 25x^7 - 180x^6 + 1090x^5 + 1225x^4 - 13545x^3 + 7110x^2 + 51840x - 64800}$$

- a. What is the domain of  $f$ ?
- b. Does the graph of  $f$  have any holes?
- c. Does the graph of  $f$  have any vertical asymptotes?
- d. Does the graph of  $f$  have any horizontal asymptotes?
- e. Does the graph of  $f$  have any slant asymptotes?
- f. What are the  $x$ - and  $y$ -intercept(s), if any?