

CUMULATIVE TEST: CHAPTERS 1-13

~~DO NOT WRITE ON THIS!~~

Choose the correct answer. Write the letter of your choice in the answer column.

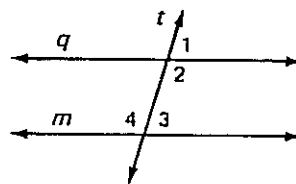
- (1-1) 1. Which kind of triangle cannot have two congruent sides?
 a. isosceles b. obtuse c. scalene d. right 1. _____
- (1-2) 2. What term best describes the vertices of a triangle?
 a. collinear b. noncoplanar
 c. obtuse d. noncollinear 2. _____
- (2-2) 3. Which of the following can be used as reasons in a proof?
 a. postulates b. definitions
 c. theorems d. Conclusions a, b, and c 3. _____
- (2-4) 4. Which method will prove two angles congruent?
 a. Prove they are vertical angles.
 b. Prove they form a linear pair.
 c. Prove they are complementary.
 d. Prove they are supplementary. 4. _____
- (2-5) 5. Given: Triangle RST with median \overline{RP} . Conclusion: ?
 a. $\triangle RST$ is isosceles b. $\overline{RP} \perp \overline{ST}$
 c. P is the midpoint of \overline{ST} . d. $m\angle R = 90$ 5. _____
- (3-2) 6. Which congruent parts will prove $\triangle PQR \cong \triangle LMT$ by SAS?
 a. $\overline{PQ} \cong \overline{LM}$; $\overline{PR} \cong \overline{LT}$; $LR \cong LT$
 b. $\overline{PQ} \cong \overline{LM}$; $\overline{PR} \cong \overline{LT}$; $LP \cong LL$
 c. $\overline{PQ} \cong \overline{LM}$; $\overline{PR} \cong \overline{LT}$; $LQ \cong LM$
 d. $\overline{PQ} \cong \overline{LM}$; $LR \cong LT$; $LQ \cong LM$ 6. _____
- (3-4) 7. Which statement is false?
 a. The base angles of an isosceles triangle are congruent.
 b. An isosceles triangle is equiangular.
 c. An equiangular triangle is equilateral.
 d. If two angles of a triangle are congruent, then the sides opposite these angles are congruent. 7. _____

(3-8) 8. Right triangles ABC and DEF have right angles at A and D respectively. If $\angle B \cong \angle E$, which pair of corresponding sides must be shown to be congruent in order to prove $\triangle ABC \cong \triangle DEF$ by the ~~HA~~ Postulate? **AAS**

- a. $\overline{AB} \cong \overline{DE}$
- b. $\overline{AC} \cong \overline{DF}$
- c. $\overline{BC} \cong \overline{EF}$
- d. $\overline{AC} \cong \overline{DE}$

8. _____

(4-3) 9. Which pair of supplementary angles in the figure can be used to prove line q is parallel to line m ?



- a. $\angle 2; \angle 4$
- b. $\angle 1; \angle 3$
- c. $\angle 3; \angle 4$
- d. $\angle 2; \angle 3$

9. _____

(4-5) 10. In $\triangle PQR$, $m\angle P = 2x$, $m\angle Q = 3x - 9$, and $m\angle R = x + 15$. What is the measure of the largest angle of the triangle?

- a. 29
- b. 58
- c. 78
- d. 112

10. _____

(4-7) 11. Find the sum of the interior angles of a polygon of 12 sides.

- a. 1800
- b. 1620
- c. 360
- d. 150

11. _____

(5-1) 12. In parallelogram $ABCD$, which pair of angles are supplementary?

- a. $\angle A$ and $\angle C$
- b. $\angle B$ and $\angle D$
- c. $\angle B$ and $\angle C$
- d. none of these

12. _____

(5-3) 13. Which of the following is not a property of a rectangle?

- a. It is a parallelogram.
- b. Its diagonals are congruent.
- c. Its diagonals bisect the angles of the rectangle.
- d. Its diagonals bisect each other.

13. _____

(5-5) 14. In $\triangle ABC$, R , S , and T are the midpoints of \overline{AB} , \overline{BC} , and \overline{AC} respectively. Which conclusion can be drawn?

