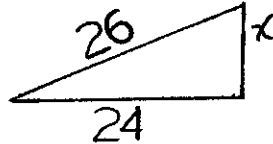


Part I. Short Answer (Two Points Each). Show how you calculate each answer in the space provided for that purpose. Place your answer on the appropriate line in the answer column. Express each answer using appropriate units and where your answers are approximate express your approximation to the nearest tenth of a unit. You may use 3.14 as an approximation for pi.

1. Consider the scale drawing of right triangle shown below. Calculate the length of the unlabeled leg if the lengths of the hypotenuse and other leg are 26 cm and 24 cm respectively.

$$\begin{array}{r} 24 \\ \times 24 \\ \hline 96 \\ 480 \\ \hline 576 \end{array}$$



$$\begin{aligned} x^2 + 24^2 &= 26^2 \\ x^2 + 576 &= 676 \\ x^2 &= 100 \\ x &= 10 \end{aligned}$$

1. 10 cm

2. Determine the perimeter of the triangle pictured in #1 above.

$$10 + 24 + 26 = 60$$

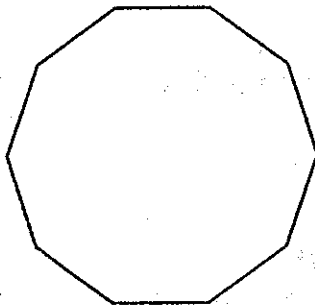
2. 60 cm

3. Determine the area of the triangle pictured in #1 above.

$$\frac{1}{2}(24)(10) = 120$$

3. 120 cm²

4. What is the exact angle measure of each interior angle of the regular polygon drawn below?



$$\frac{180 \times (8)}{10} = 144$$

4. 144°

5. What is the exact measure of each central angle in the polygon pictured in #4 above?

$$\frac{360}{10} = 36$$

5. 36°

6. How many square inches are there in 1 square foot?

$$12 \times 12 = 144$$

6. 144

7. How many cubic millimeters are there in one cubic centimeter?

$$10 \times 10 \times 10$$

7. 1000

8. Which of the following is closest to the temperature on a hot summer day?

0°C, 11°C, 22°C, 40°C, 72°C, 90°C

8. 40°

9. Which of the following is closest to the distance from Henson Hall to Holloway Hall?

10m, 100 m, 1000 m, 1 km, 10 km, 100 km, 10cm, 100 cm

9. 100m

10. Determine the circumference of a circle with diameter 20 cm.

10. 628 cm

$$\pi(20) \approx 628$$

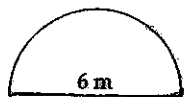
11. Determine the area of a circle with diameter 20 cm.

11. 314 cm²

$$\pi(10)^2 = 314$$

12. Determine the perimeter of the figure pictured below to the nearest 0.1 m.

12. 15.42 m



$$\begin{aligned} \frac{1}{2} \pi(6) + 6 \\ 3.14(3) + 6 \\ 9.42 + 6 \\ 15.42 \end{aligned}$$

13. Consider the cylinder illustrated below. Determine the volume of the cylinder to the nearest 0.1 cm³.

13. 785 cm³



$$\begin{aligned} V &= \pi(5)^2(10) \approx 3.14 \times 250 \\ & \begin{array}{r} 3.14 \\ \times 25 \\ \hline 1570 \\ 6280 \\ \hline 7850 \end{array} \end{aligned}$$

14. Consider the cylinder illustrated in #13 above. Find the surface area of the cylinder to the nearest 0.1 cm².

14. 471 cm²

$$\begin{aligned} 2\pi(5)^2 + 2\pi(5)(10) \\ 50\pi + 100\pi = 150\pi \end{aligned}$$

$$\begin{array}{r} 3.14 \\ \times 15 \\ \hline 1570 \\ 3140 \\ \hline 4710 \end{array}$$

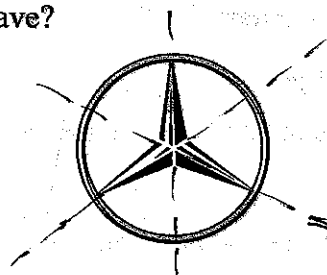
15. How many edges will a polyhedron possess if it has 20 faces and 12 vertices?

