

Graph the function and identify intervals on which the function is increasing, decreasing or constant.

30) $f(x) = |x+1| + |x-1| - 3$

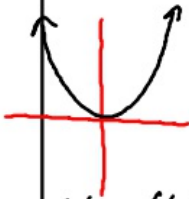
33) $g(x) = 3 - (x - 1)^2$

Use your calculator to find all local maxima and minima and the values of x where they occur.

43. $h(x) = -x^3 + 2x - 3$

45) $f(x) = x^2\sqrt{x+4}$

State whether the function is odd, even, or neither. Support graphically and confirm algebraically.



$f(x) = f(-x)$

A) $f(x) = 4x^2$

Graphically: Even Function
: Reflects over y-axis

Algebraically: $f(1) = 4(1)^2 = 4$
 $f(-1) = 4(-1)^2 = 4$

C) $f(x) = \sqrt{x^4 + 1}$ → Even

$f(x) = \sqrt{x^4 + 1}$

$f(1) = \sqrt{(1)^4 + 1} = \sqrt{2}$

$f(-1) = \sqrt{(-1)^4 + 1} = \sqrt{2}$

E) $f(x) = 4x + x^2$

$f(1) = 5$

$f(-1) = 4(-1) + (-1)^2 = -3$

Neither Even or Odd

B) $f(x) = 3x^3$

Graphically: Odd Function

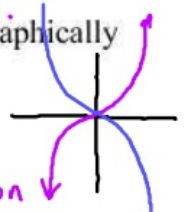
Algebraically: $f(1) = 3(1)^3 = 3$
 $f(-1) = 3(-1)^3 = -3$

D) $f(x) = 4x + x^3$ $f(x) = -f(-x)$

$f(x) = 4x + x^3$ Odd

$f(1) = 5$

$f(-1) = 4(-1) + (-1)^3 = -5$



Find all horizontal and vertical asymptotes

Don't forget to make sure that what appears to be a vertical asymptote is not actually a hole

A) $f(x) = \frac{x+1}{x}$

VA: Set denominator = 0
 $x = 0$ VA

HA: $f(x) = \frac{x+1}{1x}$ $y = 1$

If the powers are the same use the leading coefficients

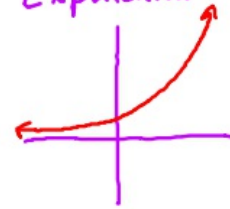
C) $f(x) = \frac{-3x^2+1}{x^2-1}$

VA: $x^2-1=0$
 $+1 \quad -1$ $x^2=1$ $x = \pm 1$

HA: $y = -3$

B) $f(x) = 2^x$

$f(x) = 2^x$
 exponential!



HA: x-axis
 $y = 0$

VA: None

D) $f(x) = \frac{3x-9}{x^2-9}$

VA: $x^2-9=0$
 $x^2=9$
 $x=3$ $x=-3$
 ↑ ↑
 Hole VA

HA: Denominator has the higher power

$y = 0$

E) $f(x) = \frac{3x^3+3}{x^2+1}$

$f(x) = \frac{3x^3+3}{x^2+1}$

HA: Numerator power is bigger: **NO HA**

VA: $x^2+1 \neq 0$
 No VA

F) $f(x) = \frac{x+5}{x^3-27}$

$f(x) = \frac{x+5}{x^3-27}$

HA: $y = 0$

VA: $x^3-27=0$
 $x=3$

Determine if each function is continuous. If the function is not continuous, find the x-axis location of each discontinuity and classify each discontinuity as infinite or removable. Also find any horizontal asymptotes.

A) $f(x) = \frac{3x^2 + 15x}{x + 5}$

B) $f(x) = \frac{x^2 + 3x}{x + 2}$

C) $f(x) = \frac{9x + 6}{x^2 - 4}$

D) $f(x) = \frac{9x + 18}{x^2 - 4}$

E) $f(x) = \frac{x - 5}{x^2 - 4x - 5}$