

NOTA= NONE OF THE ABOVE

1) You begin your study of Euclidian Geometry with three undefined terms. Those terms are:

- a. line, plane, segment      b. line, plane, space  
c. circle, line, point      d. line, plane, point      e. NOTA

2) The theorem, "The square upon the hypotenuse of a right triangle is equal to the sum of the squares upon the legs", bears the name of:

- a. Euclid      b. Hero      c. Pythagoras      d. Thales      e. NOTA

3) Find the area of a right triangle XYZ with right angle Y, if the sides of the triangle measure 5, 12 and 13.

- a. 30      b. 32.5      c. 60      d. 65      e. NOTA

4) The locus of points equidistant from the sides of a triangle is a point called the:

- a. centroid      b. circumcenter      c. incenter  
d. orthocenter      e. NOTA

5) Two angles of a triangle measure  $54^{\circ}05'20''$  and  $36^{\circ}39'59''$ . What is the measure of the third angle?

- a.  $89^{\circ}05'41''$       b.  $89^{\circ}14'41''$       c.  $89^{\circ}15'19''$   
d.  $90^{\circ}44'79''$       e. NOTA

6) The ratio of the volumes of two similar polygons is 16: 54. The ratio of their areas is:

- a.  $2\sqrt{6}: 9$       b. 2: 3      c. 8: 27      d. 4: 9      e. NOTA

7) If a conditional statement and its converse are both true, then this is a biconditional situation. Which of these statements are biconditional?

- I. If 2 triangle's are congruent, then their areas are the same.  
II. If a triangle is equilateral, then it is equiangular.  
III. If 2 triangles are congruent, then they are similar triangles.

- a. I & II      b. I & III      c. II & III      d. I, II & III      e. NOTA

8) In the section on Indirect Proofs, most Geometry books give a procedure for writing an indirect proof. Here is a scrambled list of key words found in these procedures. The most common order for writing an indirect proof as considered by most authors is:

- ( 1 ) contradict      ( 2 ) assume opposite  
 ( 3 ) conclusion      ( 4 ) reason logically

- a. 1, 2, 3, 4                      b. 2, 4, 1, 3  
 c. 3, 4, 1, 2                      d. 4, 2, 3, 1                      e. NOTA

9) A circle of a sphere has a circumference of  $24\pi$ . The center of this circle is 5 units from the center of the sphere. What is the volume of the sphere?

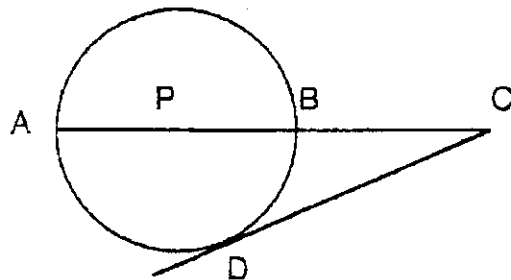
- a.  $\frac{676\pi}{3}$       b.  $\frac{2197\pi}{3}$       c.  $\frac{8788\pi}{3}$       d.  $18432\pi$       e. NOTA

10) What is the measure of the angle whose supplement is five times as large as its complement?

- a. 24      b. 30      c. 45      d. 67.5      e. NOTA

11)  $\overline{CD}$  is tangent to circle P as shown.  $\overline{AB}$  is a diameter of circle P,  $CD=6$ ,  $BC=4$ . Find the radius of circle P.

- a. 2.5  
 b. 4.5  
 c. 5  
 d. 9  
 e. NOTA

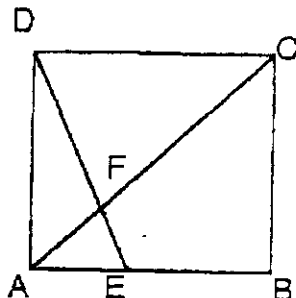


12) P is a point on side AB of equilateral triangle ABC. Find the sum of the lengths of the perpendicular segments from P to AC and BC, given the perimeter of triangle ABC is 36.

- a.  $5\sqrt{2}$       b.  $6\sqrt{3}$       c. 8.5      d.  $36\sqrt{3}$       e. NOTA

13) A dart board in the shape of a square is as pictured. E is the midpoint of segment AB. If a dart is thrown randomly onto the dart board, what would be the probability that it will be inside quadrilateral EFCB ?

