Name: _____ Date: _____

PCH - Modeling with Functions

1. A rectangular piece of cardboard has dimensions of 20 cm by 70 cm. Congruent squares of x cm on each side are cut from each of the 4 corners of this rectangle and the sides are folded up to form an open rectangular box. Express the volume of this box as a function of x.

2. A closed rectangular shaped box is x units wide and 3 times as long. Let h be the altitude of this box. If the total surface area of this box is 150 square units, express the volume of the box as a function of x.

3. The vertices of a right triangle are $(0,0)$, $(x,0)$, and $(0,y)$. If $(6,2)$ lies on the hypotenuse of the triangle, express the area of the triangle as a function of x.

4. A right triangle has one vertex on the graph of $y = 7 - x^2$, where $x > 0$ at (x,y), another at the origin, and the third on the positive x-axis at $(x,0)$. Express the area of the triangle as function of x.

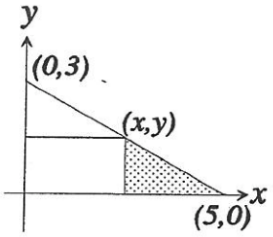
5. A rectangle has one corner on the graph of $y = 9 - x^2$, where $x > 0$, at (x, y), another corner at the origin, a third corner on the positive x-axis at $(x, 0)$, and a fourth corner on the positive y-axis at $(0, y)$. Express the area of the rectangle as function of x.

6. Let $P = (x, y)$ be a point on the graph of $y = \sqrt{x}$. Express the distance d from P to the point $(1, 0)$ as a function of x.

7. A rectangle has a side measuring x inches and a diagonal measuring 10 inches. Express the area of the rectangle as a function of x .

8. A water tank is in the shape of an inverted right cylindrical cone with altitude 50 feet and radius 14 feet. The tank is filled to a depth of h feet. Let x be the radius of the circle at the top of the water level. Express the volume of the water as a function of x.

9. Express the area of the shaded region as a function of x .



10. A wire 12 meters long is to be cut into two pieces. One piece will be shaped as an equilateral triangle and the other piece will be shaped as a circle. If x represents the length of a side of the equilateral triangle, express the total area A enclosed by the pieces of wire as a function of x .