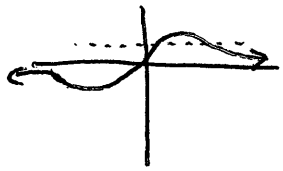
2017

5.3 Inverse Function p. 343-345

#9, 11, 13, 16, 23, 25, 29, 31, 35, 37, 43, ~~71, 75, 81~~ 63-66 all

16) Horizontal Line Test

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



Not one-to-one, does not pass horizontal line test, the inverse is not a function.

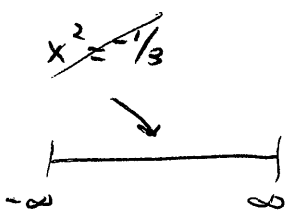
23) Determine if function is strictly monotonic (always increasing or decreasing) If monotonic, function has inverse function

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

$f'(x) = -1 - 3x^2$

$0 = -1 - 3x^2$

$3x^2 = -1$ no critical pt.



f is decreasing on $(-\infty, \infty)$, there strictly monotonic, and has an inverse.

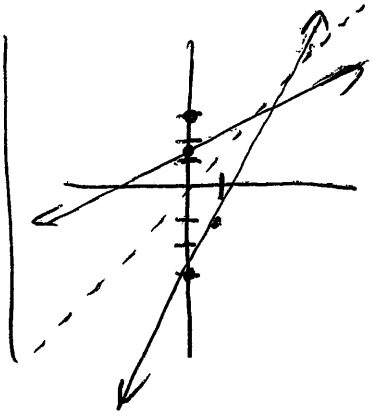
35) Find inverse of f: $f(x) = 2x - 3$ $y = 2x - 3$

$x = 2y - 3$

$x + 3 = 2y$

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

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



Evaluate derivative of inverse function at a point

$g(x)$

$g'(a) = \frac{1}{f'(b)}$

63) $f(x) = 5 - 2x^3$, $a = 7$

$5 - 2x^3 = 7$

$-2x^3 = 2$

$x^3 = -1$

$x = -1$

$f'(x) = -6x^2$

$f'(-1) = -6(-1)^2 = -6$

$f(-1) = 7$	$g(7) = -1$
$f'(-1) = -6$	$g'(7) = -\frac{1}{6}$

64) $f(x) = x^3 + 2x - 1$, $a = 2$

$2 = x^3 + 2x - 1$ Find $g'(2)$

$3 = x^3 + 2x$

$x = 1$

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

$f'(1) = 3(1)^2 + 2$

$f'(1) = 5$

$f(1) = 2$	$g(2) = 1$
$f'(1) = 5$	$g'(2) = \frac{1}{5}$

65) $f(x) = \frac{1}{27}(x^5 + 2x^3)$ $a = -11$ Find $g'(-11)$

$-11 = \frac{1}{27}(x^5 + 2x^3)$

$x = -3$

$f'(x) = \frac{1}{27}(5x^4 + 6x^2)$

$f'(-3) = \frac{1}{27}(5(-3)^4 + 6(-3)^2)$

$= \frac{459}{27} = 17$

$f(-3) = -11$	$g(-11) = -3$
$f'(-3) = 17$	$g'(-11) = \frac{1}{17}$