- a.  $1/3$
- b.  $5/12$
- c.  $1/2$
- d.  $7/12$
- e. NOTA



14) In a chemical plant, a circular cylinder discharges acid into a cone having that same diameter. The height of the cone is 4 meters and the diameter of the cylinder is 10 meters. If the volume of the cylinder is to be 180% of the volume of the cone, what should be the height of the cylinder to the nearest tenth?

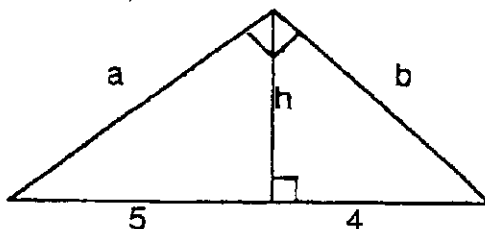
- a. 2.4
- b. 3.2
- c. 5.6
- d. 7.2
- e. NOTA

15) The diagonals of a rhombus are 8 and 12. Find the altitude of the rhombus in simplest radical form.

- a. 48
- b.  $\frac{48\sqrt{13}}{13}$
- c.  $\frac{24\sqrt{13}}{13}$
- d.  $\frac{12\sqrt{13}}{13}$
- e. NOTA

16) The altitude 'h' to the hypotenuse of a right triangle divides the hypotenuse into two parts which have a ratio of 5:4. What is the ratio of 'a' to 'b' to 'h'?

- a.  $2\sqrt{5}:3\sqrt{5}:6$
- b.  $3\sqrt{5}:6:2\sqrt{5}$
- c.  $6:2\sqrt{5}:3\sqrt{5}$
- d.  $4:5:2\sqrt{5}$
- e. NOTA



17) Given triangle ABC on a coordinate plane, the location of A is  $(-3, -10)$ ; B is  $(-12, 2)$ ; and C is  $(12, 10)$ . Find the coordinates of the point where the bisector of angle A intersects side BC.

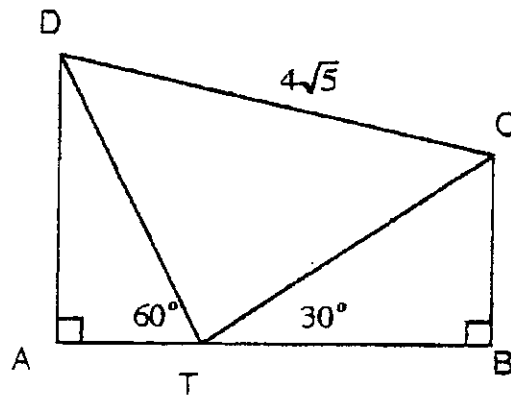
- a.  $(-3, 5)$
- b.  $(-5, 3)$
- c.  $(-9, 3)$
- d.  $(-3, 6)$
- e. NOTA

18) Henry, the hawk, is sitting in the top of a pine tree which is 75 feet tall, he spots Mickey, the mouse, on the ground at a 25 degree angle of depression. An equation for finding x, the shortest distance Henry can dive to reach Mickey, is:

- a.  $\cos 25^\circ = \frac{75}{x}$
- b.  $\tan 25^\circ = \frac{75}{x}$
- c.  $\tan 65^\circ = \frac{x}{75}$
- d.  $\sin 65^\circ = \frac{75}{x}$
- e. NOTA

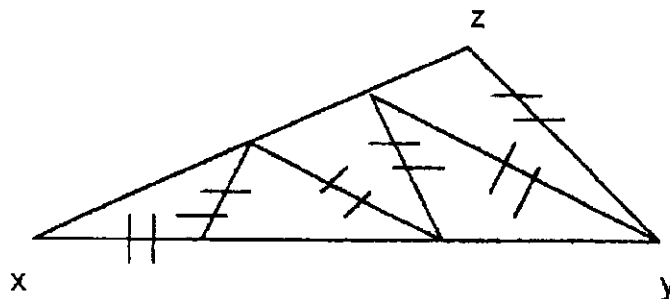
19) Find the length of segment AB in the figure as marked below, if the ratio of the perimeter of triangle TBC to that of triangle DAT is 1: 2.

- a.  $4 + 2\sqrt{2}$
- b.  $4 + 2\sqrt{3}$
- c.  $2 + 4\sqrt{3}$
- d.  $6\sqrt{3}$
- e. NOTA



20) Smart Alec Bug starts at X and travels to Z, traveling in 6 congruent segments as shown. It so happens that triangle XYZ is an isosceles triangle with  $XZ = XY$ . What is the measure of angle X?

