

HW #18

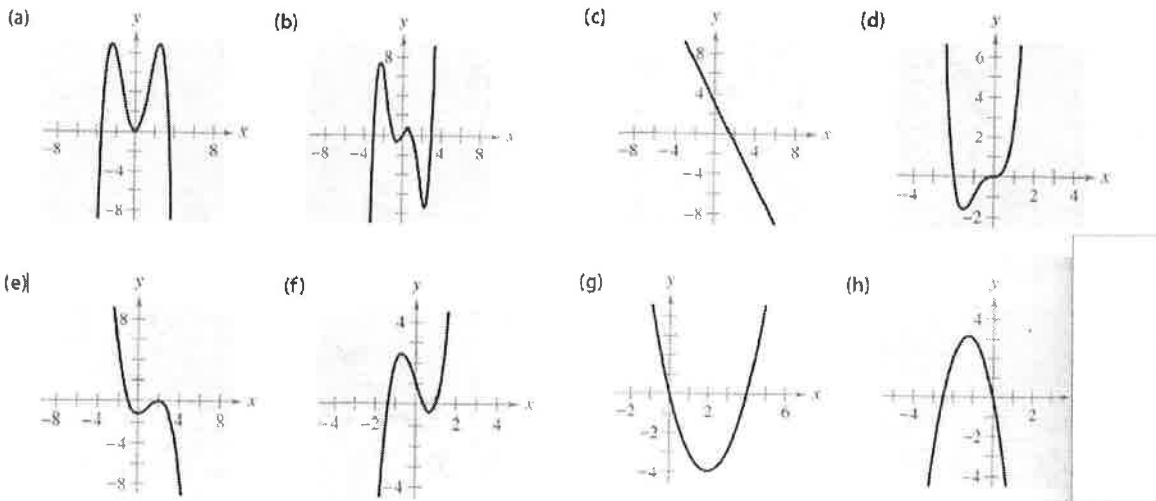
Algebra 2/Trigonometry
End Behavior Worksheet

Name _____
Date _____ Block _____

A. Given each function, identify the degree, leading coefficient, and describe the end behavior using proper notation. You are NOT ALLOWED TO USE A GRAPHING CALCULATOR!

Function	Degree	Leading Coefficient	End Behavior
1) $f(x) = x^3 - 2x^2 - x + 1$	3	1	As $x \rightarrow -\infty, f(x) \rightarrow -\infty$ As $x \rightarrow \infty, f(x) \rightarrow \infty$
2) $f(x) = 2x^5 + 2x^2 - 5x + 1$	5	2	As $x \rightarrow -\infty, f(x) \rightarrow -\infty$ As $x \rightarrow \infty, f(x) \rightarrow \infty$
3) $f(x) = -2x^5 - x^2 + 5x + 3$	5	-2	$\rightarrow \infty$ $\rightarrow -\infty$
4) $f(x) = -x^3 + 5x - 2$	3	-1	$\rightarrow \infty$ $\rightarrow -\infty$
5) $f(x) = 2x^2 + 3x - 4$	2	2	$\rightarrow \infty$ $\rightarrow \infty$
6) $f(x) = x^4 - 3x^2 + 2x + 1$	4	1	$\rightarrow \infty$ $\rightarrow \infty$

B. Match each of the graphs with the equations provided below. You are NOT ALLOWED TO USE A GRAPHING CALCULATOR!



- c 1) $f(x) = -2x + 3$ g 2) $f(x) = x^2 - 4x$ h 3) $f(x) = -2x^2 - 5x$
f 4) $f(x) = 2x^3 - 3x + 1$ d 5) $f(x) = x^4 + 2x^3$ a 6) $f(x) = -\frac{1}{4}x^4 + 3x^2$
e 7) $f(x) = -\frac{1}{3}x^3 + x^2 - \frac{4}{3}$ b 8) $f(x) = \frac{1}{5}x^5 - 2x^3 + \frac{9}{5}x$

C. Review - Find all zeros (real and imaginary) by factoring and/or taking the square root. Leave your answers in simplified radical/fractional form. [NOTE - If you forget how to factor #3 - 8, look back to your notes from our Review Unit!!]

1) $x^2 - 25 = 0$

$x^2 = 25$
 $x = \pm 5$

Zeros: $\{x=5, x=-5\}$

2) $x^2 - 6x + 9 = 0$

$\begin{matrix} 9 \\ \wedge \\ -3 \end{matrix} \begin{matrix} -3 \\ -3 \end{matrix} | -6$ $(x-3)(x-3) = 0$
 $x-3=0$ $x=3=0$
 $x=3$ $x=3$

Zeros: $\{x=3\}$

3) $x^3 - 4x^2 + 4x = 0$

$x(x^2 - 4x + 4) = 0$ $\begin{matrix} 4 \\ \wedge \\ -2 \end{matrix} \begin{matrix} -2 \\ -2 \end{matrix} | -4$
 $x(x-2)(x-2) = 0$
 $x=0$ $x-2=0$ $x-2=0$

Zeros: $\{0, 2\}$

4) $x^4 - x^2 - 20 = 0$

$\begin{matrix} -20 \\ \wedge \\ -5 \end{matrix} \begin{matrix} 4 \\ 4 \end{matrix} | -1$ $(x^2-5)(x^2+4) = 0$
 $x^2-5=0$ $x^2+4=0$
 $x^2=5$ $x^2=-4$
 $x = \pm\sqrt{5}$ $x = \pm\sqrt{-4}$

Zeros: $\{\sqrt{5}, -\sqrt{5}, i\sqrt{4}, -i\sqrt{4}\}$

5) $x^3 + 3x^2 - 4x - 12 = 0$

$x^2(x+3) - 4(x+3)$
 $(x^2-4)(x+3) = 0$
 $x^2-4=0$ $x+3=0$
 $x^2=4$ $x = \pm 2$ $x = -3$

Zeros: $\{2, -2, -3\}$

6) $x^3 - 4x^2 - 25x + 100 = 0$

$x^2(x-4) - 25(x-4)$
 $(x^2-25)(x-4) = 0$
 $x^2-25=0$ $x-4=0$
 $x^2=25$ $x=4$

Zeros: $\{5, -5, 4\}$

7) $5x^3 - 5x^2 = 10x$

$5x^3 - 5x^2 - 10x = 0$
 $5x(x^2 - x^2 - 2) = 0$ $\begin{matrix} -2 \\ \wedge \\ -2 \end{matrix} \begin{matrix} 1 \\ 1 \end{matrix} | -1$
 $5x(x-2)(x+1) = 0$
 $5x=0$ $x-2=0$ $x+1=0$
 $x=0$ $x=2$ $x=-1$

Zeros: $\{0, 2, -1\}$

8) $x^4 + 3x^2 = -2$

$x^4 + 3x^2 + 2 = 0$ $\begin{matrix} 2 \\ \wedge \\ 1 \end{matrix} \begin{matrix} 2 \\ 2 \end{matrix} | 3$
 $(x^2+2)(x^2+1) = 0$
 $x^2+2=0$ $x^2+1=0$
 $x^2=-2$ $x^2=-1$
 $x = \pm i\sqrt{2}$ $x = \pm i$

Zeros: $\{i, -i, i\sqrt{2}, -i\sqrt{2}\}$