- a. $TR = RS$
- b. $\overline{TS} \parallel \overline{AB}$
- c. $\overline{TR} \perp \overline{TS}$
- d. $\overline{RT} \perp \overline{AC}$

14. _____

(5-6) 15. In $\triangle RST$, \overline{RP} is the altitude to \overline{ST} . Which conclusion can be drawn?

- a. $RP < RS$
- b. $RP > ST$
- c. $RS = RT$
- d. $SP = PT$

15. _____

(6-2) 16. Find the fourth proportional to a , b , and c .

- a. $\frac{a+b}{c}$
- b. $\frac{ac}{b}$
- c. $\frac{bc}{a}$
- d. $\frac{b}{a+c}$

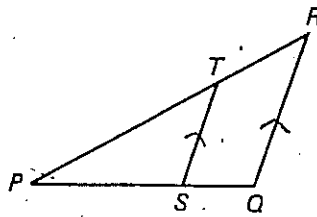
16. _____

(6-6)

17. Given: $\triangle PQR$ with $\overline{ST} \parallel \overline{QR}$.

Conclusion: ?

- a. $\triangle PTS \sim \triangle PRQ$ by AA
- b. $\triangle PTS \sim \triangle PRQ$ by SAS
- c. $\triangle PTS \sim \triangle PRQ$ by SSS
- d. $\triangle PTS$ is not similar to $\triangle PRQ$



17. _____

(7-1)

18. The length of the altitude to the hypotenuse of a right triangle is 8 meters and one segment of the hypotenuse is 4 meters. Find the length of the other segment.

- a. 20
- b. 16
- c. 12
- d. $4\sqrt{2}$

18. _____

(7-2)

19. Which of these could be the measures of the sides of a right triangle?

- a. 6, 10, 14
- b. 5, 7, 9
- c. 1, 2.4, 2.6
- d. $\sqrt{3}$, $\sqrt{4}$, $\sqrt{5}$

19. _____

(7-3)

20. The length of the hypotenuse of a 30-60 right triangle is 6. Find the length of the longer leg.

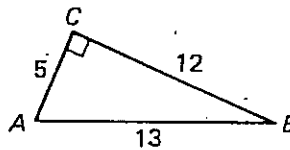
- a. 3
- b. $3\sqrt{2}$
- c. $3\sqrt{3}$
- d. $2\sqrt{3}$

20. _____

(7-5)

21. In the figure, which ratio is equal to $\sin B$?

- a. $\frac{5}{13}$
- b. $\frac{12}{13}$
- c. $\frac{5}{12}$
- d. $\frac{12}{5}$

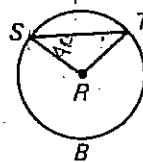


21. _____

(8-2)

22. In circle R , $m\angle S = 40$. Find $m\widehat{SBT}$.

- a. 320
- b. 260
- c. 200
- d. 160

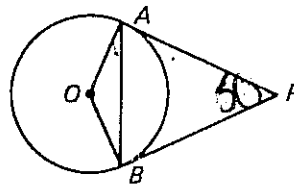


22. _____

(8-5)

23. In circle O , PA and PB are tangent segments. If $m\angle P = 50$, find $m\angle OAB$.

- a. 25
- b. 50
- c. 65
- d. 100



23. _____

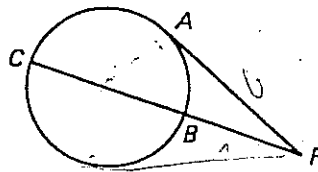
(8-7)

24. Angle RST is inscribed in a circle and $m\widehat{RST} > 180$. What must be true about $m\angle RST$?

- a. $m\angle RST < 90$
- b. $m\angle RST = 90$
- c. $m\angle RST > 90$
- d. $m\angle RST = 135$

24. _____

- (8-9) 25. In the circle at the right \overline{PA} is tangent to circle O at A and \overline{PC} is a secant. If $PA = 6$ and $PB = 4$, find PC .



- a. 24 b. 16
c. 12 d. 9

25. _____

- (9-3) 26. What construction will locate the center of the circle inscribed in $\triangle ABC$?

