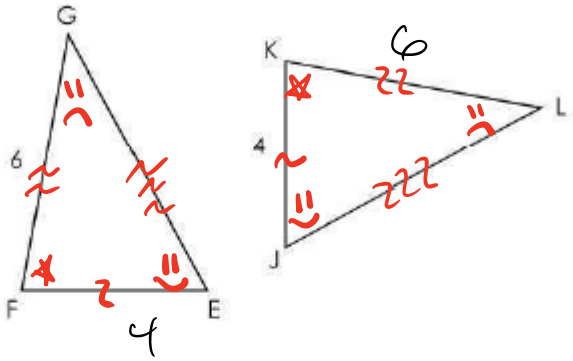
Question 1

Triangle EFG is congruent to triangle JKL.



What is KL, in units?

6 units

1	2	3
4	5	6
7	8	9
	0	
.	-	$\frac{\square}{\square}$

Question 3

The table shows the voting results of a mayoral election in a small town between candidates Smith and Jones. The small town has two polling places, one in the North District and one in the South District.

	Smith	Jones	Total
North District	21	39	60
South District	135	45	180
Total	156	84	240

Which statement is true?

Ⓐ Jones won the election with 65% of the total vote. $\frac{84}{240} = 0.35$

Ⓑ Smith won 75% of all votes from the South District. $\frac{135}{180} = .75$

Ⓒ Voters' choices are independent of the district in which they voted.

Ⓓ Support for Jones was proportionally higher in the South District than in the North District.

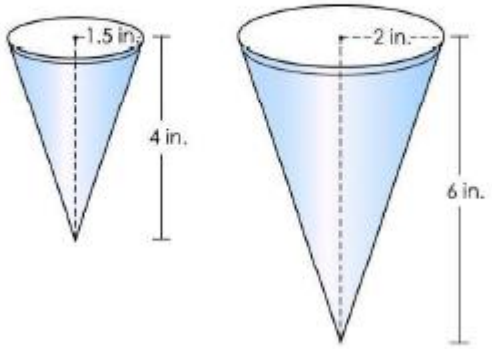
N Smith $\frac{21}{60} = .35$ N Jones $\frac{39}{60} = .65$

S Smith $\frac{135}{180} = .75$ S Jones $\frac{45}{180} = .25$

NOT INDY

Question 4

A doctor's office is deciding between buying 2 different sized cups. The 2 cups are shown.



Before deciding which size cup to buy, they determine how much water each size cup can hold.

How much more water, in cubic inches, can the larger cup hold than the smaller cup? Round your answer to the nearest hundredth.

15.71 *cubic inches*

1	2	3
4	5	6
7	8	9
	0	
.	-	$\frac{0}{0}$

$V_{Large} = \frac{1}{3}h \cdot \pi r^2$

$Large = \frac{1}{3}(6)\pi(2)^2$

$Large = 25.13$

$V_{small} = \frac{1}{3}h \cdot \pi r^2$

$Small = \frac{1}{3}(4)\pi(1.5)^2$

$Small = 9.42$

How much more? $Large - small = 25.13 - 9.42$

$= 15.71$

Question 5

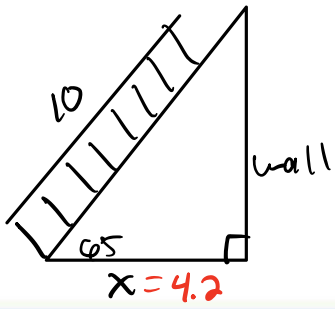
This item has **two** parts.

Regis leans a 10-foot ladder against a wall. The base of the ladder makes a 65° angle with the ground.

Part A. What is the distance, in feet, from the base of the ladder to the base of the wall? Round to the nearest tenth of a foot.

4.2 *feet*

1	2	3
4	5	6
7	8	9
	0	
.		



