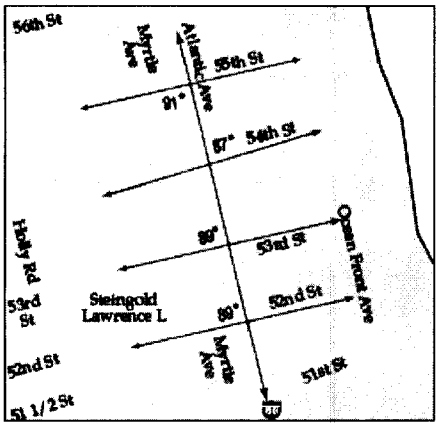
Geometry SOL Final Preparation

Name Master Ex Date _____ Block _____

1 **The map shows some streets in North Virginia Beach. Which labeled street is *not* parallel to the other labeled streets?**

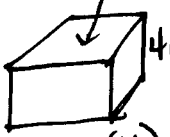


A 55th St.
B 54th St.
C 53rd St.
D 52nd St.

2 **A gift box in the shape of a rectangular prism has a base area of 56 square inches and a height of 4 inches. What is the volume of the box in cubic inches?**

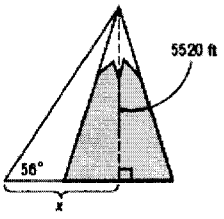
F 224
G 448
H 896
J 12,544

$B = 56\ in^2$



$V = B \cdot h = 56(4) = 224\ in^3$

3 **Whitetop Mountain is 5520 feet high. The angle of elevation to the top of the mountain from a point *x* feet away is 56°. Which is *closest* to the value of *x*?**



sin 56° ≈ 0.829
cos 56° ≈ 0.559
tan 56° ≈ 1.483

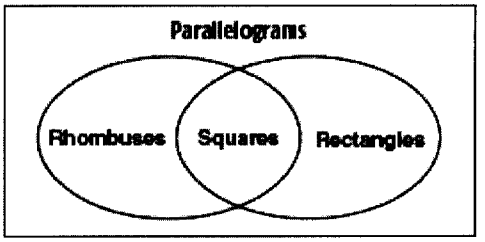
$\tan 56 = \frac{5520}{x}$

$x = \frac{5520}{\tan 56}$

3723.3

A 9871 ft
B 8184 ft
C 6658 ft
D 3723 ft

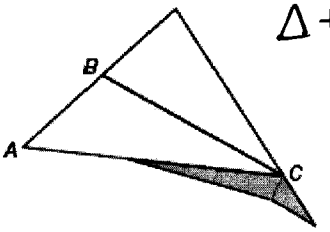
4 **According to the diagram, which is true?**



F No squares are parallelograms.
G No rhombuses are rectangles.
H Some rectangles are not squares.
J Some rectangles are not parallelograms.

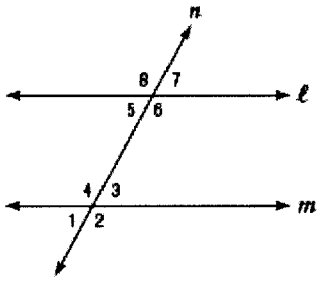
5 **A child built a paper airplane. Which lengths, in inches, could *not* be used for △*ABC*, a wing of the airplane?**

△ test



A 5, 6, 7 $5+6>7$ True
B 4, 8, 12 $4+8 \not> 12$ False
C 9, 10, 12 $9+10>12$ T
D 8, 9, 11 $8+9>11$

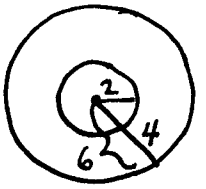
6 **Transversal n intersects lines ℓ and m. Which statement would prove that $\ell \parallel m$?**



F $m\angle 1 = m\angle 3$
G $m\angle 3 = m\angle 6$
H $m\angle 6 + m\angle 7 = 180°$
J $m\angle 4 + m\angle 5 = 180°$

7 **There are two concentric circles at the center of a basketball court. The radius of the inner circle is 2 feet and the radius of the outer circle is 6 feet. What is the ratio of the circumference of the inner circle to the circumference of the outer circle?**

A 1 : 3
B 1 : 6
C 1 : 9
D 1 : 27



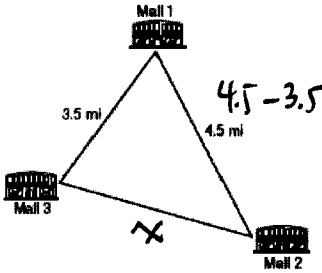
$r_1 : r_2 = 2 : 6 = 1 : 3$

Circumference ratio is equal to the scale factor!