- a. perpendicular bisector of a segment
b. angle bisector
c. parallel lines
d. perpendicular to a line from a point not on the line

26. _____

- (10-2) 27. Find the area of a right triangle whose legs have lengths of 12 centimeters and 5 centimeters.

- a. 60 cm^2 b. 65 cm^2 c. 45 cm^2 d. 30 cm^2

27. _____

- (10-6) 28. Two polygons are similar and the ratio of a pair of corresponding sides is 3 : 4. If the area of the smaller polygon is 27, find the area of the larger polygon.

- a. 144 b. 64 c. 36 d. 48

28. _____

- (10-8) 29. In circle O , $m\angle AOB = 72$ and $OA = 10$ meters. Find the area of the sector determined by $\angle AOB$ and \widehat{AB} .

- a. $5\pi \text{ m}^2$ b. $20\pi \text{ m}^2$ c. $10\pi \text{ m}^2$ d. $100\pi \text{ m}^2$

29. _____

- (11-1) 30. Find the total surface area of a cube if each edge has a length of 8 centimeters.

- a. 320 cm^2 b. 512 cm^2 c. 384 cm^2 d. 256 cm^2

30. _____

- (11-4) 31. Find the volume of a regular square pyramid if each edge of the base measures 8 centimeters and the length of the altitude is 6 centimeters.

- a. 384 cm^3 b. 320 cm^3 c. 128 cm^3 d. 192 cm^3

31. _____

- (12-2) 32. Find the coordinates of the midpoint of a segment that joins $A(8, -2)$ and $B(-2, 8)$.

- a. (5, 5) b. (6, 6) c. (3, 3) d. (0, 0)

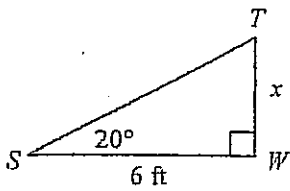
32. _____

- (13-2) ~~33.~~ Determine the number of lines of symmetry for a square.

- a. 2 b. 4 c. 3 d. 6

33. _____

1. Solve for x . Round your answer to the nearest tenth.



Do Not Write on This!

4

- [A] 2.1 ft [B] 5.6 ft [C] 16.5 ft [D] 2.2 ft

2. A statue of a town's founder stands in the town park. Nicholas is 17 meters from the statue. If Nicholas looks up at an angle of 26° , he can just see the top of the statue. His eyes are 1.4 meters above the ground. How tall is the statue? Round to the nearest tenth of a meter.

- [A] 8.3 m [B] 17.7 m [C] 16.3 m [D] 9.7 m

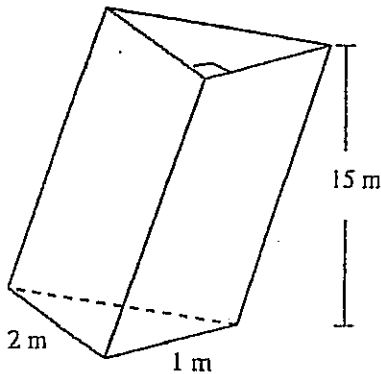
3. Given $\triangle ABC$ with $b = 12$ feet, $c = 24$ feet, and $a = 35$ feet, find the measure of angle A .

- [A] 118.75° [B] 151.25° [C] 19.26° [D] 9.49°

4. A cat got away from its owners 42 kilometers east and 61 kilometers north of home. Amazingly, the cat found its way back in just 8 days. Find the distance and direction of the trip, assuming the cat took the shortest route.

- [A] 103 km; 55.5° south of west [B] 103 km; 55.5° east of south
 [C] 74.1 km; 34.5° south of west [D] 74.1 km; 34.5° west of south

5. Find the volume of the prism.



- [A] 15 m^3 [B] 30 m^3 [C] 1 m^3 [D] 7.5 m^3

6. The base of a hexagonal pyramid has an area of 76.8 square inches. The height of the pyramid is 18.1 inches. Find the volume of the pyramid to the nearest tenth.