$\cos(65°) = \frac{x}{10}$

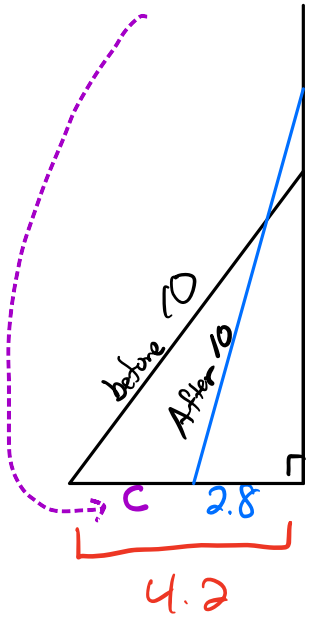
$10\cos(65) = x$

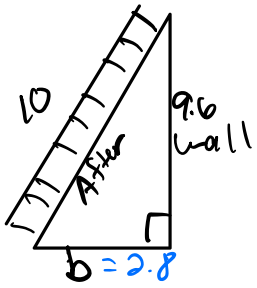
$4.2 = x$

Part B. Regis needs to move the ladder so that it reaches a window 9.6 feet above the ground.

How many feet **closer** to the building does he need to move the base of the ladder?

1.4 *feet*





$b^2 + 9.6^2 = 10^2$

$b^2 + 92.16 = 100$

$b^2 = 7.84$

$b = \pm\sqrt{7.84}$

$b = 2.8$

$c + 2.8 = 4.2$

$c = 1.4$

Question 11

Probabilities for two events, event A and event B, are given.

$P(A \text{ and } B) = 0.14$
$P(B) = 0.4$

What is the probability of A given B?

$\frac{0.14}{0.4}$ OR 0.35

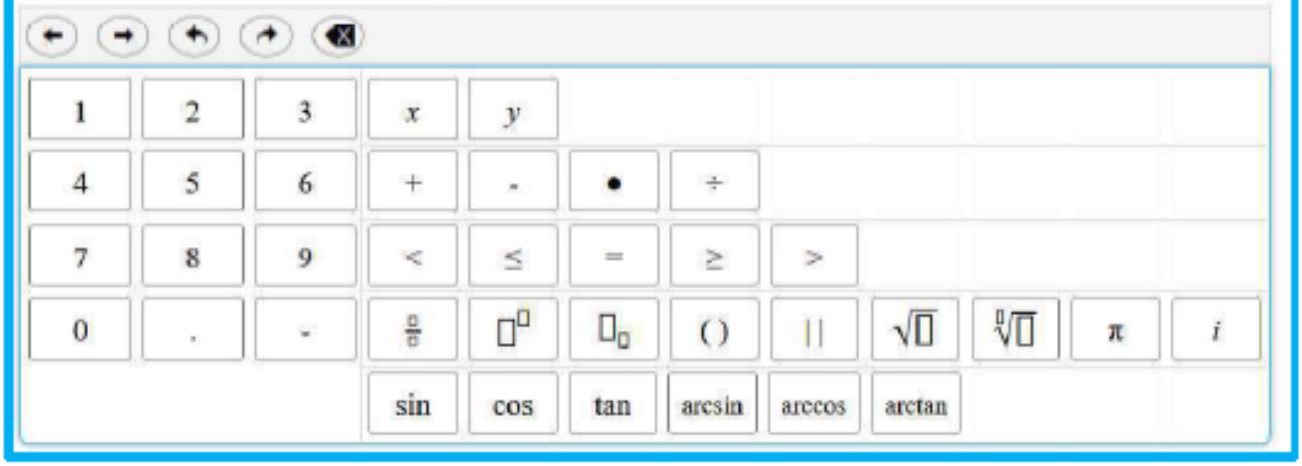
$Prob(A|B) = \frac{P(A \text{ and } B)}{P(B)}$

$= \frac{0.14}{0.4}$

Question 17

Create the equation of a circle that has a center at (1, 3) and a radius of 4 units.