- a.  $\frac{180}{7}$
- b. 20
- c.  $\frac{180}{11}$
- d.  $\frac{180}{13}$
- e. NOTA



21) Find the length of the apothem of a regular decagon with a side of 3.4 yards and with an area of 119 sq. yards.

- a. 0.7
- b. 3.5
- c. 7
- d. 70
- e. NOTA

22) What is the measure of the smallest angle formed by the hands of a clock at 2: 47 a.m. ?

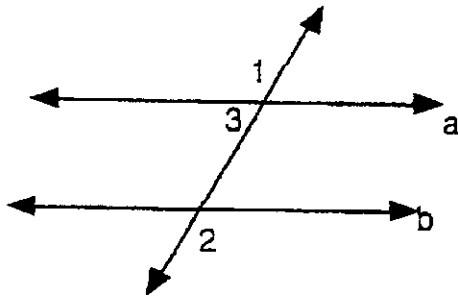
- a. 138      b. 143.5      c. 161.5      d. 198.5      e. NOTA

23) A glide reflection is a translation followed by a reflection over a line 'k' . What is the relation of line 'k' to the line of translation?

- a. they are parallel      b. they are perpendicular  
c. they are oblique      d. they intersect at a  $45^\circ$   $\angle$       e. NOTA

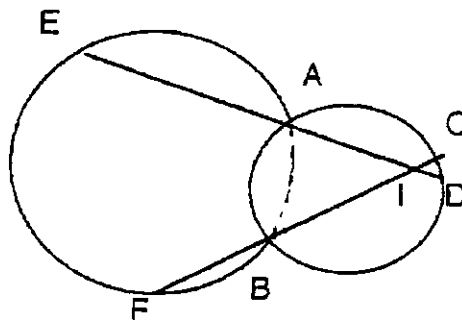
24) Given:  $a \parallel b$ .  $m\angle 1 = x^2 + 4y$ ;  $m\angle 2 = x + 4y + 6$ ;  $m\angle 3 = 5y + 15x$ . Find the measure of angle 1.

- a)  $60^\circ$  or  $\left(\frac{905}{9}\right)^\circ$       b)  $60^\circ$  or  $\left(\frac{860}{9}\right)^\circ$       c)  $65^\circ$  or  $\left(\frac{860}{9}\right)^\circ$       d)  $65^\circ$  or  $115^\circ$       e) NOTA



25) In terms of minor arcs, what is the absolute value of the difference between arc AB of the small circle and arc AB of the large circle if the measure of arc CD = 20, the measure of arc EF = 160, and the measure of angle AIB = 70.

- a. 100  
b. 110  
c. 120  
d. 140  
e. NOTA



26) A secant and a tangent to a circle intersect to form an angle of 38 degrees. If the measures of the intercepted arcs are in a ratio of 2: 1, what is the measure of the third arc of the circle?

- a. 76      b. 132      c. 152      d. 228      e. NOTA

27) Find the volume of a soda cup in the shape of a frustrum whose top base has a diameter of 16.4 cm and whose bottom base has a circumference of  $12\pi$  cm and whose height is 14.3 cm. (Put answer in Pi form, but round to the nearest tenths place).

- a.  $492.1\pi \text{ cm}^3$       b.  $541.8\pi \text{ cm}^3$       c.  $726.6\pi \text{ cm}^3$   
d.  $738.2\pi \text{ cm}^3$       e. NOTA

28) Given isosceles  $\Delta XYZ$  inscribed in circle P, with  $\overline{XY} \cong \overline{YZ}$ . Segment YW is a non-diameter chord of circle P and intersects segment XZ at point D. If  $YD = 12$  and  $YW = 18$ , find YZ.

- a.  $2\sqrt{6}$       b.  $6\sqrt{2}$       c.  $6\sqrt{3}$       d.  $6\sqrt{6}$       e. NOTA

29) In triangle ABC, the measure of angle C = 90 degrees, measure of angle B = 60 degrees and  $BC = 8$ . Find the length segment AB.

- a. 4      b.  $4\sqrt{3}$       c.  $8\sqrt{3}$       d. 16      e. NOTA

30) If two circles have exactly two points in common, the number of their common tangents is:

- a. one      b. two      c. three      d. four      e. NOTA