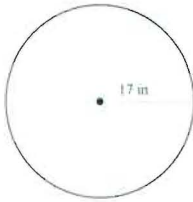# KEY - SOLUTIONS

Geometry: Circumference, Area, and Volume STUDY GUIDE

_____ 1. Find the circumference of the circle to the nearest tenth. Use 3.14 for π.
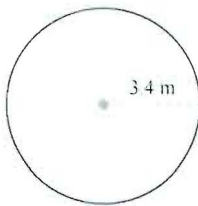
(circle with radius labeled 17 in)

$C = d\pi$ or $C = 2\pi r$

$r = 17$, so $d = 34$

$C = 34(3.14) = 106.8$ in

_____ 2. Find the area of the circle to the nearest tenth. Use 3.14 for π.

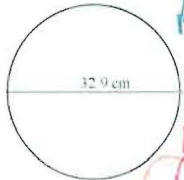(circle labeled 3.4 m)

$A = \pi r^2$

$r = 3.4$

$A = (3.14)(3.4)^2 = (3.14)(11.56) = 36.3 \text{ m}^2$

_____ 3. Find the area of a circle with diameter 31.6 cm, both in terms of π and to the nearest tenth. Use 3.14 for π.

_____ 4. The diameter of a circle is 14 m. What is the area of the circle? Use 3.14 for π.

_____ 5. Estimate the area of the circle. Use 3 to approximate π.

(circle labeled 32.9 cm)

$A = \pi r^2$ $d = 32.9$
$A = 3r^2$ $r = 16.45$
$A = 3(16.45)^2$
$A = 811.8 \text{ cm}^2$

$A = \pi r^2$ $d = 14$
$A = 3.14(7)^2$ $r = 7$
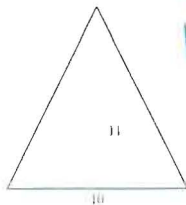$A = 3.14(49)$
$A = 153.9 \text{ m}^2$

$A = \pi r^2$
$d = 31.6$, so $r = 15.8$
$A = (3.14)(15.8)^2$
$A = (3.14)(249.64)$
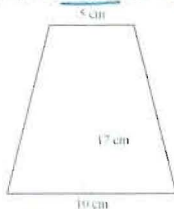$A = 783.9 \text{ cm}^2$

_____ 6. Find the area of the triangle.

(triangle with sides labeled 11 and 10)

$A = \dfrac{bh}{2} = \dfrac{10(11)}{2} = \dfrac{110}{2} = 55 \text{ units}^2$

$b = 10$
$h = 11$

_____ 7. Find the area of the trapezoid.

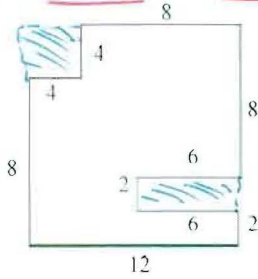(trapezoid labeled 5 cm, 17 cm, 10 cm)

$A = \dfrac{(b_1 + b_2)h}{2}$

$b_1 = 5$
$b_2 = 10$
$h = 17$

$A = \dfrac{(5+10)(17)}{2} = \dfrac{15(17)}{2} = \dfrac{255}{2} = 127.5 \text{ cm}^2$

_____ 8. Find the perimeter and area of the figure.

P = ADD ALL SIDES

$P = 8+8+6+2+6+2+12+8+4+4$

$P = 60$ units

A = LARGE SQUARE − SMALL RECTANGLES.

$A = (12)(12) - [4(4)+6(2)] = 144 - 28 = 116$ units^2

_____ 9. Amber is using 3 ft by 14 ft sheets of wallpaper to cover a rectangular wall that has an area of 240 ft². What is the least number of sheets of wallpaper she will need? Area of sheet ⇒ $A = 3(14) = 42$ ft^2

$240/42 \neq 6$ sheets of wallpaper

_____ 10. If two pieces of ice have the same volume, the one with the greater surface area will melt faster because more of its surface area is exposed to the air, which is warmer than the ice. Four pieces of ice (P_1, P_2, P_3, and P_4) have the same volume. Each piece of ice is shaped like a rectangular prism. Find the piece of ice that melts faster than the others.