8. What is the equation of a circle with a center of (4, -1) and a radius of 5?

F $(x-4)^2 + (y+1)^2 = 100$
G $(x-4)^2 + (y+1)^2 = 5$
H $(x-4)^2 + (y+1)^2 = 25$
J $(x+4)^2 + (y-1)^2 = 25$

9 **The locations of three shopping malls form a triangle on a map. Which best describes the possible distances between Mall 2 and Mall 3?**

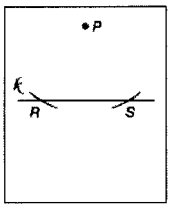


$4.5 - 3.5 < x < 3.5 + 4.5$

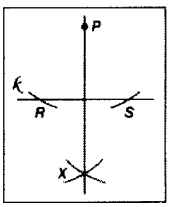
$1 < x < 8$

A greater than 1 mile and less than 8 miles
B greater than 8 miles
C greater than 1 mile
D greater than 15.75 miles

10. What type of construction is represented below?



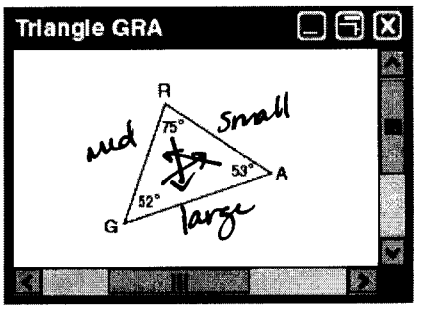
Step 1 Using P as the center, draw two arcs with equal radii that intersect line k at points R and S.



Step 2 Using R and S as centers, draw two arcs with equal radii that intersect at point X. Draw $\overline{PX}$.

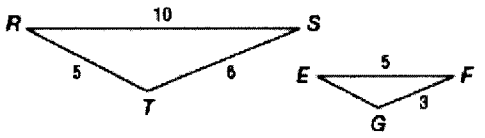
F. The perpendicular bisector of a segment.
G. A segment congruent to another segment.
H. A line perpendicular to a line through a point on the line.
J. A line perpendicular to a line through a point not on the line.

11 **A student draws the triangle below with a geometry software program. Which lists the side lengths of the triangle in order from least to greatest?**



A *RA, AG, GR*
B *GR, RA, AG*
C *RA, GR, AG*
D *AG, GR, RA*

12. In addition to the information in the drawing, which statement can be used to prove that $\triangle RST \sim \triangle EFG$?



F $\angle R = \angle E$

G $\angle T = \angle G$

H $EG = 4$

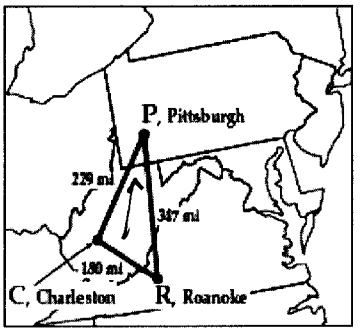
J $EG = 2.5$

$\frac{10}{5} = \frac{6}{3} = \frac{5}{EG}$

$6EG = 15$

$EG = 2.5$

13 A pilot flew from Pittsburgh, Pennsylvania to Charleston, West Virginia, then to Roanoke, and back to Pittsburgh. Which lists the angle measures in the triangle formed in order from least to greatest?