$(x-1)^2 + (y-3)^2 = 4^2$



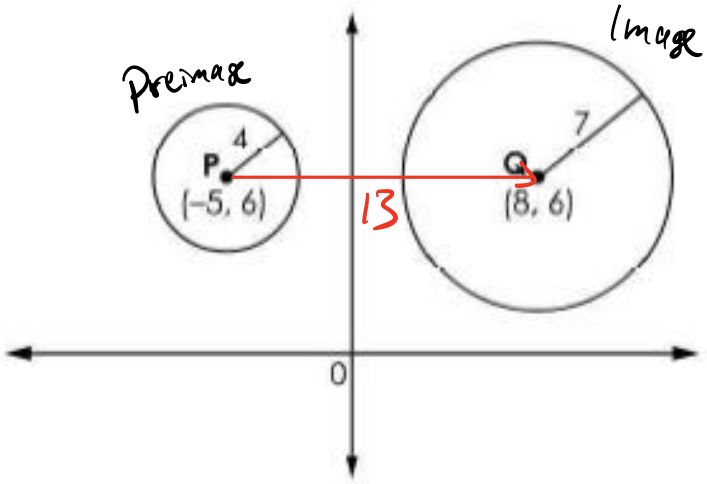
Circle $(x-h)^2+(y-k)^2=r^2$

Center = (h, k)

radius = r

Question 20

Consider the two circles shown.



To show that circle P is similar to circle Q, circle P is translated t units to the right. The image is then dilated about its center by a scale factor of s.

What are the values of t and s?

scale factor = $\frac{\text{Image}}{\text{Pre}} = \frac{7}{4}$

$= \frac{\text{New}}{\text{OLD}} = \frac{7}{4}$

$= \frac{\text{radius}'}{\text{radius}} = \frac{7}{4}$

$t =$ 13

$s =$ 7/4

Question 21

The table shows when the tickets for a concert are sold and the types of tickets that are sold.

	Tickets Purchased on Day of Concert	Tickets Purchased in Advance	Total
Adult	48	100	148
Child	62	40	102
Total	110	140	250

Counted twice

What is the probability that a randomly selected person attending the concert is an adult or has purchased the ticket in advance?

$\frac{188}{250}$

1	2	3
4	5	6
7	8	9
	0	
.	-	$\frac{\square}{\square}$

$\frac{148+140-100}{250} = \frac{188}{250}$

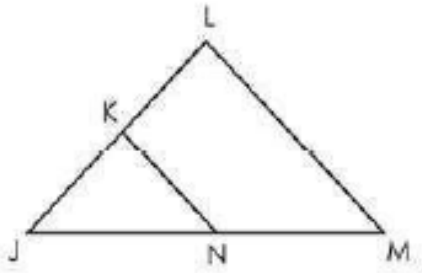
$P(\text{Adult or Advanced}) = P(\text{Adult}) + P(\text{Advanced}) - P(\text{Adult AND Adv})$

$= \frac{148}{250} + \frac{140}{250} - \frac{100}{250}$

$= \frac{188}{250}$

Question 22

A triangle JLM and line segment KN are given.



A proof of $\frac{JK}{JL} = \frac{JN}{JM}$ is shown.

Statements	Reasons
△ JLM	Given
?	Given
∠JNK = ∠JML ∠JKN = ∠JLM	Corresponding angles are congruent.
△ JKN = △ JLM	Angle-angle similar triangle postulate
$\frac{JK}{JL} = \frac{JN}{JM}$	Corresponding parts of similar triangles are proportional.

Which statement must be added to the given to keep this proof valid?

This only works for parallel lines

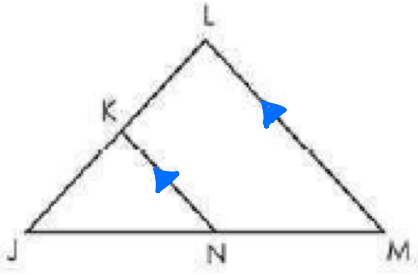
∴ which lines must be parallel?