Piece	Length	Width	Height	SURFACE AREA
P_1	32 ft	3 ft	3 ft	402 ft^2
P_2	18 ft	4 ft	4 ft	320 ft^2
P_3	16 ft	6 ft	3 ft	324 ft^2
P_4	18 ft	8 ft	2 ft	392 ft^2

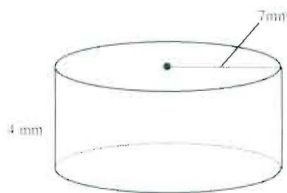_____ 11. Find the volume of the figure in terms of x.
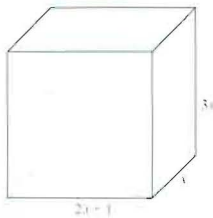
$V = lwh = (3x)(2x+1)(x)$

$V = (3x)(2x^2+x)$

$V = 6x^3 + 3x^2$

_____ 12. Find the volume of the cylinder. Round your answer to the nearest tenth.
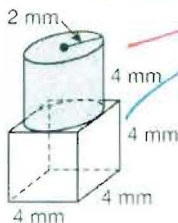
$V = \pi r^2 h$

$r = 7$ $V = (3.14)(7^2)(4)$

$h = 4$ $V = (3.14)(49)(4)$

$V = 615.4$ mm^3

_____ 13. Find the volume of the composite figure. Round to the nearest tenth. Use 3.14 for π.

$V = \pi r^2 h$

$= (3.14)(2^2)(4)$

$= (3.14)(4)(4)$

$= (3.14)(16)$

$V = 50.24$ mm^3

$V = lwh$

$V = (4)(4)(4)$

$V = (16)(4)$

$V = 64$ mm^3
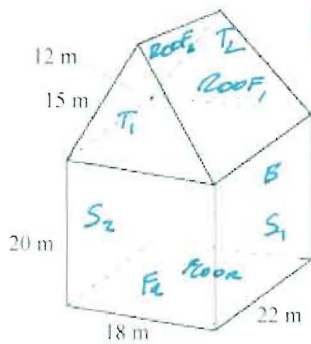
TOTAL: $V = 50.24 + 64 = 114.2$ mm^3

Short Answer

1. A farmer drew the following figure as an outline for a barn that he is planning to build.

Part A: How many square meters of lumber will he need to build the exterior of the barn including the roof and floor? Show your work.

Part B: How many cubic meters of straw would it take to fill the barn all the way to the roof? Show your work.

(A) $A_F = 20(18) = 360$ $A_{Floor} = 18(22) = 396$

$A_B = 360$

$A_{S_1} = 22(20) = 440$ $A = 2872 m^2$

$A_{S_2} = 440$

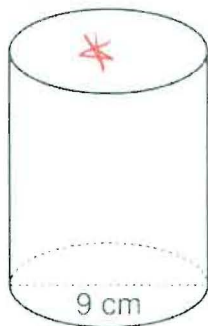$A_{R_1} = 15(22) = 330$

$A_{R_2} = 330$

$A_{T_1} = 108$ $A_{T_2} = 108$

(B) $V = lwh$

$V = \frac{bh}{2} L$

$V = 18(20)(22) = 7920$

$V = \frac{(12)(18)(22)}{2} = 2376$
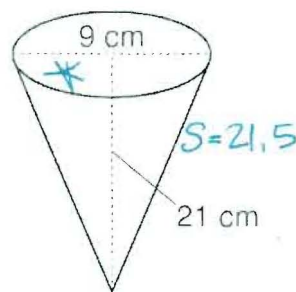
$V = 10,296 m^3$

2. A new movie theater is going to sell popcorn. The manager has the choice of the three different size containers shown. The manager plans to charge $4.75 for a container of popcorn.
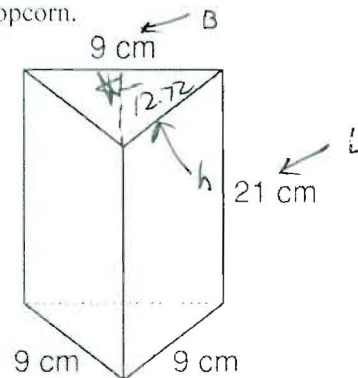
9 cm ← B

9 cm

12.72

21 cm

S = 21.5

21 cm

h   21 cm   ← L

9 cm   9 cm

Part A: Which container would you choose as the manager of the movie theater? Explain.

Part B: If all of the containers are made using the same material, which container would cost the least to make?

PART A!

$V = \pi r^2 h$

$V = 3.14 (4.5)^2 (21)$

$V = 1335.3 cm^3$

$V = \frac{lwh}{2}$

$V = \frac{9(12.72)(21)}{2}$

$V = 1202.8 cm^3$

$V = \frac{\pi r^2 h}{3}$

$V = \frac{1335.3}{3}$

$V = 445 cm^3$

* You have to decide which volume you will sell for $4.75

PART B: SURFACE ARE

$S = (\pi r^2)(2) + (d)(\pi)(h)$

$S = (3.14)(4.5)^2 (2) + (9)(3.14)(21)$

$S = 127.17 + 593.46$

$S = 720.6 cm^2$

$S = \pi r^2 + \pi rs$

$S = (3.14)(4.5)^2 + (3.14)(4.5)(21.5)$

$S = 63.585 + 303.795$

$S = 367.38 cm^2$

COST LEAST TO MAKE

$S = bh + 3(bL)$

$S = 9(12.72) + (3)(9)(21)$

$S = 114.48 + 567$

$S = 681.5 cm^2$

BEST DEAL FOR CUSTOMER AND THEATER, COST AND VOLUME.