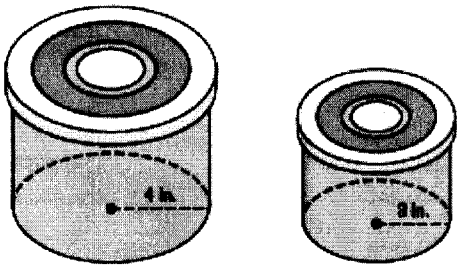
A $\angle P, \angle R, \angle C$

B $\angle R, \angle P, \angle C$

C $\angle C, \angle R, \angle P$

D $\angle P, \angle C, \angle R$

14 Two cylindrical kitchen canisters are similar. How many times more volume will the larger canister hold?



F $\frac{4}{3}$ times more

G $\frac{8}{3}$ times more

H $\frac{16}{9}$ times more

J $\frac{64}{27}$ times more

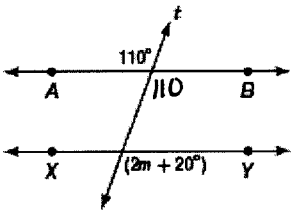
$a:b = 4:3$

volume $= a^3 : b^3$

$= 4^3 : 3^3$

$= 64 : 27$

15 Transversal t intersects $\overleftrightarrow{AB}$ and $\overleftrightarrow{XY}$ as shown. Which value of m would make $\overleftrightarrow{AB} \parallel \overleftrightarrow{XY}$?



$2m + 20 = 110$

$2m = 90$

$m = 45$

A 25

B 45

C 65

D 80

16 What is the converse of the following statement? $q \to p$

If you go to the movies, then you eat popcorn.

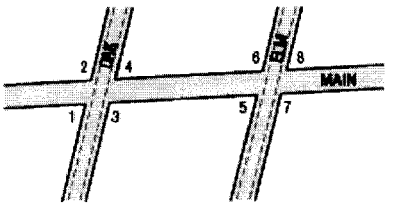
F If you do not go to the movies, then you eat popcorn.

G If you do not go to the movies, then you do not eat popcorn.

H If you eat popcorn, then you go to the movies.

J If you do not eat popcorn, then you do not go to the movies.

17 Main Street intersects Oak Street and Elm Street. Which of the following relationships would *not* be sufficient to prove that Oak Street is parallel to Elm Street?



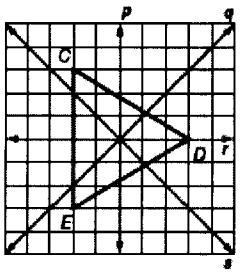
A $\angle 1 \cong \angle 5$ corr $\angle$s are $\cong$!

B $\angle 4 \cong \angle 8$ corr $\angle$s!

C $\angle 2 \cong \angle 3$ vert. $\angle$s have nothing to do w/ || lines!

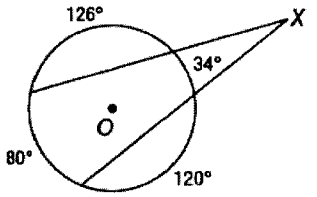
D $\angle 4$ and $\angle 6$ are supplementary. Consec. int $\angle$s!

18 Triangle *CDE* is drawn in the plane. Which of the lines is a line of symmetry?



F p
G q
H r
J s

19. What is $m\angle X$ in circle O?



A 123°
B 114°
C 46°
D 23°

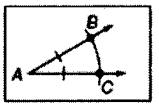
$m\angle X = \frac{1}{2}(80-34)$

20 What is the *contrapositive* of the following statement? $\sim q \to \sim p$

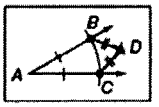
If you study mathematics, then you go to the College of William and Mary.

F If you do not go to the College of William and Mary, then you study mathematics.
G If you do not study mathematics, then you do not go to the college of William and Mary.
H If you do not go to the College of William and Mary, then you do not study mathematics.
J If you go to the College of William and Mary, then you study mathematics.

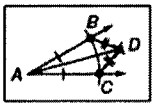
21. What type of construction is represented below?



Step 1
Draw any angle with vertex A. Placing the compass at A, draw an arc that intersects both sides of $\angle A$. Label points B and C and mark congruent segments.



Step 2
Draw an arc in the interior of $\angle A$ with compass point at B. Using the same radius, draw an arc from C that intersects the first arc at D. Draw $\overline{BD}$ and $\overline{CD}$ and mark congruent segments.



Step 3
Draw $\overline{AD}$.

A. The perpendicular bisector of a segment.
B. A sement congruent to another segment.
C. An angle congruent to a given angle.
D. The bisector of an angle.

22 What is the *inverse* of the following statement? $\sim p \to \sim q$

If you live in Blacksburg, then you live in Virginia.

