Name _____ Date _____ Period _____

Use the Rational Zeros Theorem to write a list of all potential rational zeros.

1. $f(x) = 6x^3 - 14x^2 + 12x - 28$

2. $f(x) = 6x^4 - x^3 - 6x^2 - x - 12$

Use the Rational Zeros Theorem to write a list of all potential rational zeros. Then determine which ones, if any, are zeros. <u>Show your work on a separate piece of paper.</u>

3. $f(x) = 3x^3 + 5x^2 - 3x - 5$

4. $f(x) = -2x^3 - 3x^2 + 23x + 12$

Use synthetic division to see if the number k is an upper or lower bound for the real zeros of $f(x)$ and state why it is an upper or lower bound.

5. $k = 1;\ f(x) = x^3 - 4x^2 + 7x - 2$

6. $k = 2;\ f(x) = x^4 - x^3 + x^2 + x - 12$

7. $k = -1;\ f(x) = 3x^3 - 4x^2 + x + 3$

8. $k = 3;\ f(x) = 2x^3 - 4x^2 + x - 3$

9. $k = -2;\ f(x) = x^4 - 4x^2 + 5x + 4$

10. $k = \dfrac{2}{5};\ f(x) = 5x^3 - 4x^2 + x - 2$

Find all of the real zeros of the function using the Rational Zero Theorem. Find exact values whenever possible. Identify each zero as <u>rational</u> or <u>irrational</u>.

11. $f(x)=2x^3-3x^2-4x+6$

12. $f(x)=x^3+3x^2-3x-9$

13. $f(x) = x^3 + x^2 - 8x - 6$
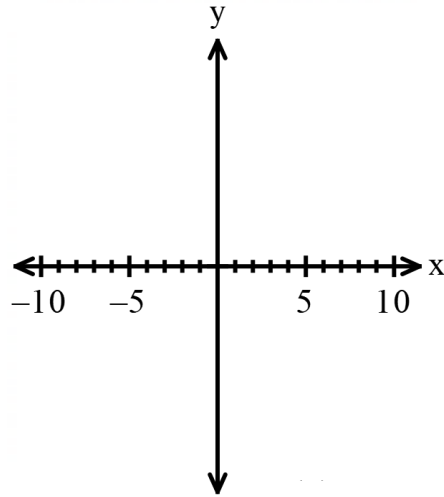
14. $f(x) = -x^4 + 3x^3 + 6x^2 - 6x - 8$

Review

Without using technology, sketch each polynomial. (Hint: Identify the degree, the zeros, their multiplicity, determine whether they touch or cross the x-axis at each zero and describe their end behavior.)

15. $f(x) = x^2(4x + 3)^2$ Degree: _____
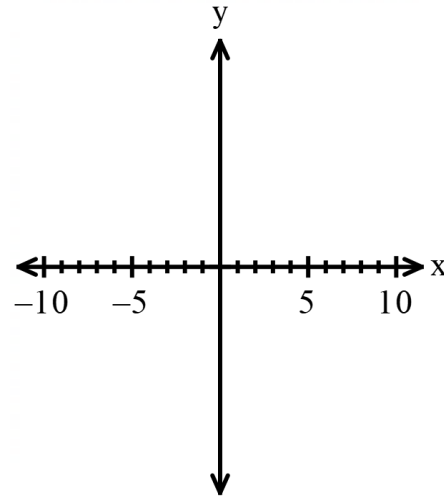
Zeros	Multiplicity	Touch/Cross

$\lim\limits_{x \to -\infty} f(x) =$ $\lim\limits_{x \to \infty} f(x) =$

16. $f(x) = -x^4(3x - 5)$ Degree: _____

Zeros	Multiplicity	Touch/Cross

$\lim\limits_{x \to -\infty} f(x) =$ $\lim\limits_{x \to \infty} f(x) =$

Factor.

17. $8x^2 - 13x - 6$ 18. $81x^4 - 49y^2$ 19. $216x^3 + 125$