Ⓐ $\overline{JL} \perp \overline{LM}$

Ⓑ $\overline{KN} \perp \overline{LM}$

Ⓒ $\overline{JL} \parallel \overline{LM}$

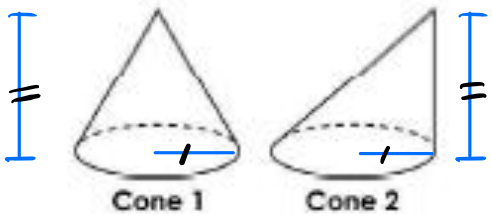
● $\overline{KN} \parallel \overline{LM}$



CAVALIERI'S PRINCIPLE If two shapes have same base & height, then they have same volume.

Question 23

Two cones are shown. The heights and bases of Cone 1 and Cone 2 are congruent.



In Cone 1, the vertex is directly above the center of the circle. In Cone 2, the vertex is directly above a point on the circle.

Select the phrases that correctly complete the sentences comparing the cross sections and volumes of Cone 1 and Cone 2.

The area of a cross section parallel to the base at the same height in each cone is [ ]

Therefore, the volume of Cone 1 is [ ] the volume of Cone 2.

Drop Down Choices:

The area of a cross section parallel to the base at the same height in each cone is

- equal for Cone 1 and Cone 2.
- larger for Cone 1 than for Cone 2.
- smaller for Cone 1 than for Cone 2.

Therefore, the volume of Cone 1 is [ ] the volume of Cone 2.

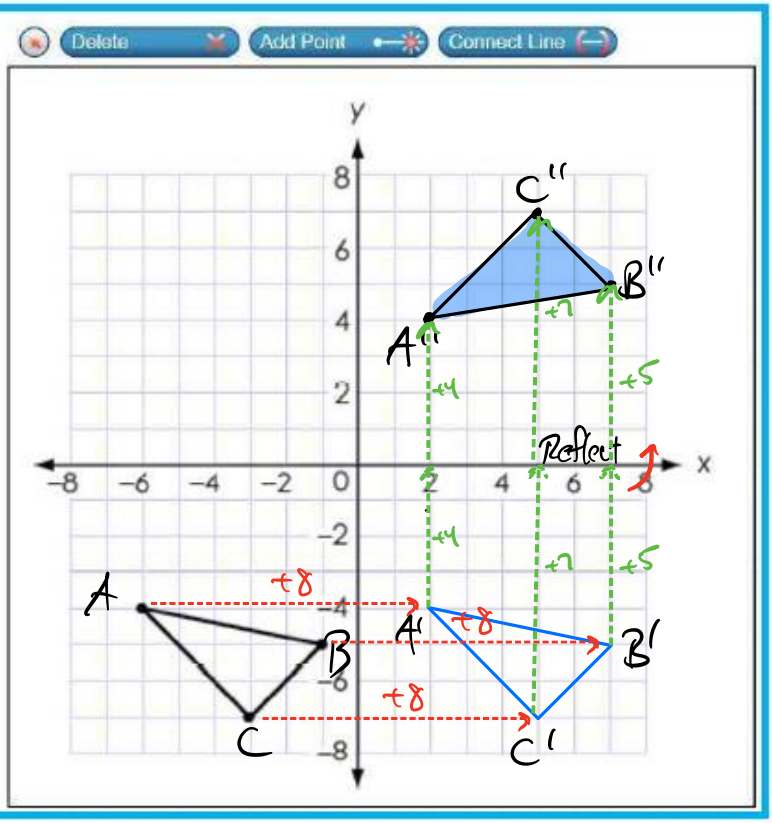
- equal to
- less than
- greater than

Question 25

A triangle is shown.

The triangle is translated 8 units to the right, then reflected over the *x*-axis.