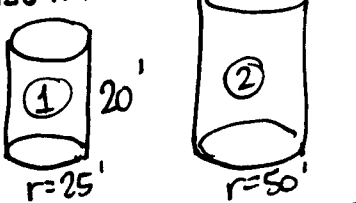
F If you do not live in Virginia, then you do not live in Blacksburg.
G If you do not live in Blacksburg, then you do not live in Virginia.
H If you do not live in Blacksburg, then you live in Virginia.
J If you live in Blacksburg, then you do not live in Virginia.

23 **An aquarium curator wants to expand his facility by constructing a new aquarium. The old aquarium is a cylinder that is 20 feet tall with a diameter of 50 feet. The new aquarium will be a similar cylinder with a diameter of 100 feet. How much more water, in cubic feet, will the new aquarium hold?**

$V_2 - V_1$
314159.3
−39269.9
274,889.4

A 78,540
B 117,810
C 274,890
D 314,160

39269.9
314159.3



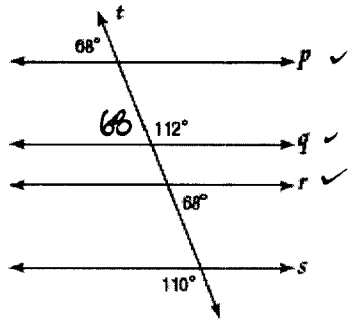
$a:b = 25:50 = 1:2$

Volume SF $= a^3:b^3 = 1:8$

Volume $= 8 \times$ volume of ①
Volume of ① $= \pi(25)^2 \cdot 20$

$\pi(25)^2 \cdot 20 \cdot 8$
314159.2654

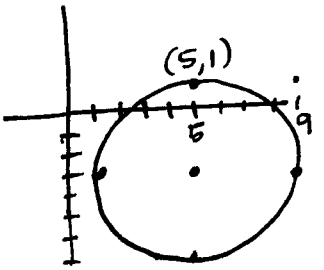
24 Line t is a transversal. Which of lines p, q, r and s is *not* parallel to the other three?



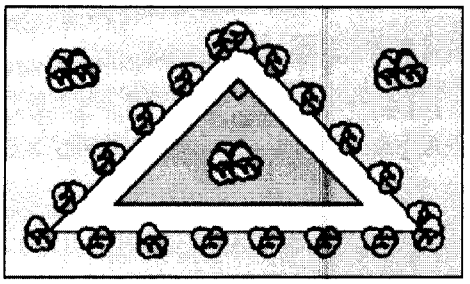
F p
G q
H r
J s

25 A circle with center (5, –3) has a radius of 4 units. Which point is on the circle?

A (13, –3)
B (9, 1)
C (1, –7)
D (5, 1)



26 A park has a walking path in the shape of a right triangle. Which of the following side lengths could *not* be lengths of the path, in kilometers?



F 1.5, 2, 2.5 $1.5^2+2^2=2.5^2$
G 3, 4, 5 $3^2+4^2=5^2$
H 4, 5, 5.5 $4^2+5^2\neq5.5^2$
J 2.5, 6, 6.5 $2.5^2+6^2=6.5^2$

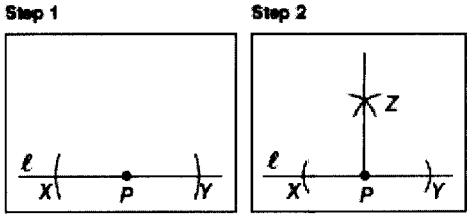
27 Let *p* represent "The town is Arlington."
Let *q* represent "The town is a suburb of Washington, D. C."
Which is a representation of the statement below?

If the town is a suburb of Washington, D. C., then the town is not Arlington.

A $\sim p \rightarrow \sim q$
B $q \rightarrow \sim p$
C $\sim q \rightarrow \sim p$
D $p \rightarrow \sim q$

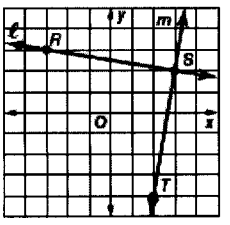
28. What type of construction is represented below?

Line ℓ and point *P* are given. Arcs are drawn at points *X*, *Y*, and *Z*, then $\overline{PZ}$ is drawn. Which construction is illustrated?



