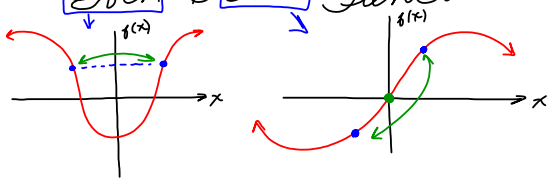
October 25, 2017

2.6 Even & odd Functions



Test: replace x with $-x$

$f(x) = x^2 + 3$

① $f(-x) = (-x)^2 + 3$

$= (-x)(-x) + 3$

$= \boxed{x^2 + 3}$ ← even

Oct 25-10:54 AM

② $f(x) = x^3 - 2x$ (odd)

Test even

$f(-x) = (-x)^3 - 2(-x)$

$= (-x)(-x)(-x) + 2x$

$= x^2(-x) + 2x$

$= \boxed{-x^3 + 2x}$ * not even

odd $f(-x) = (-x)^3 - 2(-x)$

$= -x^3 + 2x$

$= -(x^3 - 2x)$

$f(-x) = -f(x)$ ← odd

Oct 25-11:10 AM

$f(x) = x + 1$

T.1 $f(-x) = (-x) + 1$

$= \boxed{-x + 1}$ not even ✓

T.2 $f(-x) = (-x) + 1$

$= -x + 1$

$= -(x - 1)$ not odd

($x - 1$ is not $f(x)$)

So, $f(x) = x + 1$ is neither

Oct 25-11:20 AM

① $f(x) = x^4 - 4x^2$

② $f(x) = x + \frac{1}{x}$

Oct 25-11:23 AM

2.7 Combining Functions

$f(x) = 2x - 5$ & $g(x) = x^2 - 4$

* Operations on Functions

① Add

② Subtract

③ Multiply

④ Divide

⑤ Compose

Oct 25-11:32 AM

① $f(x) + g(x)$

$(2x - 5) + (x^2 - 4)$

$2x - 5 + x^2 - 4$

$\boxed{x^2 + 2x - 9}$

② a) $f(x) - g(x)$

$(2x - 5) - (x^2 - 4)$

$2x - 5 - x^2 + 4$

$\boxed{-x^2 + 2x - 1}$

b) $g(x) - f(x)$

$(x^2 - 4) - (2x - 5)$

$x^2 - 4 - 2x + 5$

$\boxed{x^2 - 2x + 1}$

Oct 25-11:34 AM

(3) $f(x) \cdot g(x)$

$(2x-5)(x^2-4)$

$2x^3 - 8x - 5x^2 + 20$

$\boxed{2x^3 - 5x^2 - 8x + 20}$

Oct 25-11:39 AM

(4) $\frac{f(x)}{g(x)} = \frac{2x-5}{x^2-4 \neq 0}$

* $g(x) \neq 0$

$x^2 \neq 4$

$x \neq \pm 2$

Domain: $(-\infty,-2) \cup (-2,2) \cup (2,\infty)$

Oct 25-11:40 AM

(5) Composition of Functions

$(f \circ g)(x) = f(g(x))$

$= f(x^2-4)$

$= 2(x^2-4) - 5$

$= 2x^2 - 8 - 5$

$= \boxed{2x^2 - 13}$

$(g \circ f) = g(f(x))$

$= g(2x-5)$

$= (2x-5)^2 - 4$

$= (2x-5)(2x-5) - 4$

$= 4x^2 - 20x + 25 - 4$

$= \boxed{4x^2 - 20x + 21}$

Oct 25-11:42 AM