Limits at Infinity

Skill: Common factor polynomial expressions.

Outcome: Use limits at infinity to sketch curves that do not have horizontal asymptotes (polynomial functions).

Warm up: Find the $\lim_{x\to\infty} x^2$ $\lim_{x\to-\infty} x^2$

Investigate: Use the limits to help define the curve $y = x^2$

We can us intuition to recognize the product: infinity x infinity = infinity.
What about subtracting infinity: What is infinity cubed less infinity squared?
Skill – make sum/difference of infinity 'products' of infinity using factoring skills.

Examples:
Evaluate the following limits

$\lim_{x\to\infty}\left(x^4 - x\right)$ $\lim_{x\to\infty}\left(x^3 - 2x + 1\right)$ $\lim_{x\to\infty}\left(x^4 - x^5\right)$

Sketch the graph of the curve $y = (x-3)^2(x+2)(1-x)$ by finding its intercepts and its limits.

Odd and Even Functions

Even Functions are symmetric about the y- axis.

An even function is a function such that $f(x) = f(-x)$

An examples of an even function is $y = x^2$

Sketch the curve of $y = x^2$

Odd functions are symmetric about the origin; *x* values are rotated 180^0 about the center to get the negative x-values.

An odd function is a function such that $f(-x) = -f(x)$

An example of an odd function is $f(x) = x^3$

Sketch the curve of $f(x) = x^3$

Examples: Justify algebraically why function is even or odd, or neither. Sketch the functions too.

a) $f(x) = x^6$ **is even.** **b)** $g(x) = x^3 + \frac{1}{x}$ **is odd.** **c)** $h(x) = 3x^2 + 2x - 8$ **is neither**.

Homework: Page 206 #1,2(Sketch the functions in 2)