NAME_____DATE_____PER._____

REVIEW #19: FUNCTIONS

Draw sketches as necessary, <u>show all work</u>, and <u>simplify answers</u>.

1. a) _____ b) _____ c) _____	Use the following sets of points to answer the questions below: (-2, 7), (0, 4), (-5, 1), (3, 2), (4, 1), (-2, 3) a) Is this set of points a function? b) State the domain. c) State the range.
_____2.	Find the range of the function $f(x) = 2x - 5$ given the domain is $D = \{1, -4, 0, 7\}$
_____3.	Solve the equation for 'c': $3a + 2c = 4m$.
_____4.	Solve the equation for 'h': $V = lwh$

5. A right cone has a diameter that is twice its height.

_____	a) Find the radius in terms of the height.
_____	b) Express the volume, V, as a function of the height, h.

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	c) Find the volume of the cone if the height is 6 centimeters.
_____	
_____	d) If the volume is 243π cm^3, find the height of the cone.

6. At a sand and gravel plant, sand is falling off a conveyor and onto a conical pile at the rate of 5π cubic feet per minute. The diameter of the base of the cone is approximately three times the altitude.

	a) Express the volume of sand in the pile as a function of its height.
_____	
_____	b) Find the volume of the sand in the pile when it is 15 feet high.
_____	c) After 4 minutes have gone by, find the volume and corresponding height of the sand pile.

7. A closed box with a square base of side x has a surface area of 100 ft^2.

	a) Find the length of the height, y, in terms of the side of the base, x.
_____	

	b) Express the volume, V, of the box as a function of x.
_____	
_____	c) Find the volume when x = 4 feet.

8. An empty cylindrical tank has a height of 20 meters and a radius of 4 meters. Water is poured into the tank at a constant rate. After 5 minutes, the height of the water in the tank is 5 meters.

a) Sketch a picture of the problem situation.	
_____	b) What is the volume of the water after 5 minutes.
_____	c) Express the volume, V, of the water in the tank as a function of the height, h.
_____	d) What is the volume of the water if the height is 12 meters?

9. A rectangular dog pen is constructed using a barn wall as one side and 60 m of fencing for the other three sides.

a) Sketch a picture of the problem situation.	
_____	b) Let x be the width of the pen touching the barn and y be the length of the pen that is parallel to the barn. Express the length of the pen in terms of the width x.

	c) Express the area of the pen in terms of the width x.
_____	
_____	d) Find the area of the pen when x is 15 meters.

10. An aquarium without a glass top of height 1.5 feet is to have a volume of 6 ft³.
Let x denote the length of the base and let y denote the width.

	a) Express y as a function of x.
_____	
_____	b) Express the total number of square feet of glass needed as a function of x.

11. The area bounded by a vertical line through the point (x, 0) and the line y = 4x
is revolved around the x-axis.

	a) Give the coordinates of a point on the non-vertical line in terms of x.
_____	
_____	b) Find the volume of the resulting solid in terms of x.
_____	c) Find the volume when x = 3.

12. A cylindrical can has a volume of 400π cm³. The material for the top and bottom costs 2 cents/cm². The material for the vertical surfaces costs 1 cent/cm².

_____	a) Find the height of the cylinder in terms of the radius.
_____	b) Express the surface area of the can as a function of the radius, r.
_____	c) Find the area when r = 4 cm.
_____	d) Find the cost of the material to cover the can. Answer in dollars (use the π key).

13. Sand is poured out of a container onto the beach and forms a right circular cone. The height of the cone is always equal to the diameter of the cone.

a) Sketch a picture of the problem situation.	
_____	b) Find the height in terms of x, the radius of the cone.
_____	c) Find the volume of the cone in terms of x.

	d) If the volume is 144π in^3, find the height and the radius of the conical pile.
_____	

14. A baseball diamond is a square with 90-foot sides. A runner has taken a 9-foot lead from first base. At the moment the ball is pitched, the runner runs toward second base at 27 ft/sec.

a) Sketch a picture of the problem situation.	
_____	b) How many seconds will it take to get to second base with his 9-foot lead?
_____	c) Express the runner's straight-line distance, d, from home plate as a function of the time, t, after the ball is thrown.
_____	d) How far did the runner go after 2 seconds?