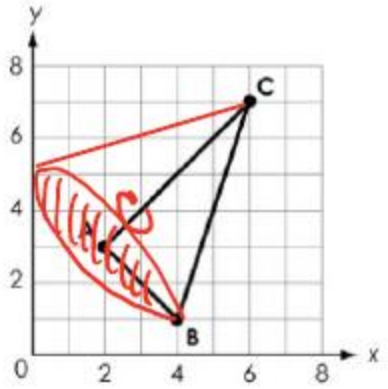
Question 1 (2017)

Triangle ABC is shown.



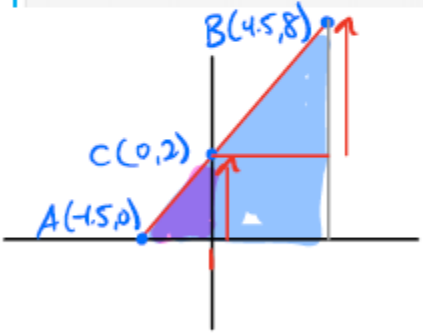
Which three-dimensional figure results from rotating the triangle 360° about $\overline{AC}$?

(A) cone
(B) cylinder
(C) pyramid
(D) sphere

Question 2 (2017)

Line segment AB has endpoints A (−1.5, 0) and B (4.5, 8). Point C is on line segment AB and is located at (0, 2).

What is the ratio of $\frac{AC}{CB}$?



$\frac{AC}{CB} = \frac{1.5}{4.5} = \frac{1}{3}$

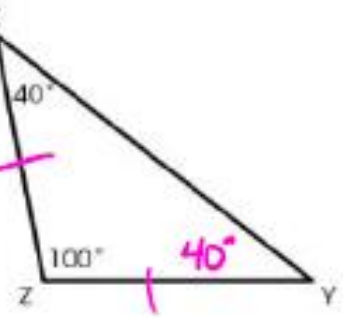
$\frac{AC}{CB} = \frac{2}{6} = \frac{1}{3}$

$AC = \sqrt{(\quad)^2 + (\quad)^2} = 2.5$

$CB = \quad = 7.5$

Question 3 (2017)

Triangle XYZ is shown.



Which triangle must be similar to triangle XYZ?

(A) a triangle with two angles that measure 40°

(B) a triangle with angles that measure 40° and 60° ✗

(C) a scalene triangle with only one angle that measures 100° ✗

(D) an isosceles triangle with only one angle that measures 40°

Question 4 2017

During a 90-day semester, a student records whether he arrives at school on time and whether he goes to bed by 10:00 p.m. the night before. The results are shown in the table.

Number of Occurrences

	Arrives at School on Time	Arrives at School Late	total
Goes to Bed by 10:00 p.m.	72	8	80
Goes to Bed After 10:00 p.m.	9	1	10

Does the student arriving at school on time depend on whether the student goes to bed by 10:00 p.m.? Justify your reasoning.

Type your answer in the space provided.

Prob(on time | before 10) = $\frac{72}{80} = \frac{9}{10}$

Prob(on time | after 10) = $\frac{9}{10}$

NO, ...

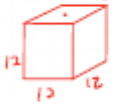
Question 5 (2017)

A globe has a ~~diameter of 12 inches~~. It fits inside a cube-shaped box that has a side length of 12 inches.

$r = 6$ in

What is the volume, rounded to the nearest hundredth of a cubic inch, of the space inside the box that is not taken up by the globe?

823.22 *cubic inches*



$V_{\text{not globe}} = V_{\text{box}} - V_{\text{globe}}$

$= lwh - \frac{4}{3}\pi r^3$

$= (12)^3 - \frac{4}{3}\pi(6)^3$

$= 1728 - \frac{4}{3}\pi(216)$

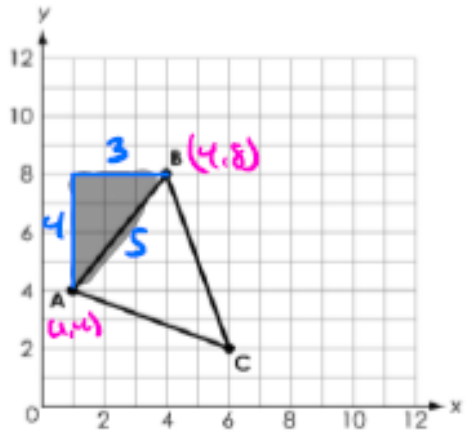
$= 1728 - 288\pi$

≈ 823.22

Question 6 (2017)

3-4-5

Triangle ABC is shown.



