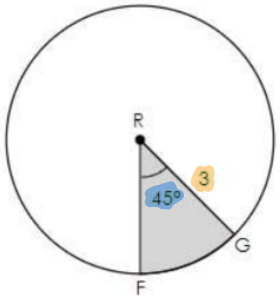
Pear Assessment

Ohio Spring 2024 Geometry Item Release

Created By OHIO'S STATE TEST

1 A circle is shown.



$A_{sector} = \frac{\theta}{360^\circ}\pi r^2$

$= \frac{45^\circ}{360^\circ}\pi(3)^2$

Which expression represents the shaded area formed by sector FRG?

(A) $(3)^2\pi$

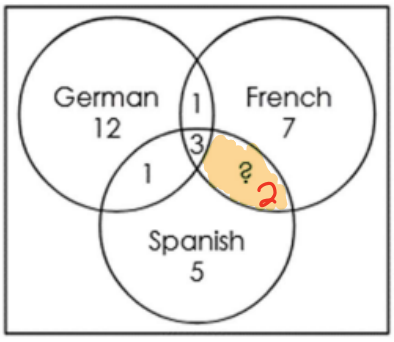
(B) $\frac{(3)^2\pi}{360}$

(C) $\frac{45}{360}(3)^2\pi$

(D) $\left(\frac{315}{360}\right)(3)^2\pi$

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2 Alicia surveys 31 people about how many world languages they speak. She finds that 11 people speak Spanish, 17 people speak German, and 13 people speak French. Part of the data she collects is shown in the Venn diagram.



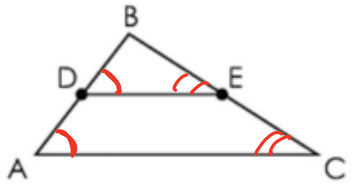
Spanish = $1+3+?+5 = 11$

French = $1+3+7+? = 13$

How many people does Alicia survey that speak both French and Spanish but not German?

2

3 Triangle ABC and triangle DBE are shown. $\overline{DE}$ is parallel to $\overline{AC}$.



AA Sim

Marsha wants to prove that the side lengths of triangle DBE are proportional to those of triangle ABC.

An incomplete proof is given.

Statement	Reasons
1. $\overline{DE} \parallel \overline{AC}$	Given
2. $\angle BAC \cong \angle BDE$	Corresponding angles of parallel lines are congruent
3. $\angle BCA \cong \angle BED$	Corresponding angles of parallel lines are congruent

Which statement and reason would be the **best** next step in the proof.

(A) $AD = DB$ because D is the midpoint of $\overline{AB}$

(B) Triangle ABC is similar to triangle DBE by AA.

(C) Triangle ABC is similar to triangle DBE by ASA.

(D) $\frac{AB}{DB} = \frac{BC}{BE}$ because corresponding sides of similar triangles are in proportion.

4 Alfred correctly explains a correspondence between two triangles.

Select a word or phrase of each blank to complete Alfred's argument.

Congruent figures

1. Suppose triangle ABC is congruent to triangle DEF.

2. Then there is a series of rigid motions that maps triangle ABC onto triangle DEF.

3. Any [a] of a triangle preserves the distances between every pair of corresponding points in the triangle.

4. Therefore, if two triangles are congruent, then corresponding angles have [b] and corresponding sides have [c]

a

- rotations, reflections, and dilations
- translations, rotations, and reflections
- translations, rotations, reflections, and dilations

b

- the same measure
- proportional, but unequal measures,

c

- the same length
- proportional, but unequal lengths

---

5 Lucas translates quadrilateral $PQRS$ x units right and y units up to create quadrilateral $P'Q'R'S'$, where x and y are not equal to zero.

Translation keeps angle same
∴ Parallel

Which statement **best** describes $\overline{PP'}$, $\overline{QQ'}$, $\overline{RR'}$, and $\overline{SS'}$?

(A) Each line segment is the same distance from the other line segments.

(B) Each line segment intersects the same point as the other line segments.

(C) Each line segment is perpendicular to atleast one of the other line segments.

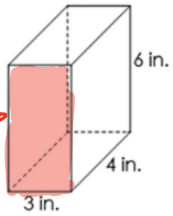
(D) Each line segment is either parallel to or collinear with the other line segments.

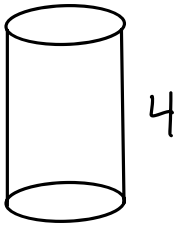
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6 The items has two parts.