F. The perpendicular bisector of a segment.
G. A segment congruent to another segment.
H. A line perpendicular to a line through a point on the line.
J. A line perpendicular to a line through a point not on the line

29 Point *T* is the image of point *R* under a rotation about point *S*. Which of the following statements verifies that $\ell \perp m$?



⊥ lines slopes are opp recip. of each other & their product is −1.

A Slope of ℓ is not equal to slope of *m*.
B slope of ℓ · slope of $m = -1$
C $\overline{RS} = \overline{TS} = \sqrt{37}$
D Lines ℓ and *m* intersect in the plane.

30 The surface area of a right cylinder is three times the surface area of a smaller similar cylinder. What is the ratio of the radius of the larger cylinder to the radius of the smaller cylinder?

$SA: a^2 : b^2$

$3 : 1$

Ratio of radii $= a : b$ so take the $\sqrt{}$ of each

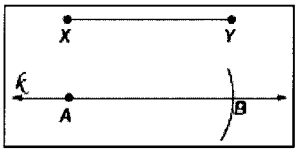
F $\sqrt[3]{3} : 1$

G $\sqrt{3} : 1$

H $9 : 1$

J $27 : 1$

31. What type of construction is represented below?



Given $\overline{XY}$.
Use a straightedge to draw line ℓ. Plot point A on ℓ. Set the compass with radius XY. Place compass point on A and draw an arc intersecting ℓ at B.

A. The perpendicular bisector of a segment.

B. A segment congruent to another segment.

C. A line perpendicular to a line through a point on the line.

D. A line perpendicular to a line through a point not on the line.

32 A golf ball has a diameter of 1.68 inches. Which is *closest* to the volume of the ball, in cubic inches?

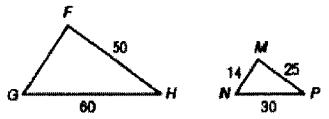
F 0.84

G 2.5

H 3.0

J 8.9

33 In addition to the information in the drawing, which statement would be needed to prove that $\triangle FGH \sim \triangle MNP$?



A $\frac{FG}{MN} = \frac{FH}{MP}$

$\frac{FG}{MN} = \frac{GH}{NP} = \frac{FH}{MP}$

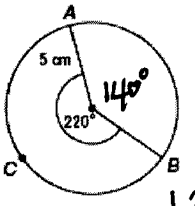
B $\frac{FH}{MP} = \frac{GH}{NP}$

C $\angle F \cong \angle M$

D $\angle G \cong \angle N$

34 Which value is *closest* to the length of $\overset{\frown}{AB}$, in centimeters?

$360 - 220 = 140$



$\frac{140}{360} \cdot 2 \cdot \pi (5)$

12.2

F 10

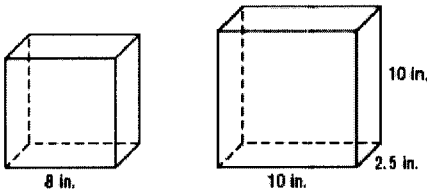
G 12.2

H 19.2

J 30.5

35. Two storage boxes are similar. About how many times more volume will the larger box hold?

$a : b = 8 : 10 = 4 : 5$



Volume $a^3 : b^3$

$4^3 : 5^3$

$64 : 125$

A The larger box will hold 1.25 times as much.

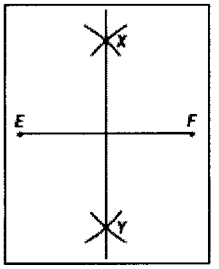
B The larger box will hold 1.56 times as much.

$\frac{125}{64} = 1.95$

C The larger box will hold 1.95 times as much.

D The larger box will hold 2.44 times as much.

36. What type of construction is represented below?



Given $\overline{EF}$.
Set a compass for any radius greater than $\frac{1}{2}$ EF. Draw four arcs with this radius using E and F as centers. Draw $\overline{XY}$.

F. The perpendicular bisector of a segment.

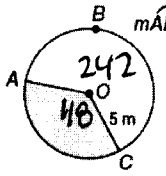
G. A segment congruent to another segment.