Triangle A'B'C' is created by dilating triangle ABC by a scale factor of 4.

What is the length of $\overline{A'B'}$?

20

$AB \cdot SF = A'B'$

$5 \cdot 4 = A'B'$

$20 = A'B'$

$SF = 4$

Question 7 (2017)

A study reports that in 2010 the population of the United States was 308,745,538 people and the land area was approximately 3,531,905 square miles.

Based on the study, what was the population density, in people per square mile, of the United States in 2010? Round your answer to the nearest tenth.

87.4 *people per square mile*

$$\text{Pop Density} = \frac{308,745,538}{3,531,905}$$

$$= 87.41\,62$$

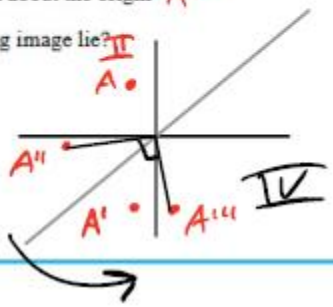
Question 8 (2017)

A figure is fully contained in Quadrant II. The figure is transformed as shown.

- a reflection over the x-axis A'
- a reflection over the line $y = x$ A''
- a 90° counterclockwise rotation about the origin A'''

In which quadrant does the resulting image lie?

Ⓐ Quadrant I
Ⓑ Quadrant II
Ⓒ Quadrant III
Ⓓ Quadrant IV



Question 9 (2017)

An online retailer conducts a random survey of its customers. The survey shows that 80% of the customers receive their purchases within four days, and 95% of those customers are satisfied with the quality of their purchases.

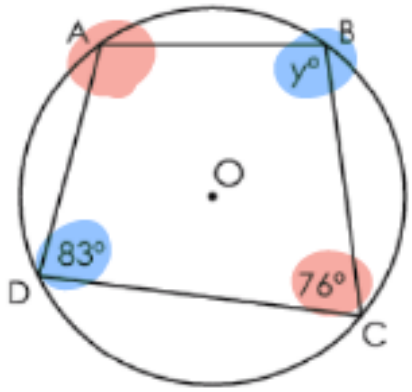
What percent of all customers receive their purchases within four days and are not satisfied with the quality of their purchases?

Ⓐ 4%
Ⓑ 5%
Ⓒ 19%
Ⓓ 24%

$.80(.05) = .04$

Question 10 (2017)

Quadrilateral ABCD is inscribed in circle O, as shown.



$y+83=180$

$y=97$

What is the value of y?

$y =$ 97

Question 11 (2017)

Josh has a bag containing pieces of candy. The bag contains 10 red circular pieces, 10 red square pieces, 10 blue triangular pieces, and 10 blue star-shaped pieces. He draws a red piece of candy from the bag.

What is the complement of this event?

Prob(Red^c) = Prob(BLUE)

(A) He draws a blue piece.

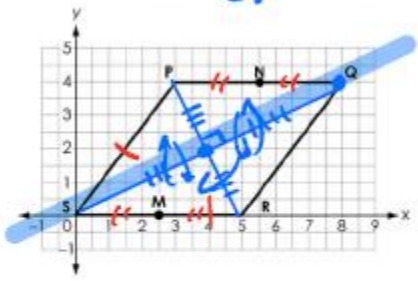
(B) He draws a square piece.

(C) He draws a circular piece.

(D) He draws a star-shaped piece.

Question 12 (2017)

Rhombus PQRS is shown on the coordinate plane. Points M and N are midpoints of their respective sides.