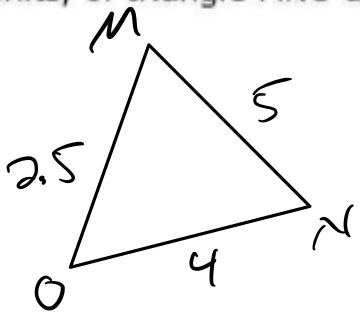
Use the Connect Line tool to draw the result.



Question 28

The side lengths, in units, of triangle MNO are given.

- MN = 5
- NO = 4
- OM = 2.5



P = 11.5 Pre-Image

Triangle MNO is dilated by a scale factor of k, with the center at point M, to create triangle MGH. Triangle MGH has a perimeter of 17.25 units.

IMAGE ?

What is the value of k?

$k =$ $\frac{17.25}{11.5}$

Scale factor: $K = \frac{MNO'}{MNO} = \frac{17.25}{11.5}$

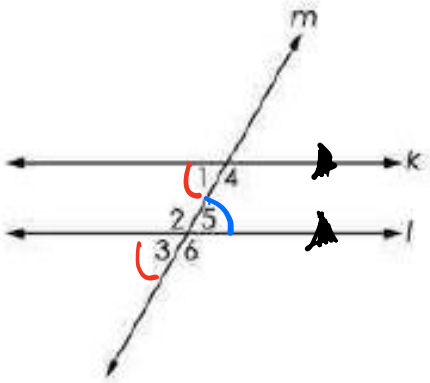
$= \frac{New}{OLD}$

$= \frac{IMAGE}{Pre\text{-}Image}$

1	2	3
4	5	6
7	8	9
	0	
.	-	⁄

Question 37

A diagram is shown, where $k \parallel l$ and m is a transversal.



Move statements and reasons to the table to prove that $\angle 1 \cong \angle 5$.

Statements	Reasons
1. $k \parallel l$	1. Given
2. $\angle 1 \cong \angle 3$	2. Corresponding angles are congruent.
3. $\angle 3 \cong \angle 5$	3. vertical $\angle$'s $\cong$
4. $\angle 1 \cong \angle 5$	4. Transitive

$\angle 1 \cong \angle 2$ $\angle 1 \cong \angle 3$ $\angle 1 \cong \angle 4$ $\angle 2 \cong \angle 3$

$\angle 2 \cong \angle 4$ $\angle 2 \cong \angle 5$ $\angle 2 \cong \angle 6$ $\angle 3 \cong \angle 4$

$\angle 3 \cong \angle 5$ $\angle 4 \cong \angle 5$ $\angle 4 \cong \angle 6$

Transitive property Symmetric property

Vertical angles are congruent.

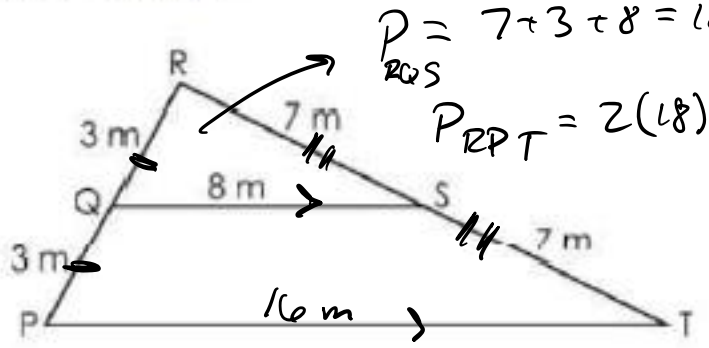
Straight angles form a linear pair.

Corresponding angles are congruent.

Alternate exterior angles are congruent.

Question 40

A figure is shown.



