What Exactly is a Polynomial Function ???

The following is a list of criteria in order for a given relation to be classified as a **Polynomial Function**:

1) the relation is expressed in terms of one variable (i.e. x)

2) each term in the relation is a power with the variable as the base

3) the degree of each term is a whole number

4) the relation is a function

5) the domain of the relation is any real number

6) the range of the relation is any real number OR it may have an upper boundary or a lower boundary but not both

7) the relation cannot have any horizontal or vertical asymptotes

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On the reverse side of this page is a list of examples of polynomial functions and a list of examples of non-polynomial functions.

Identify why each of the non examples are not polynomial functions.

Polynomial Concept Attainment Activity

Compare and contrast the examples and non-examples of polynomial functions below. Through reasoning, identify 3 attributes of every polynomial function that distinguish them from non-polynomial functions:

Yes Examples	Non Examples
$y = x$	$y = \sqrt{x}$
$y = 2x - 1$	$f(x) = 3x^{\frac{1}{2}} - x$
$y = -\frac{2}{5}x$	$x = -6$
$y = x^2$	$x^2 + y^2 = 16$
$y = (x - 2)^2 + 1$	$h(x) = \sqrt[3]{x}$
$f(x) = -x^2 + x$	$y = \sin \beta$
$y = -0.2(4x - 3)(x + 3)$	$y = \frac{1}{x-2}$
$y = x^3 + 2x^2 - x + 11$	$y = 2^x$
$y = 4$	$y = \frac{x-1}{x^2 - x + 1}$
$h(x) = -x^4 + \frac{1}{2}x^2 - 3$	
$y = -4x^0 + 4$	
$y = x(x^2 - 4)(x + 2)$