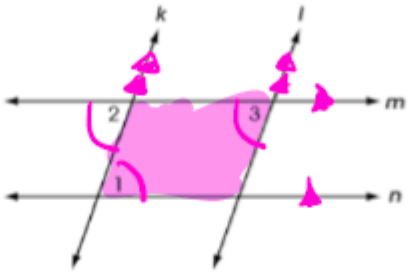


Select all of the transformations that map the rhombus onto itself.

- ☐ a 90° clockwise rotation around the center of the rhombus NO
- ☑ a 180° clockwise rotation around the center of the rhombus
- ☑ a reflection across $\overline{PR}$
- ☐ a reflection across $\overline{NM}$ NO
- ☑ a reflection across $\overline{QS}$

Question 13 (2017)

Two pairs of parallel lines intersect to form a parallelogram as shown.



Prove: $\angle 1 \cong \angle 3$

Place statements and reasons in the table to complete the proof that the opposite angles of a parallelogram are congruent.

	Statements		Reasons
1.	$m \parallel n$ $k \parallel l$	1.	Given
2.	$\angle 1 \cong \angle 2$	2.	Alt INT $\angle$'s $\cong$
3.	$\angle 2 \cong \angle 3$	3.	Corr $\angle$'s $\cong$
4.	$\angle 1 \cong \angle 3$	4.	Transit

$\angle 1 \cong \angle 2$

$\angle 1 \cong \angle 3$

$\angle 2 \cong \angle 3$

$\angle 1 \cong \angle 1$

Alternate exterior angles are congruent.

Alternate interior angles are congruent.

Transitive property of congruence

Opposite angles are congruent.

Corresponding angles are congruent.

Question 14 (2017)

Angle A is the complement of angle B.

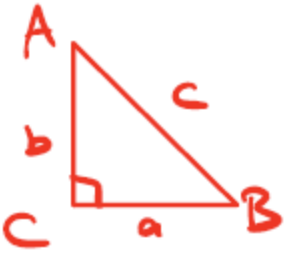
Which equation about the two angles must be true?

(A) $\sin A = \sin B$

(B) $\sin A = \cos A$

(C) $\cos B = \sin B$

(D) $\cos A = \sin B$



$\cos A = \frac{b}{c}$

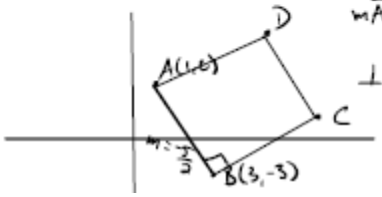
$\sin B = \frac{b}{c}$

Question 15 (2017)

Square ABCD has vertices at A (1, 2) and B (3, −3).

What is the slope of $\overline{BC}$?

2/5



$m\overline{AB} = \frac{\Delta y}{\Delta x} = \frac{2-(-3)}{1-3} = \frac{5}{-2}$

$\perp m\overline{AB} = m\overline{BC} = \frac{2}{5}$

Question 16 2017

Kevin asked Olivia what parallel lines are. Olivia responded, "They are lines that never intersect."

What important piece of information is missing from Olivia's response?

Ⓐ The lines must be straight.

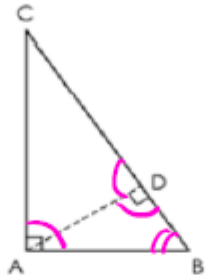
Ⓑ The lines must be coplanar.

Ⓒ The lines can be noncoplanar.

Ⓓ The lines form four right angles.

Question 17 (2017)

James correctly proves the similarity of triangles DAC and DBA as shown.



His incomplete proof is shown.

Statements		Reasons	
1.	$m\angle CAB = m\angle ADB = 90°$	1.	Given
2.	$m\angle ADB + m\angle ADC = 180°$	2.	Angles in a linear pair are supplementary.
3.	$90° + m\angle ADC = 180°$	3.	Substitution
4.	$m\angle ADC = 90°$	4.	Subtraction property of equality
5.	$\angle CAB \cong \angle ADB$ $\angle CAB \cong \angle ADC$	5.	Definition of congruent angles
6.	$\angle ABC \cong \angle DBA$ $\angle DCA \cong \angle ACB$	6.	Reflexive property of congruence
7.	$\triangle ABC \sim \triangle DBA$ $\triangle ABC \sim \triangle DAC$	7.	?
8.	$\triangle DBA \sim \triangle DAC$	8.	Substitution

What is the missing reason for the seventh statement?