(a) The figure shows the dimensions, in inches (in.), of a wax candle.

$A = 3 \cdot 4 \cdot 6 = 72$





The candle is melted and remolded in the shape of a right cylinder of height 4 inches so that the volume remains the same.

Part A

Complete the sentence of relate the dimensions of the two shapes.

As the volume of the two shapes are the same and the height of the cylinder is equal to one of the side lengths of the prism, the a of the cylindrical candle must be equal to the b of the face of the prism with side lengths that are not equal to the height of the cylinder.

$A = \pi r^2 \cdot h$

$72 = \pi r^2 \cdot 4$

$18 = \pi r^2$

$\sqrt{\frac{18}{\pi}} = r$

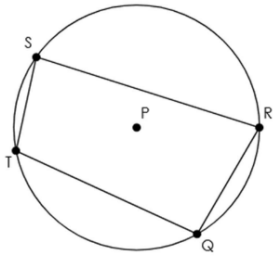
a
- ✓ area of the base
- circumference of the base

b
- ✓ area
- perimeter

(b) **Part B**

The face of the prism with side lengths not equal to the height of the cylinder is 6 inches by 3 inches. The radius, rounded to the nearest hundredth of an inch, of the base of the cylindrical candle is 2.39 inches.

7 Quadrilateral $QRST$ is inscribed in circle P.



opposite angles of an inscribed QUAD are supplementary.

Which equation must be true?

(A) $m\angle Q = 90^\circ$

(B) $m\angle Q = m\angle S$

(C) $m\angle Q + m\angle R = 180^\circ$

(D) ✓ $m\angle Q + m\angle S = 180^\circ$

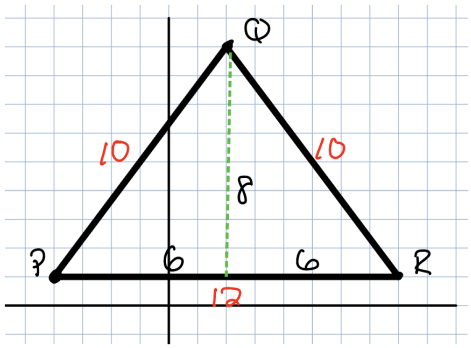
8 The coordinates of the vertices of $\triangle PQR$ are given.

- $P\,(-4,\ 1)$
- $Q\,(2, 9)$
- $R\,(8, 1)$

What is the perimeter, in units, of $\triangle PQR$?

32 units

$P = 10 + 10 + 12$



PT
6-8-10

9 The area of triangle QRS is 24 square centimeters. Triangle QRS is scaled by a factor of 4 to create triangle TUV.

Complete the statement of describe a way to find the area of triangle TUV.

To find the area of triangle TUV, a the area of triangle QRS by 16.

The area of triangle TUV is 384 square centimeters.

a
- divide
- ✓ multiply

$A_{QRS} = \frac{1}{2} b \cdot h$

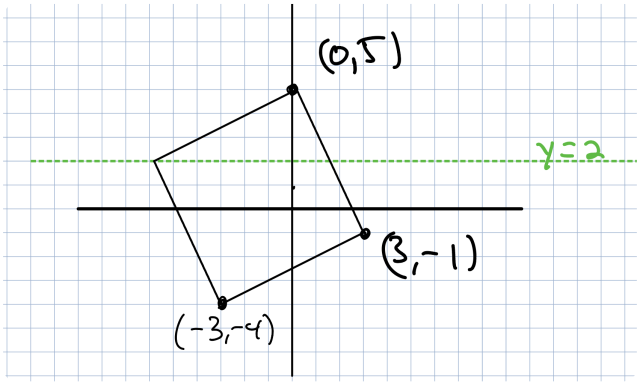
$A_{TUV} = \frac{1}{2}(4b)(4h) = 16\left(\frac{1}{2}bh\right)$

10 The vertices of a rectangle are given as ordered pairs:

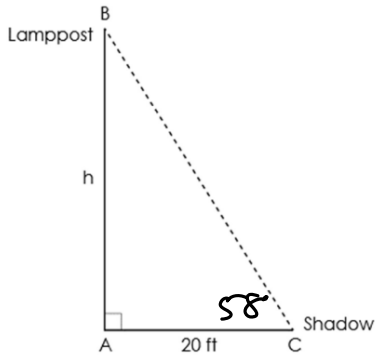
- $(0, 5)$
- $(3, -1)$
- $(-3,\ -4)$
- $(x, 2)$

What is the x-coordinate of the fourth vertex?