- [A] 94.9 in^3 [B] 139.0 in^3 [C] 1390.1 in^3 [D] 463.4 in^3

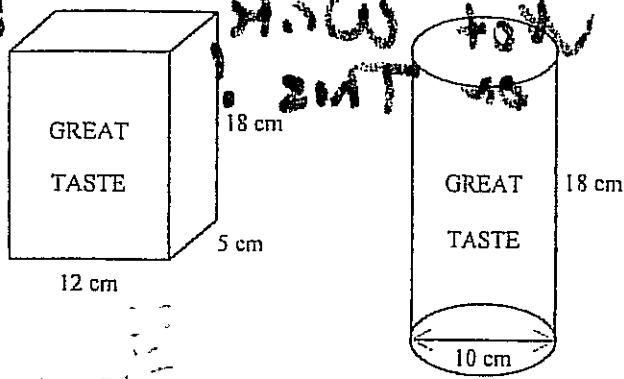
9. A sphere has a volume of 4500π cubic inches. Find the surface area of the sphere.

- [A] $900\pi \text{ in}^2$ [B] $2700\pi \text{ in}^2$ [C] $300\pi \text{ in}^2$ [D] $13,500\pi \text{ in}^2$

10. Mr. Jones built a fenced-in area for his horse in the shape of a square with each side 35 feet in length. Find the distance of the diagonal path from one corner to the opposite corner.

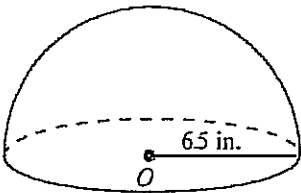
- [A] 2450 ft [B] $2450\sqrt{2}$ ft [C] 35 ft [D] $35\sqrt{2}$ ft

7. A cereal company is considering different types of packaging for its new product, "GREAT TASTE".

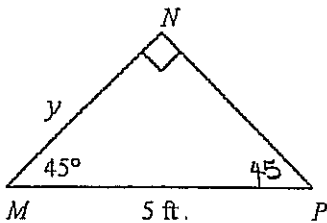


What is the volume of the package that would hold the greater amount of cereal?
(Use $\pi = 3.14$)

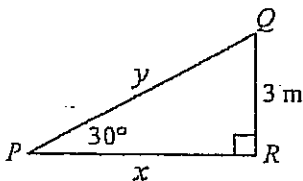
- [A] 5652 cm^3 [B] 1080 cm^3 [C] 282.6 cm^3 [D] 1413 cm^3
8. Find the volume of the hemisphere. Use 3.14 for π .



- [A] 323.4 in^3 [B] 574.9 in^3 [C] 431.2 in^3 [D] 88.4 in^3
11. The lengths of two sides of a triangle are given below. What should the length of the missing side be for the triangle to be a right triangle?
13 in.; 21 in.
- [A] 16.99 in. [B] 610 in. [C] 16.49 in. [D] 272 in.
12. Find y .

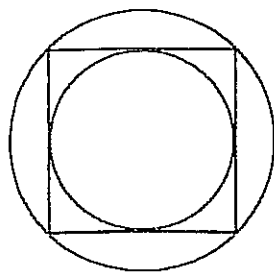


- [A] $10\sqrt{2}$ ft [B] $\frac{5\sqrt{3}}{2}$ ft [C] $\frac{5\sqrt{2}}{2}$ ft [D] $\frac{10}{3}$ ft
13. Find the values of x and y .



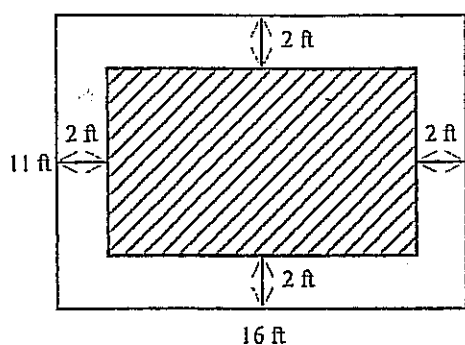
- [A] $x = 5.2 \text{ m}, y = 3 \text{ m}$ [B] $x = 10.4 \text{ m}, y = 10.4 \text{ m}$
[C] $x = 5.2 \text{ m}, y = 6 \text{ m}$ [D] $x = 6 \text{ m}, y = 5.2 \text{ m}$

The inner circle is inscribed in the square, and the square is inscribed in the outer circle. If the area of the outer circle is 676π square millimeters, find the area of the inner circle.