H. A line perpendicular to a line through a point on the line.

J. A line perpendicular to a line through a point not on the line.

37. Which value is *closest* to the area of the shaded sector of circle *O*, in square meters?

360 − 242 = 118



$\frac{118}{360} \cdot \pi(5)^2$

25.7

A 78.5
B 52.8
C 25.7
D 10.3

38 A child's ball has a diameter of 12 inches. Which is *closest* to the surface area in square inches?

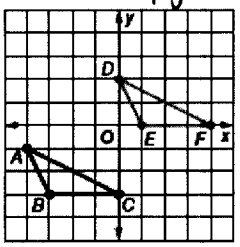
r = 6

F 113.1
G 150.8
H 452.4
J 904.8

$4\pi(6)^2$

39 Triangle *ABC* and its image, triangle *DEF*, are shown. Which statement describes the type of transformation that occurred?

$(x,y) \rightarrow (x+4, y+3)$



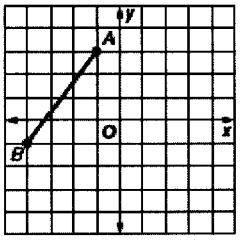
A Slope of $\overline{AC}$ = slope of $\overline{DF}$; since the slopes are the same, the transformation is a rotation.

B Each of the points *A*, *B*, and *C* is reflected in the *x*-axis.

C For points *A*, *B*, and *C*, each *x*-coordinate increases by 4 units, and each *y*-coordinate increases by 3 units. So, the transformation is a translation.

D Since $BC \neq DF$, the transformation is a dilation with a scale factor of 1.

40 $\overline{AB}$ is rotated 90° clockwise about the origin. What is the length of its image?



rotations are isometries — the shape & size is preserved!

F 3
G $\sqrt{13}$
H 4
J 5

41 Which if-then statement follows from the pair of statements?

If I pass my driving test, then I will get my driver's license. $p \rightarrow q$

If I get my driver's license, then I will drive my parent's car. $q \rightarrow r$

A If I do not pass my driving test, then I will not drive my parent's car.

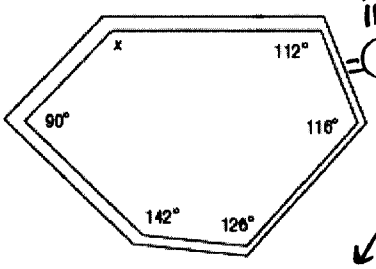
B If I pass my driving test, then I will drive my parent's car. $p \rightarrow r$

C If I drive my parent's car, then I got my driver's license.

D If I get my driver's license, then I did not pass my driving test.

Law of Syllogism!

42 LeeAnn cut a piece of stained glass that is shaped like the hexagon below. What is the value of x?

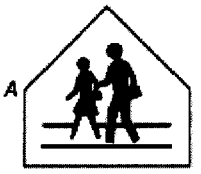


int ∡sum $=(6-2)180$
$=720$

$x+586=720$
$x=134$

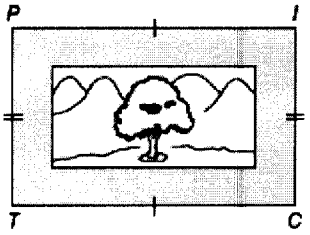
F 114°
G 134°
H 314°
J 494°

43 Schools often have the traffic sign below near their buildings. What is the *closest* estimate of $m\angle A$?



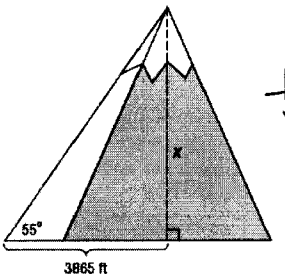
A 90° has to be >90!
B 135°
C 160°
D 180°

44 The opposite sides of a picture frame are congruent. The frame is a parallelogram. What additional information would not verify that the frame is a rectangle?



F $\angle P \cong \angle C$; $\angle T \cong \angle I$; $m\angle T + m\angle C = 180°$ opp ∡s R≅ consec ∡s R supp.
G $\overline{PC} \cong \overline{IT}$ diag R≅
H $\overline{PC} \perp \overline{IT}$ diag R NOT ⊥!
J $\overline{PT} \perp \overline{TC}$ consec. sides R⊥!

45. The angle of elevation to the top of Whitetop Mountain is 55° from a horizontal distance of 3865 feet. Which is *closest* to the value of x, the height of the mountain?



