

Name: Key

bell work

Factor completely:

1.)  $12x^2 - 75$   
 $3(2x+5)(2x-5)$

2.)  $8x^3 - 125$   
 $(2x-5)(4x^2+10x+25)$

3.)  $6x^2 - 5x - 6$   
 $(2x-3)(3x+2)$

4.)  $2x^2y^2 + 5x^2 - 2y^2 - 5$   
 $(x+1)(x-1)(2y^2+5)$

Solve:

5.)  $3x^3 - 33x^2 - 36x = 0$   
 $x=0 \quad x=12 \quad x=-1$

6.)  $8x^5 + 32x^3 = -x^2 - 4$   
 $x = \pm 2i \quad x = -\frac{1}{2} \quad x = \frac{1 \pm i\sqrt{3}}{4}$

7.)  $4x^2 + 4x - 15 = 0$   
 $x = \frac{3}{2} \quad x = -\frac{5}{2}$

8.)  $2x^2 + 12 = -4$   
 $x = \pm 2i\sqrt{2}$

State the degree, end behavior, roots and multiplicity, and sketch the graph.

9.)  $y = -x(x+3)^2(x-4)^3$   
 Degree: 6<sup>th</sup>  
 End behavior:  $\lim_{x \rightarrow -\infty} f(x) = -\infty$ ,  $\lim_{x \rightarrow \infty} f(x) = -\infty$   
 Roots and Multiplicity:  $x=0$  (M1),  $x=-3$  (M2),  $x=4$  (M3)

10.)  $y = x^2(x-5)^3(x+4)^2$   
 Degree: 7<sup>th</sup>  
 End behavior:  $\lim_{x \rightarrow -\infty} f(x) = -\infty$ ,  $\lim_{x \rightarrow \infty} f(x) = \infty$   
 Roots and Multiplicity:  $x=0$  (M2),  $x=5$  (M3),  $x=-4$  (M2)

Write the equation of the polynomial in standard form:

11.)  $x=3$  multiplicity of 2 and  $x=5i$   
 $y = x^4 - 6x^3 + 34x^2 - 150x + 225$

12.)  $x = -3 + 2i$  and  $x = -1$   
 $y = x^3 + 7x^2 + 19x + 13$

Simplify:

13.)  $\frac{24-8m}{m^2-9m+18} \cdot \frac{m+5}{9m^2+45m} = \frac{8}{9m(m-6)}$

14.)  $\frac{6}{k-5} - \frac{2}{5k-4} = \frac{28k-14}{(k-5)(5k-4)}$

15.)  $\frac{\frac{1}{x} + \frac{x^2}{x-3}}{\frac{x-3}{4} - \frac{1}{4}} = \frac{4x-12+4x^3}{x^3-7x^2+12x}$

16.) Solve:  $\frac{x-1}{3x} - \frac{x+4}{2x^2} = \frac{1}{3} \quad x = -\frac{12}{5}$