

Show all your work if you want to receive credit.

- (1) Given the functions $f(x) = \sqrt{x^3}$, and $g(x) = x^2 + 8x$, $x \geq 4$, find the following
 - (a) Domain and range of g
 - (b) $(g \circ f)(x)$ (Simplify)
 - (c) $f^{-1}(x)$
 - (d) $g^{-1}(x)$

- (2) Draw the graph of $y = 1.1x^3 - 12.8x^2 - 2.9x + 6.1$. Be sure to state the viewing rectangle.

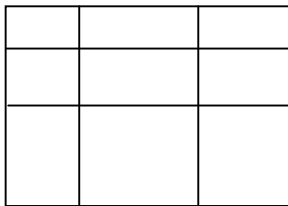
- (3) Suppose that z varies inversely with the squareroot of x and directly with the cube of y . If $z = 3$ when $x = 3$ and $y = 4$, find y when $x = 7$ and $z = 5$.

- (4) Find the average rate of change of $f(x) = x^2 - 2x + 2$ on the interval $3 \leq x \leq 3 + h$

- (5) Find the local maximum and minimum points for $y = 7.3 + 2.6x - 1.4x^3$

- (6) A piece of wire 12 inches long is bent into a square and a circle. Find an expression for the maximum area enclosed by the square and circle.

- (7) 1200 feet of fencing is used to create the group of pens shown. Find the maximum area that can be contained by pens.



- (8) A restaurant currently has 36 tables that make a profit of \$144 each, per night. Market research has shown that for each additional table, the profit per table will decreased by \$12. What is the total number of tables that the restaurant should use in order to maximize profit?

- (9) Suppose a car rental agency uses the greatest integer function to specify that the price on car rentals. The equation is given by

$$P(x) = \begin{cases} 30 & 0 < x < 1 \\ 30 + 25\|x\| & 1 \leq x \end{cases}$$

where x is the number of days the car is rented and P is the cost in dollars. Sketch the graph of the function on $0 \leq x \leq 5$.