$\tan 55 = \frac{x}{3865}$

$x = 3865(\tan 55)$
5519.8

sin 55° ≈ 0.819
cos 55° ≈ 0.574
tan 55° ≈ 1.428

A 5519 ft
B 3165 ft
C 2219 ft
D 687 ft

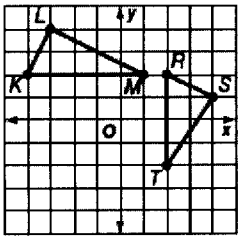
46 Which if-then statement follows from the pair of statements?

If the sun is shining, then we will have a picnic at the Mount Rogers National Recreation Area. $p \to q$
If we have a picnic at the Mount Rogers National Recreation Area, then it is not raining. $q \to r$

F If we do not have a picnic at the Mount Rogers National Recreation Area, then the sun is shining.
G If the sun is shining, then it is not raining. $p \to r$
H If it is not raining, then the sun is shining.
J If we have a picnic at the Mount Rogers National Recreation Area, then the sun is shining.

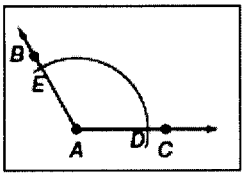
Law of Syllogism

47 Which set of true statements can be used to verify that $\triangle KLM \cong \triangle RST$?

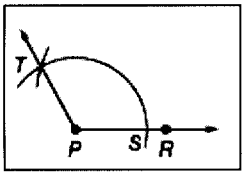


A $KL = RS$; $LM = ST$; $KM = RT$
B $KL = RS$; $LM = ST$; $m\angle M = m\angle T$
C $KL = RS$; $LM = ST$; $m\angle K = m\angle R$
D $m\angle K = m\angle R$; $m\angle M = m\angle T$

48. What type of construction is represented below?



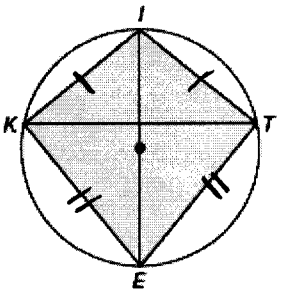
Step 1
Using A as the center, draw an arc that intersects $\angle BAC$ at E and D.



Step 2
Draw $\overline{PR}$. Draw an arc with center P with the same radius as $\overline{DE}$. Draw an arc with center S with radius DE that intersects the other arc. Then draw $\overline{PT}$.

F. The perpendicular bisector of a segment.
G. A sement congruent to another segment.
H. An angle congruent to a given angle.
J. The bisector of an angle

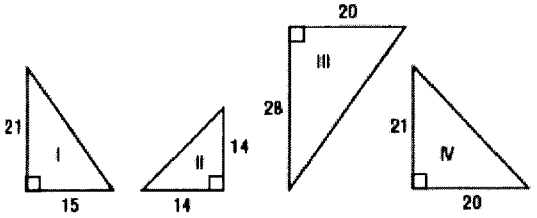
49 Karen designed a logo that is a kite inscribed in a circle. One diagonal of the kite, IE, is a diameter of the circle. Which statement is true about angles $\angle KIT$ and $\angle KET$?



opp. ∠s of a quad inscribed in a ⊙ are supplementary!

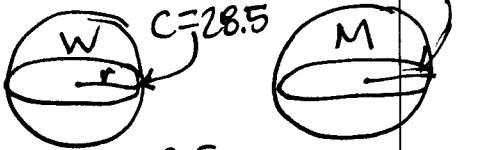
A $\angle KIT$ and $\angle KET$ are both right angles.
B $\angle KIT$ and $\angle KET$ are congruent.
C $\angle KIT$ and $\angle KET$ are supplementary.
D $\angle KIT$ and $\angle KET$ are not related.

50 Which of the four triangles are similar?



F I and III only
G I, II, and III only
H I and IV only
J III and IV only

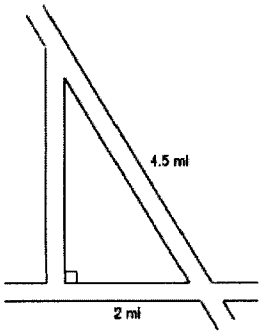
51 The circumference of a great circle of a women's league basketball is 28.5 inches, and the circumference of a great circle of a men's league basketball is 29.5 inches. Which is *closest* to the ratio of the surface area of the women's basketball to the surface area of the men's basketball?