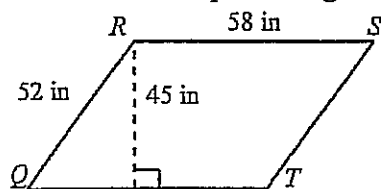
- [A] $\frac{169}{\sqrt{2}}\pi \text{ mm}^2$ [B] $\frac{338}{\sqrt{2}}\pi \text{ mm}^2$ [C] $169\pi \text{ mm}^2$ [D] $338\pi \text{ mm}^2$

15. The rectangular floor in Mark's living room is 11 feet by 16 feet. A rectangular rug is placed in the middle of the room. What is the area of the rug?



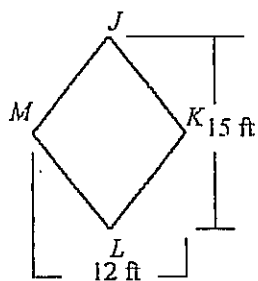
- [A] 22 ft^2 [B] 126 ft^2 [C] 38 ft^2 [D] 84 ft^2

16. Find the area of parallelogram $QRST$.



- [A] 2610 in^2 [B] 2813 in^2 [C] 2475 in^2 [D] 3016 in^2

17. Find the area of the rhombus.



- [A] 90 ft^2 [B] 180 ft^2 [C] 27 ft^2 [D] 54 ft^2

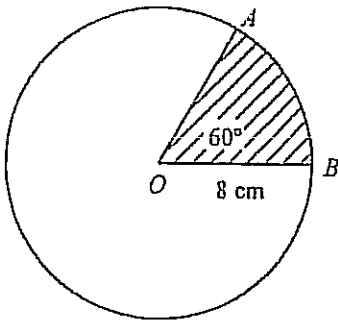
18. Find the area of a regular pentagon with an apothem 2.8 meters long and a side 4 meters long.

- [A] 56 m^2 [B] 28 m^2 [C] 22.4 m^2 [D] 14 m^2

19. A circle with a diameter of 6 inches has its center at the center of a square with 6-inch sides. Find the area of the region that is inside the square and outside the circle. Use 3.14 for π .

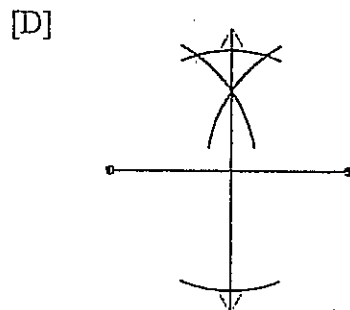
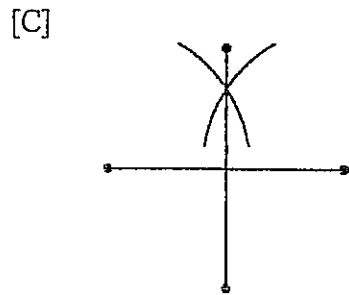
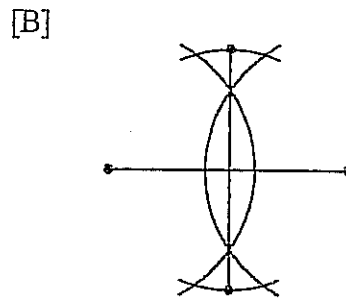
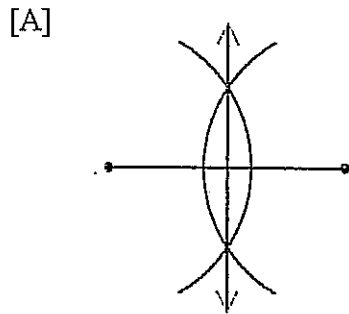
[A] 42.8 in² [B] 7.7 in² [C] 1.5 in² [D] 9.8 in²

