hw-19-mathematical-model

Due: **12/13/2015 at 06:00am EST.**

Students will be able to:

- Create Mathematical Models as a Function
- Evaluate Mathematical Model as a Function

Functions and symbols that WeBWorK understands.

Links to some useful WeBWorK pages for students

1. (1 pt) We consider a rectangular field that has perimeter of 404 yards.

1. Determine formula for the area of the field, A, in terms of the length of the field, x.

$A(x) =$ _____

2. What is the domain of the function A?

Domain of $A(x)$ is _____

Note: use interval notation for the domain

3. If $x = 198$, what is A?

$A(198) =$ _____

4. If $A(x) = 8601$, what is x?

$x =$ _____

2. (1 pt) Let $P = (x,y)$ be a point on graph of $y = x^2 - 15$.

(a) Express the distance d from P to the point $(1,-2)$ as a function of x.

$d(x) =$ _____

(b) What is d if $x = 0$

$d(0) =$ _____

(c) What is d if $x = 3$

$d(3) =$ _____

3. (1 pt) An open box with a square base is to be made from a square piece of cardboard 27 inches on a side by cutting out a square from each corner and turning up the sides. See the figure on page 263 of our text.

(a) Express the volume V of the box as a function of the length x of the side of the square cut from each corner.

$V(x) =$ _____

(b) What is the volume if a 9.4-inch square is cut out?

$V(9.4) =$ _____

(c) What is the volume if a 11-inch square is cut out?

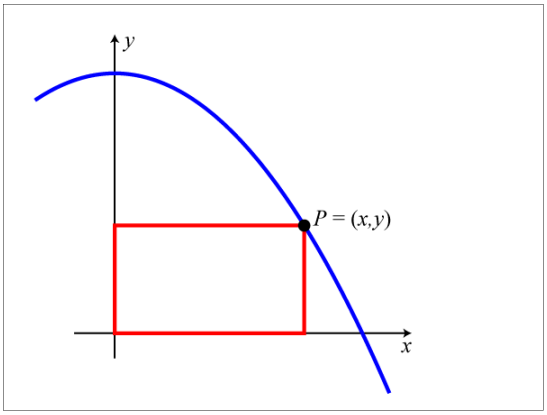
$V(11) =$ _____

(d) What is domain of $V(x)$?

Domain of $V(x)$ is _____

Note: use interval notation for the domain

4. (1 pt) A rectangle has one corner in quadrant I on the graph of $y = 64 - x^2$, another at the origin, a third on the positive $y-$axis, and the fourth on the positive $x-$axis. See the figure below



(1) Width of rectangle in terms of x is _____

(2) Height of rectangle in terms of x is _____

(3) Express the area A of the rectangle as a function of x.

Area $A(x) =$ _____

(4) What is the domain of A?

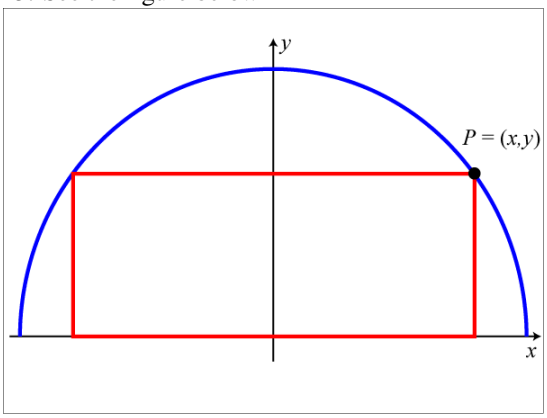
Domain of A is _____

Note: use interval notation for the domain

(5) Graph $A = A(x)$. For what value of x is A the largest?

Value of x that makes $A(x)$ largest is $x \approx$_____

5. (1 pt) A rectangle is inscribed in a semicircle of radius $r = 3$. See the figure below



Let $P = (x,y)$ be the point in quadrant I that is a vertex of the rectangle and is on the semicircle of radius $r = 3$ shown above.

(1) Express the area A of the rectangle as a function of x.

$A(x) =$ _____

(2) Express the perimeter P of the rectangle as a function of x.

$P(x) =$ _____

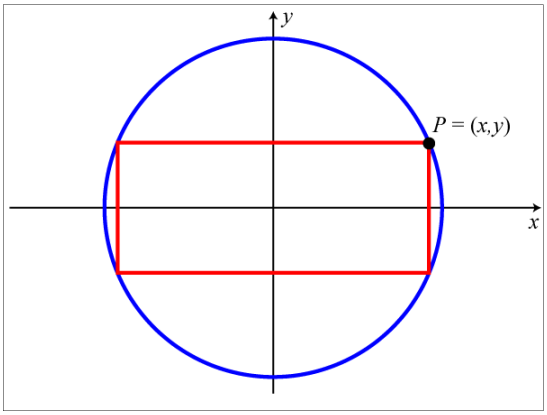
(3) Graph $A = A(x)$. For what value of x is A the largest ?

$x \approx$ _____

(4) Graph $P = P(x)$. For what value of x is P the largest ?

$x \approx$ _____

6. (1 pt) A rectangle is inscribed in a circle of radius $r = 4$. See the figure below



Let $P = (x, y)$ be the point in quadrant I that is a vertex of the rectangle and is on the circle of radius $r = 4$ shown above.

(1) Express the area A of the rectangle as a function of x.

$A(x) =$ _____

(2) Express the perimeter P of the rectangle as a function of x.

$P(x) =$ _____

(3) Graph $A = A(x)$. For what value of x is A the largest ?

$x \approx$ _____

(4) Graph $P = P(x)$. For what value of x is P the largest ?

$x \approx$ _____