−6



11 A lamppost casts a shadow of 20 feet (ft) along the ground, as shown.



$\tan(58°) = \frac{h}{20}$

$20 \tan(58°) = h$

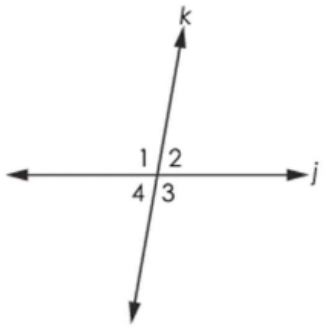
$32 \approx h$

The measure of angle C is 58 degrees.

What is the height, h, of the lamppost to the nearest foot?

32 *feet*

12 Lines j and k intersect to form angles 1, 2, 3 and 4, as shown.



vertical Angles Theorem

Eliot is trying to complete the proof that angle 3 is congruent to angle 1. First, he notes that angles 1 and 2 form a linear pair, as do angles 2 and 3. Next, he notes that the measures of angles 1 and 2 have a sum of 180 degrees because they are supplementary. Next, he notes that the measures of angles 2 and 3 have a sum of 180 degrees because they are supplementary.

Which statement should be the next step in Eliot's proof?

(A) Angles 1 and 4 form a linear pair. True, but not needed

(B) Angles 1 and 2 each have a measure of 90 degrees. False

(C) The measure of angle 1 and the measure of angle 3 have a sum of 180 degrees by substitution. False

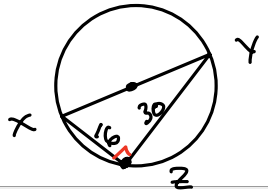
(D) ✓ The sum of the measures of angles 1 and 2 is equal to the sum of the measures of angles 2 and 3 by substitution. Kinda. Skipping steps.

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13 Triangle XYZ is inscribed in a circle, where $\overline{XY}$ is a diameter of the circle, $XZ = 16$ units, and $YZ = 30$ units.

What is the diameter, in units, of the circle?

34 units



Right Triangle

PT
8-15-17
16-30-34

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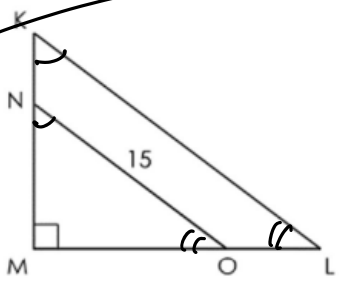
14 A baseball has a volume of 12.75 cubic inches $(in.^3)$ and a mass of 144.585 grams (g).

What is the density, in grams per cubic inch, of the baseball?

$\frac{144.585}{12.75}$ $\frac{g}{in.^3}$

$\frac{\text{grams}}{in^3} \Rightarrow \frac{144.585}{12.75}$

15 Triangle MKL is similar to triangle MNO and $NO = 15$, as shown.



The sine of $\angle MKL$ is 0.8.

What is the length , in units, of side MO? 12 units

$\sin(K) = \frac{8}{10}$

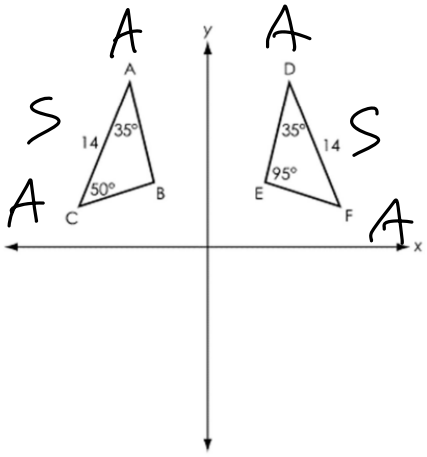
$\sin(N) = \frac{8}{10} = \frac{MO}{15}$

$\frac{8(15)}{10} = MO$

$12 = MO$

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16 Triangle DEF is the image of triangle ABC after a reflection across the y-axis, as shown.