20. Find the area of the shaded region. Use 3.14 for π and round your answer to the nearest hundredth.

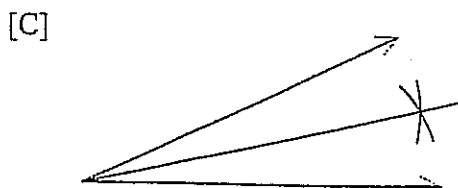
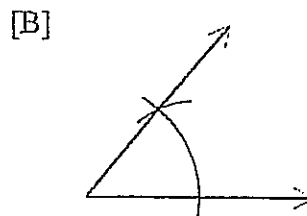
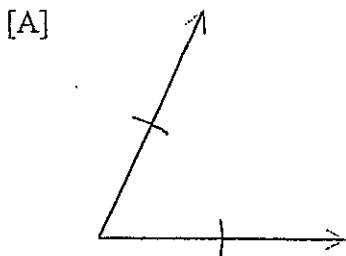


[A] 133.97 cm² [B] 200.96 cm² [C] 33.49 cm² [D] 50.24 cm²

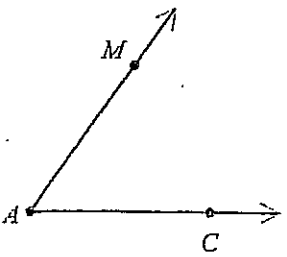
21. Which drawing depicts the construction of a perpendicular bisector that is congruent to the solid line segment?



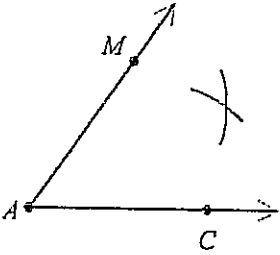
22. Which figure best represents the construction of a congruent angle?



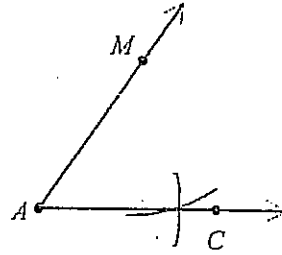
23. Which is the first step in bisecting $\angle MAC$?



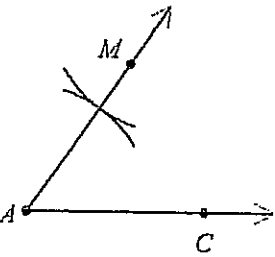
[A]



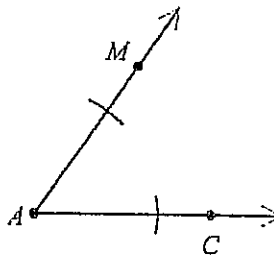
[B]



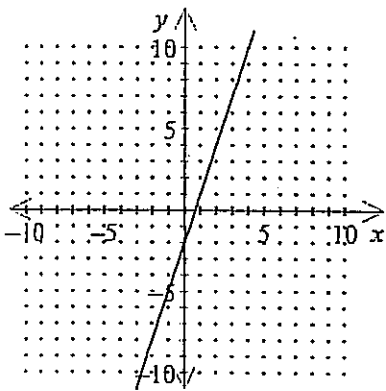
[C]



[D]



24. Which equation best describes the graph below?



[A] $y = \frac{1}{3}x - 2$

[B] $y = 3x - 2$

[C] $y = -3x + 2$

[D] $y = 3x + \frac{2}{3}$

25. Find the slope of a line perpendicular to the line containing the points $C(-2, -3)$ and $D(3, 12)$.

[A] $-\frac{1}{3}$

[B] -3

[C] 3

[D] $\frac{1}{3}$

26. A line l has slope $-\frac{4}{7}$. Which of the following pairs of points define a line that is parallel to l ?

[A] $(2, -5)$ and $(6, 2)$

[B] $(1, 6)$ and $(2, 2)$

[C] $(6, -2)$ and $(6, 5)$

[D] $(-5, 6)$ and $(2, 2)$

Name _____ Period _____ Date _____

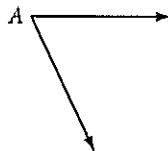
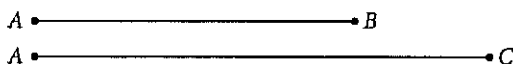
Part A

Identify each statement as true or false.