Ⓐ CPCTC ≅

Ⓑ AA postulate

Ⓒ All right triangles are similar.

Ⓓ Transitive property of similarity

Question 18 (2017)

Triangle ABC is reflected across the line $y = 2x$ to form triangle RST.

Select all of the true statements.

$\triangle ABC \cong \triangle RST$

- [x] $\overline{AB} \cong \overline{RS}$
- [ ] $\overline{AB} = 2 \bullet \overline{RS}$
- [x] $\triangle ABC \sim \triangle RST$
- [x] $\triangle ABC \cong \triangle RST$
- [x] $m\angle BAC = m\angle SRT$
- [ ] $m\angle BAC = 2 \bullet m\angle SRT$

Question 19 (2017)

The equation of a circle is shown.

$x^2 + y^2 - 10x + 8y + 16 = 0$

What is the radius of the circle?

radius: 5

1 2 3 + - • ÷
4 5 6 < ≤ = ≥ >
7 8 9 $\frac{a}{b}$ $\square^{\square}$ $\square_{\square}$ ( ) | | $\sqrt{\square}$ $\sqrt[n]{\square}$ π i
0 . - sin cos tan arcsin arccos arctan

$(x-h)^2 + (y-k)^2 = r^2$

$(x^2 - 10x + 25) + (y^2 + 8y + 16) = -16 + 25 + 16$

$(x-5)^2 + (y+4)^2 = 25$

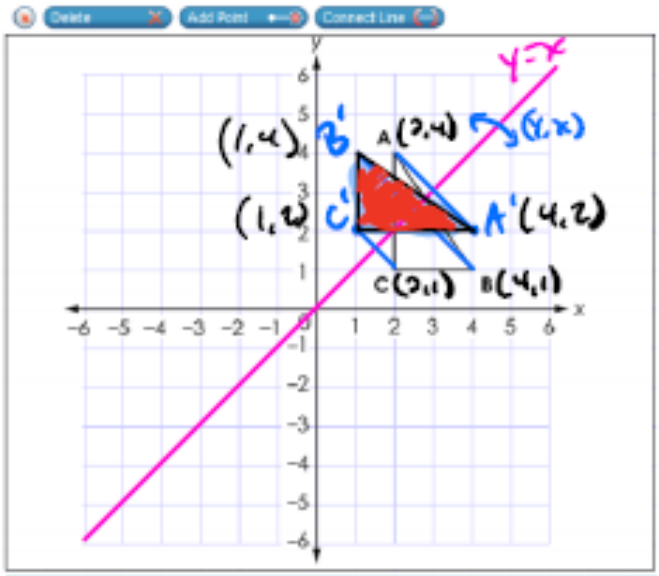
$r^2 = 25$

$r = 5$

Question 20 (2017)

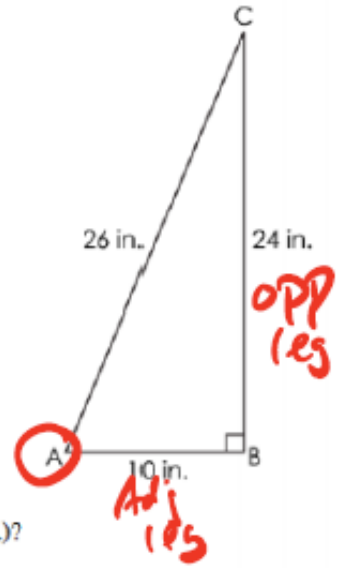
Triangle ABC is reflected across the line $y = x$.

Use the Connect Line tool to create the resulting triangle on the coordinate grid.



Question 21 (2017)

Triangle ABC is shown.



What is tan(A)?

$\frac{24}{10}$