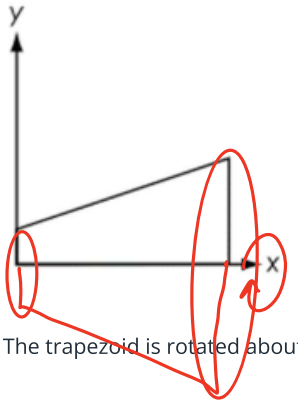


Complete the sentence that can be used to prove the two triangles are congruent. The triangle can be proved to be congruent by calculating the measure of a and then using the b criterion for congruence.

a
- ○ angle B
- ✓ angle F

b
- ○ Side - Side - Side
- ○ Side - Angle - Side
- ✓ Angle - Side - Angle

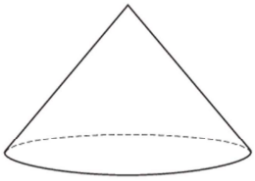
17



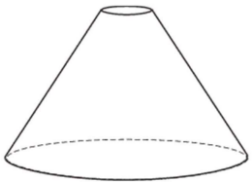
A trapezoid is shown on a coordinate grid. The trapezoid is rotated about the x -axis.

What is the resulting shape?

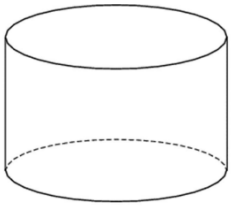
A



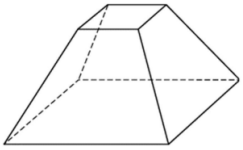
B



C

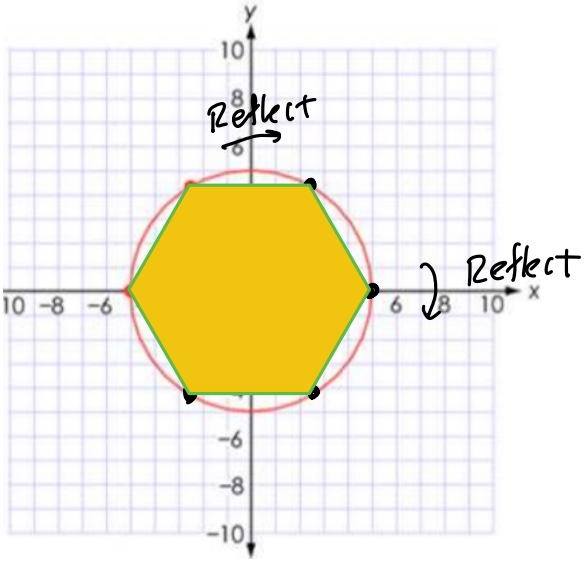


D

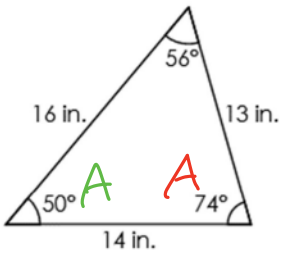


18 Two points of a regular hexagon inscribed in circle Q are shown.

Complete the hexagon.



19 A triangle is shown.



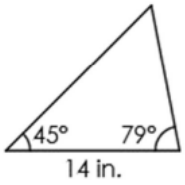
AA - Sim

Which triangle is similar?

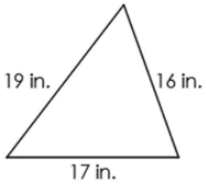
Ⓐ



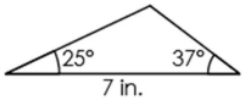
Ⓑ



Ⓒ



Ⓓ



20 A scientist conducts experiments on bacteria using three different conditions, A, B and C. The table shows the probabilities of the bacteria being affected by each condition.

Probabilities

Individual	Conditional
$p(A) = \frac{50}{100} = \frac{1}{2}$	$P(A \mid B) = \frac{15}{65} = \frac{3}{13}$
$P(B) = \frac{65}{100} = \frac{13}{20}$	$P(A \mid C) = \frac{10}{20} = \frac{1}{2}$
$P(C) = \frac{20}{100} = \frac{1}{5}$	$P(A \mid C) = \frac{15}{20} = \frac{4}{5}$

Complete the statements to explain which two conditions are independent.

Two conditions that are independent of each other are conditions **a**

The scientist can conclude this because **b** = **c**

a

- ○ A and B
- ✓ A and C
- ○ B and C

b

- ○ P(A)
- ○ P(B)
- ○ P(C)
- ○ P(A|B)
- ✓ P(A|C)
- ○ P(B|C)

c

- ✓ P(A)
- ○ P(B)
- ○ P(C)
- ○ P(A|B)
- ○ P(A|C)
- ○ P(B|C)