Applied Math 40S

Design and Measurement - Test Review

Distance Around an Object

Perimeter – add the distances together
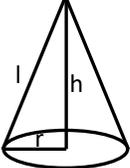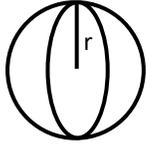
Circumference (Circle) = $2\pi r$

Area

Rectangle = L x W

Circle = πr^2

Triangle = ½ base x height

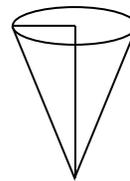|		Surface Area	Volume
Box		$2LW + 2LH + 2WH$	$L \times W \times H$
Cylinder		$2\pi rh + 2\pi r^2$	$\pi r^2 h$
Cone		$\pi rl + \pi r^2$ l = slant	$1/3\pi r^2 h$
Sphere		$4\pi r^2$	$4/3\pi r^3$

NOTES:

Adding tax use amount x 1.13

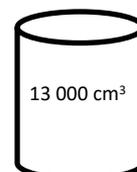Adding extra amount use amount x 1.05 (for 5%), amount x 1.10 (for 10%)

Test Review Questions

1. A kitchen floor measures 16 ft by 12 ft. James wants to tile the floor using 12" by 12" tiles.
   a) If he allows an extra 5% for waste, how many tiles will James need to use?
   b) If tiles come in boxes of 8 for $12.75 (including taxes) how much will James pay for the tiles?
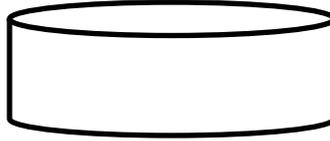
2. Kyla works for a company that makes paper cones for use at a water dispenser. Each cone has an open top and measures 6 cm in diameter at the top with a height of 4 cm.
   a) If an extra 5% is allowed for overlapping the paper so it can be glued together, how much paper is required for 100 such cups?
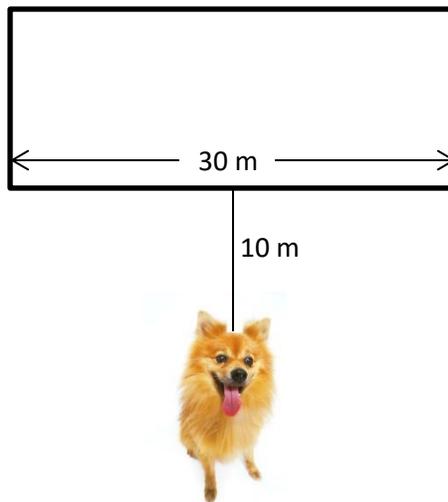   b) What is the volume of water that can fit inside each cup?

3. Rufus is emptying his outdoor swimming pool. It measures 8 m by 6 m by 2 m. If his hose can eliminate 30 000 cm^3 of water every minute, how many hours will it take to empty the swimming pool?

4. Jill needs a hole excavated in her back yard. The hole is to measure 8 m by 5 m by 25 cm. How many cubic meters of earth need to be removed?

5. A room measures 22' by 15' with a height of 8'. There is a door 2.5' by 6.5', a window of 4' by 3' and a closet door of 5' by 6.5'. Joanne wants to paint the walls using **two coats** of paint.
   a) Find the total area to be painted for the two coats.
   b) If paint covers 250 ft^2 per can, how many cans are needed for the job?
   c) If paint costs $38.50 per can **plus tax**, find the total cost of the paint.

6. A cement truck holds 4 m^3 of cement. The cement is to be poured into holes with each hole requiring 13 000 cm^3 of cement. How many holes can the truck completely fill?
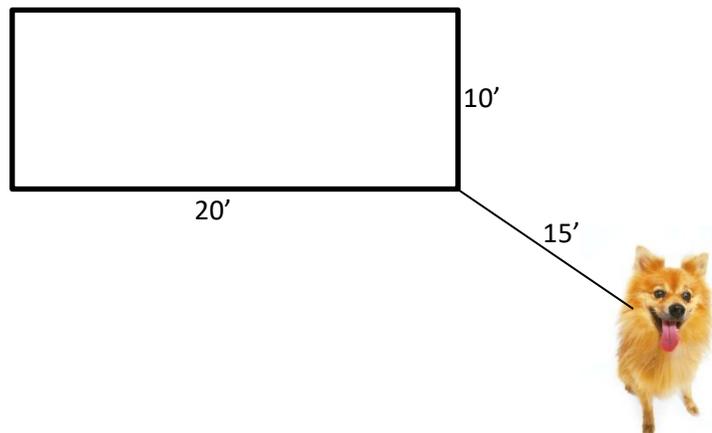
13 000 cm^3

7. Christophe wants to fill his circular pool with water. The pool is 12 m in diameter and he wants to fill it to a depth of 1.5 m. If water flows into the pool at 8 m³ per hour, how long will it take to fill the pool?

8. A room is tiled using tiles that measure 24" by 24". The room has a total of 30 tiles. Randy wants to re-tile the room using tiles that measure 12" by 12".
   a) How many tiles will he need if he allows an extra 5% for waste?
   b) Cases of 10 sell for $17.95 plus tax. Find the total cost for the job.