A 0.902
B 0.933
C 0.966
D 1.035

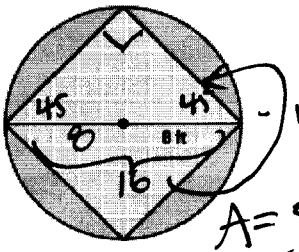
SF = 28.5 : 29.5
area SF = $28.5^2 : 29.5^2 = 812.25 : 870.25$
$= \frac{812.25}{870.25}$
$= .933$

52 The streets near Fiona's house form the right triangle shown. Fiona rides her bicycle down each street once. Which number is *closest* to the distance she rides?



F 13.0 mi
G 11.4 mi
H 10.5 mi
J 8.5 mi

53 George designed a circular patio with a radius of 8 feet. He added tiles that make an inscribed square. What is the area of the tiles he added, in square feet?

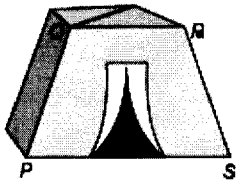


$\frac{16}{\sqrt{2}} = 8\sqrt{2} =$ side

$A = s^2$
$= (8\sqrt{2})^2$
$= 64 \cdot 2$
$= 128$

A 32
B 64
C 73
D 128

54 The front of a tent appears to be an isosceles trapezoid. What information is needed to verify that this quadrilateral is an isosceles trapezoid?



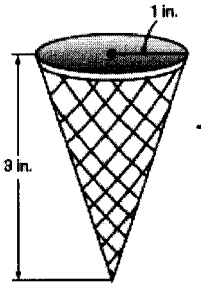
F $m\angle P + m\angle Q = 180°$ ✓ consec ∠s supp make

G $\overline{QR} \parallel \overline{PS}$ ✓ 1 pr. opp. ≅ sides.

H $\overline{QS} \cong \overline{RP}$ diag ≅

J $\overline{PQ} \cong \overline{RS}$; $\overline{QR} \parallel \overline{PS}$ ≅ diag + 1 pr. opp sides H.

55. A sugar cone for ice cream is shaped like a right cone as shown. Which is *closest* to the volume, in cubic inches, of ice cream that will fill the cone?



$\frac{1}{3}\pi(1)^2(3)$

A 3

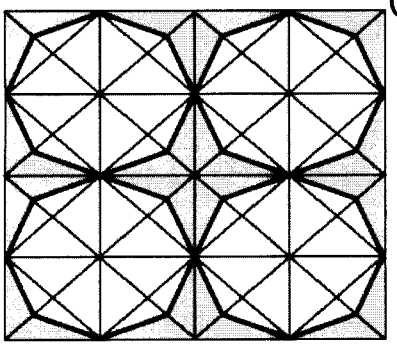
B 3.14

C 9.4

D 12.6

56. A design for a floor tile is made using the lines of symmetry of a square. What is the sum of the measures of the interior angles of one convex octagon in the design?

$(8-2)180)$
$6(180)$



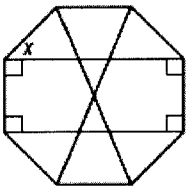
F 720°

G 1080°

H 1260°

J 1440°

57. A stained glass design uses a shape formed by connecting the vertices of a regular octagon. What is the value of x?



E I

$\frac{360}{8} = 45 = E$

$I = 180 - 45$

$I = 135$

135 $135 - 90$

45

A 135°

B 90°

C 45°

D 30°

58. Two cylindrical storage containers are similar. About how many times larger is the volume of the larger container?

SF = 1.2 : 3.6
= 1 : 3

Volume
$= 1^3 : 3^3$
$= 1 : 27$

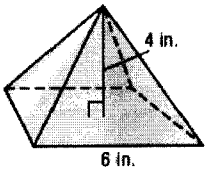
F The volume is 3 times larger.

G The volume is 6 times larger.

H The volume is 9 times larger.

J The volume is 27 times larger.

59. What is the total volume, in cubic inches, of an acrylic bookend in the shape of a square pyramid?



$\frac{1}{3} B \cdot h$

$\frac{1}{3}(6^2)(4)$

A 24

B 32

C 48

D 144