- OMIT ~~1.~~ A polygon with 43 sides has 850 diagonals.
2. A heptagon has more sides than an octagon.
 3. The altitude of a triangle bisects a side of the triangle.
 4. No rectangle is a square.
 5. If $\triangle BOY \cong \triangle GRL$, then $\overline{OY} \cong \overline{RG}$.
 6. SAA and ASA are two shortcuts for showing that two triangles are congruent.
 7. All triangles inscribed in a circle are acute triangles.
 8. The circumference of a circle is more than three times the length of the diameter.
 9. If the lengths of the sides of a triangle are 50 cm, 120 cm, and 130 cm, then the triangle is a right triangle.
 10. In a 30° - 60° - 90° triangle, the side opposite the 30° angle is half the length of the hypotenuse.
 11. If a pyramid and a prism have congruent bases and equal heights, then the volume of the prism is three times the volume of the pyramid.
 12. If the corresponding angles of two quadrilaterals are congruent, then the two quadrilaterals are similar.
 13. If the volumes of two similar prisms are in the ratio 16^3 to 49^3 , then their corresponding surface areas are in the ratio 16^2 to 49^2 .
 14. In an indirect proof, you begin by assuming the opposite of what you are trying to prove and then try to arrive at a contradiction.
 15. In a right triangle, the ratio of the length of the side opposite acute angle A to the length of the side adjacent to angle A is called the tangent of angle A .

Part B

OMIT Given the segments and angle shown here, construct $\triangle ABC$ and then construct the inscribed circle of $\triangle ABC$.



(continued)

Name _____ Period _____ Date _____

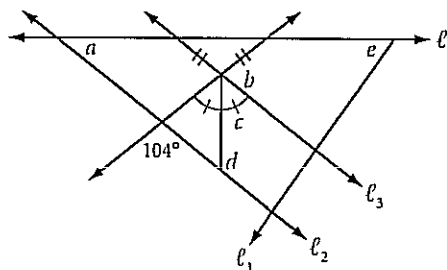
Part C *OMIT*

1. $l_2 \parallel l_3, l_1 \perp l_2$

$a =$ _____ $b =$ _____

$c =$ _____ $d =$ _____

$e =$ _____

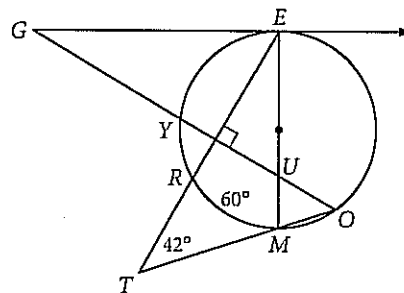


2. \overline{GE} is a tangent. \overline{ME} is a diameter.

$m\widehat{YE} =$ _____ $m\angle OGE =$ _____

$m\angle MOG =$ _____ $m\angle MER =$ _____

$m\angle GUM =$ _____



Part D

Choose the correct answer.

- OMIT 1.* If n parallel lines are drawn, then they divide the plane into how many regions?

- A. $2n$ B. n C. $n + 1$
 D. $n - 1$ E. $\frac{n(n - 1)}{2}$

- OMIT 2.* What is the exact measure of the angle formed by the hands of a clock at 3:20?

- A. 0° B. 5° C. 10°
 D. 20° E. None of these

3. What is the measure of each exterior angle of a regular 14-gon?

- A. 15° B. 24° C. 36°
 D. 156° E. None of these

- OMIT 4.* Which polygon cannot be used to create a regular tessellation?

- A. Square B. Equilateral triangle
 C. Regular hexagon D. Regular octagon
 E. None of these

5. A sector of a circle has a central angle measuring 40° . If the area of the sector is $9\pi \text{ m}^2$, what is the radius of the circle?

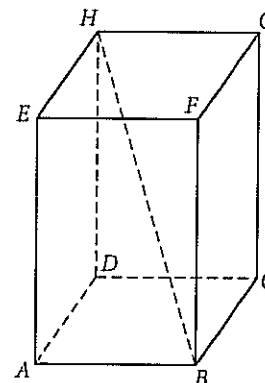
- A. 6 m B. $6\sqrt{2}$ m C. 9 m
 D. 12 m E. $144\sqrt{2}$ m

(continued)

Name _____ Period _____ Date _____

6. In the right rectangular prism at right, $AD = 9$ cm, $CD = 12$ cm, and $CG = 18$ cm. What is the length of diagonal \overline{BH} ?