9. A dog is tied to a rope that is 10 m long. The rope is attached to the middle of a house that is 30 m long. Find the total area available for the dog to explore.
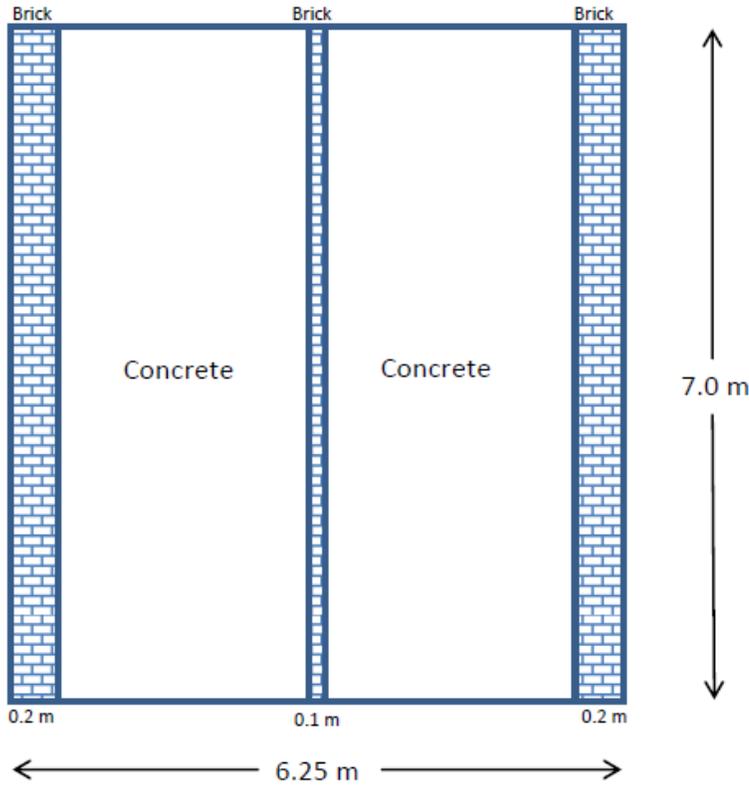
30 m

10 m

10. Another dog is attached to a 15 foot rope that is anchored to the corner of a shed measuring 20' by 10'. Find the total area available for this dog to explore.

10'

20'

15'

Solutions

1. A) 202 tiles.   B) 26 boxes x $12.75 = $331.50

2. A) 4948.01 cm^2 B) 37.70 cm^3

3. V = 96 000 000 cm^3 ÷ 30 000 cm^3 = 3200 minutes. 53.33 hours.

4. 10 m^3

5. A) 592 – 16.25 – 12 – 32.5 = 531.25. 2 coats = 1062.5 ft^2 B) 5 cans   C) $217.53

6. 307

7. 21.21 h

8. A) 120 x 1.05 = 126 tiles   B) $233.35 x 1.13 = $263.69

9. $\pi(10)^2$ ÷ 2 = 157.08 m^2

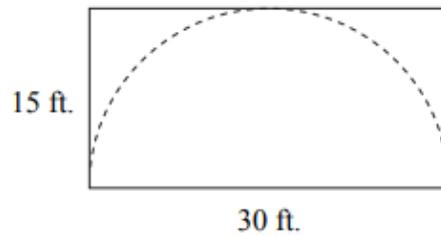10. 3/4 $(\pi 15^2)$ + 1/4 $(\pi 5^2)$ = 549.77 ft^2

11.

The Hacketts are planning to pour a concrete driveway. The driveway will be 6.25 m by 7.0 m by 0.10 m deep, and the concrete pads will be bordered with brick as shown in the diagram below.

Brick		Brick		Brick
	Concrete		Concrete	

7.0 m

0.2 m   0.1 m   0.2 m

6.25 m

If concrete costs $145.25 per m³, find the total cost of the concrete portion of the driveway. Make sure to include both taxes. Show your work.

12.

A traditional plains tipi is built using a rectangular canvas that is twice as long as it is wide. The diagram below shows how a semicircle would be cut out of a canvas with dimensions of 30 ft. (length) and 15 ft. (width). (Diagram is not drawn to scale.)

15 ft.

30 ft.

a)   Calculate how much canvas is left over after the semicircle has been cut out.

(2 marks)

b)   You would like to construct a tipi with both dimensions three times greater than those for the tipi in (a). Given that canvas is only sold in a rectangular shape, how much will the canvas cost if the price of canvas is $7.39/ft^2, plus taxes? (Note: GST = 5%, PST = 8%)
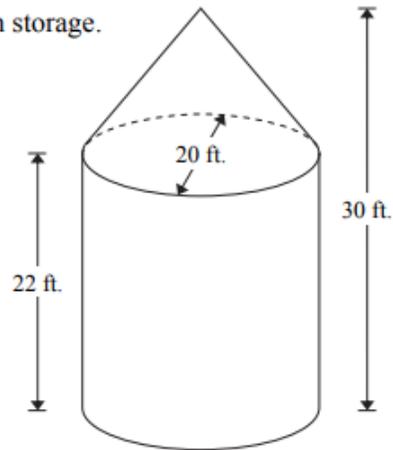
13,

Sheena is wrapping boxes using a roll of wrapping paper with a total area of 3.5 m². Each box has a 20 cm width, 20 cm length, and 40 cm height. If Sheena uses 20% extra paper on each box, how many boxes can she wrap? Show your work.

14.

The Menard family has a grain farm. They own 5 bins for grain storage.

Each bin
- is composed of a cone and a cylinder
- is 30 feet tall (from the top of the cone to the bottom of the cylinder)
- has a diameter of 20 feet
- has a cylinder 22 feet tall

(Diagram is not drawn to scale.)

20 ft.

30 ft.

22 ft.

a)   Calculate the volume of one grain bin. Show your work.

(2 marks)