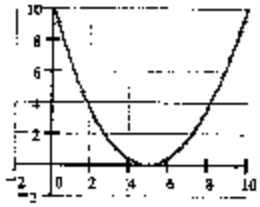
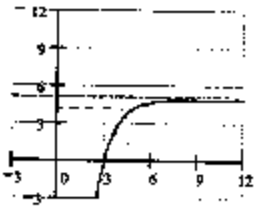
5.) (10 pts) The graphs of f and g are given in the figures below, along with the asymptote to the graph of g.



$y = f(x)$



$y = g(x)$

Using the graphs, determine approximate values (to the nearest integer) for each of the following:

(a) $f(g(3))$ 10 (b) $g^{-1}(f(8))$ 4 (c) $f^{-1}(0)$ 5

(d) $f(g(1{,}000{,}000))$ 0 (e) $g(g^{-1}(3))$ 3

6.) (15 pts) Determine the *zeros* (if any) and describe the behavior as $x \to \infty$ of the following functions: [No explanation necessary.]

(a) $f(x) = \dfrac{5(x+1)(1-x)}{(x+2)(x-3)}$ zeros: $x = -1, x = 1$

as $x \to \infty$, $f(x) \to -5$

(b) $g(x) = \dfrac{(x^2+1)}{(x+2)}$ zeros: none

as $x \to \infty$, $g(x) \to \infty$

(c) $h(x) = -2x(x-3)(x+4)$ zeros: $x = 0, x = 3, x = -4$

cubic with negative leading co-eff... ⟶ as $x \to \infty$, $h(x) \to -\infty$

(d) $j(x) = (x-2)^3(3x+1)$ zeros: $x = 2, x = -\frac{1}{3}$

quartic with positive leading co-eff ⟶ as $x \to \infty$, $j(x) \to \infty$

(e) Using the function from part (d), write a formula for $m(x)$, given $m(x) = j(x-1)$. [No need to "expand," but do simplify.]

$m(x) = ((x-1)-2)^3(3(x-1)+1)$

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