15. 30

$$\# \text{ FACES} + \# \text{ VERTICES} = \# \text{ EDGES} + 2$$

16. Consider the figure below. How many lines of symmetry does the figure have?

16. 3



17. Consider the figure in exercise #16 above. How many rotation symmetries does it have?

17. 3

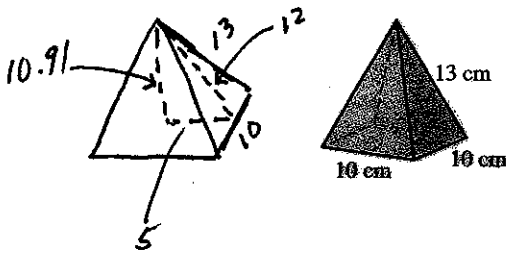
18. Suppose a particular regular polygon will tessellate the plane. What are the possible number of sides that polygon might possess?

18. 3, 4, 6

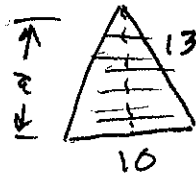
ONLY REGULAR POLYGONS THAT TESSELLATE

Part II. Short Problems (7 points each).

19. Suppose a square pyramid has dimensions as illustrated below. Show how to find the volume of the pyramid to the nearest 0.1 cm^3 and the surface area of the pyramid to the nearest 0.1 cm^2 . (State your conclusions in complete sentences.)



Look at a face



$$a^2 + 5^2 = 13^2$$

$$a^2 + 25 = 169$$

$$a^2 = 144$$

$$a = 12$$

$$\text{Area of a Face} = \frac{1}{2}(10)(12) = 60 \text{ cm}^2$$

$$\text{Surface area} = \text{Area of Base} + 4(\text{Area of Face})$$

$$= 10 \times 10 + 4(60) = 340$$

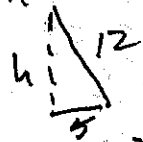
So, the surface area is 340 cm^2

$$V = \frac{1}{3}(\text{Area of Base})(\text{height}) = \frac{1}{3}(100)(10.91)$$

$$= \frac{1091}{3} \approx 363.7$$

So the volume is about 363.7 cm^3

Find height of pyramid



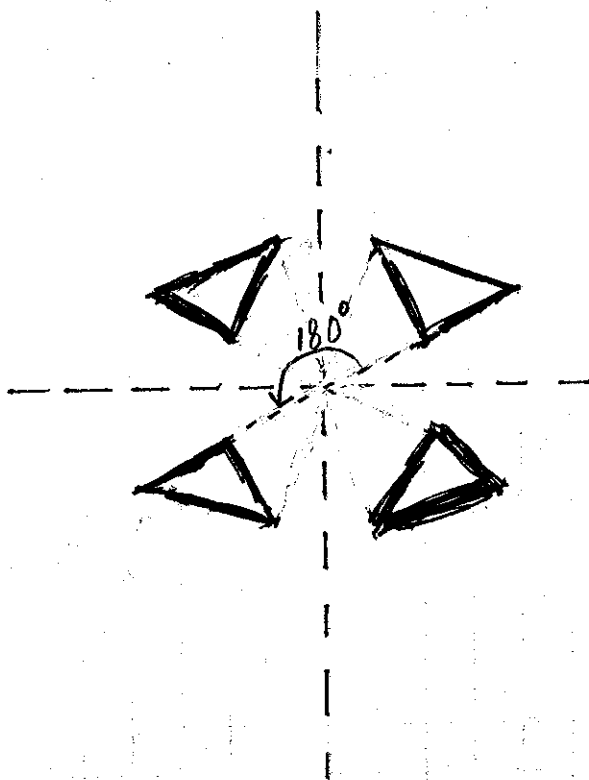
$$h^2 + 5^2 = 12^2$$

$$h^2 + 25 = 144$$

$$h^2 = 119$$

$$h \approx 10.91$$

20. Complete the figure below so that it is symmetric about the two perpendicular dashed lines. Describe any rotation symmetries the resulting figure possesses.



Rotate 180°

Rotate 360°

The figure has two rotation symmetries

3