- A. 9 cm
- B. $3\sqrt{61}$ cm
- C. $9\sqrt{61}$ cm
- D. 27 cm
- E. $27\sqrt{61}$ cm



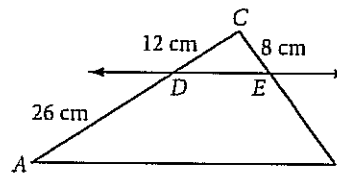
~~omit~~ 7. A scientist finds a clump of mysterious metal on her laboratory floor. It has a mass of 685.8 grams. The scientist drops it into a cylindrical container, causing the water level to rise 1.3 cm. The radius of the base of the container is 4.0 cm. Use the table below to determine what type of metal the scientist has found. (Assume the metal is pure.)

Metal	Silver	Lead	Platinum	Gold
Density g/cm ³	10.5	11.3	21.4	19.3

- A. Silver
- B. Lead
- C. Platinum
- D. Gold
- E. None of these

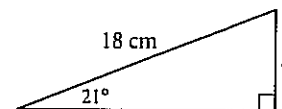
8. $\overline{DE} \parallel \overline{AB}$. $BE =$ _____

- A. 14 cm
- B. $17\frac{1}{3}$ cm
- C. 49 cm
- D. 68 cm
- E. None of these



9. Which of the following expressions represents the value of x ?

- A. $\frac{18}{\sin 21^\circ}$
- B. $\frac{18}{\cos 21^\circ}$
- C. $\frac{18}{\tan 21^\circ}$
- D. $18 \tan 21^\circ$
- E. $18 \sin 21^\circ$



10. What is the statement "If $\overline{AB} \cong \overline{DC}$, then $\overline{DC} \cong \overline{AB}$ " called?

- A. Distributive property of congruence
- B. Associative property of congruence
- C. Reflexive property of congruence
- D. Transitive property of congruence
- E. Symmetric property of congruence

11. What is a statement that is assumed to be true without proof called?

- A. Lemma
- B. Converse
- C. Conjecture
- D. Corollary
- E. Postulate

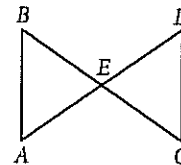
12. What is the intersection of the three angle bisectors of a triangle?

- A. Centroid
- B. Incenter
- C. Orthocenter
- D. Circumcenter
- E. Bisectroid

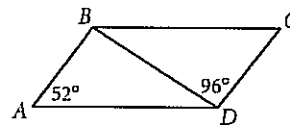
(continued)

Name _____ Period _____ Date _____

13. \overline{BC} bisects \overline{AD} and $\overline{CD} \cong \overline{AB}$. From this information, which of the following reasons could be used to prove that $\triangle ABE \cong \triangle DCE$?



- A. SSS B. SAS C. ASA
 D. SAA E. None of these
14. $ABCD$ is a parallelogram. What is the measure of $\angle BDA$?
- A. 52° B. 96° C. 32°
 D. 84° E. 26°
15. What is the volume of a hemisphere with radius 3 cm?
- A. $6\pi \text{ cm}^3$ B. $12\pi \text{ cm}^3$ C. $18\pi \text{ cm}^3$
 D. $36\pi \text{ cm}^3$ E. None of these

~~Part E~~ OMIT

Choose *one* of the three conjectures below. Draw a diagram, state the “given” and “show” information in terms of your diagram, and then write either a flowchart proof or a two-column proof of the conjecture.

- If two chords in a circle intersect, then the product of the length of the two segments on one chord is equal to the product of the lengths of the two segments on the other chord.
- If two triangles are similar, then the ratio of the lengths of a pair of corresponding altitudes is equal to the ratio of the lengths of a pair of corresponding sides.
- The measure of the angle formed by a tangent and a secant that intersect in the exterior of a circle is one-half the difference of the measures of the intercepted arcs.