$P_{RQS} = 7+3+8 = 18$

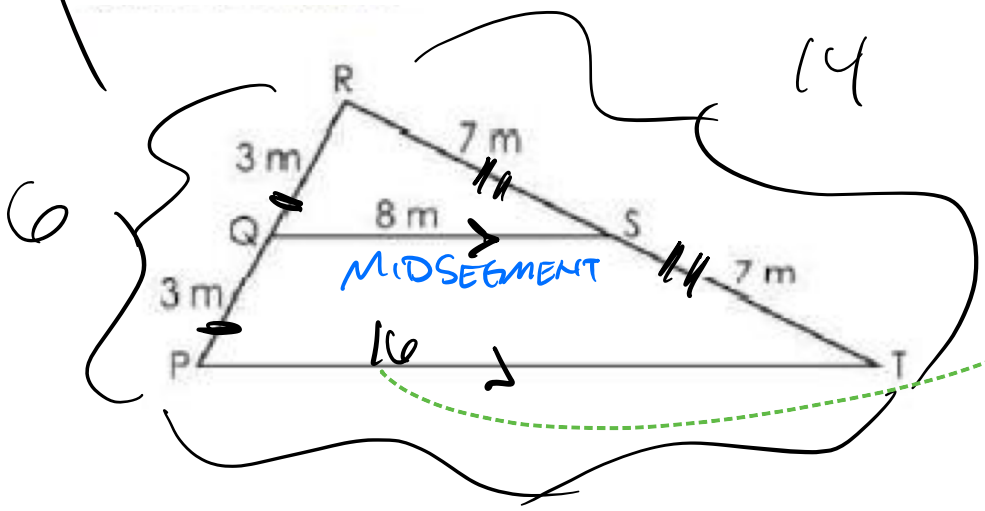
$P_{RPT} = 2(18) = 36$

What is the perimeter, in meters (m), of △PRT?

36 m

1	2	3
4	5	6
7	8	9
	0	
.	-	$\frac{\square}{\square}$

OR



14

6

16

MID SEGMENT IS parallel to 3rd side and half it's length

Question 41

Maurice has a bag containing 40 small wooden blocks.

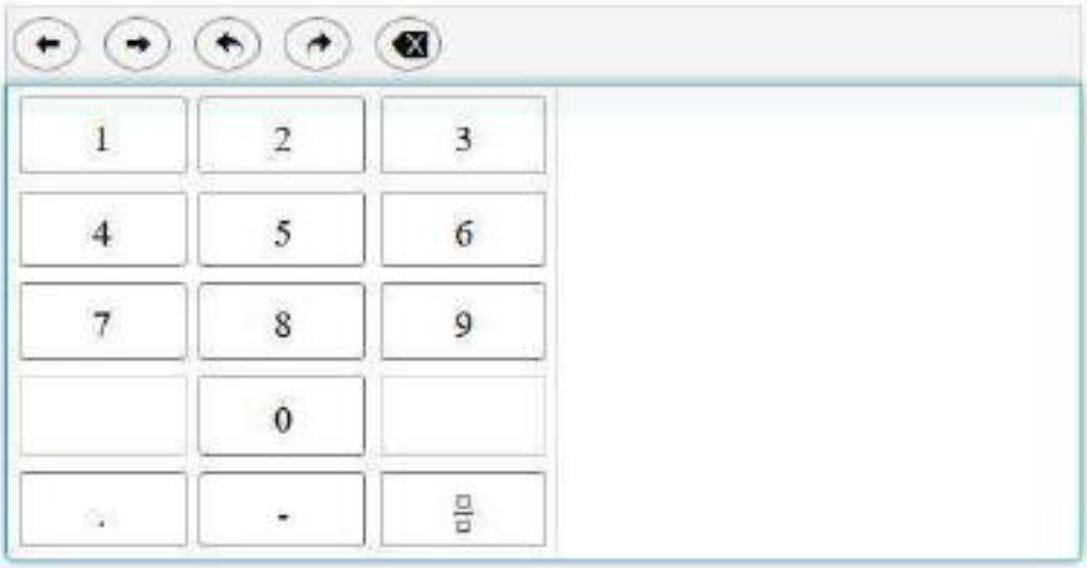
- There are 20 cubes, of which 5 are blue.
- There are 20 spheres, of which 6 are blue.

Maurice randomly selects a cube from the bag.

What is the probability that the cube he selects is blue?

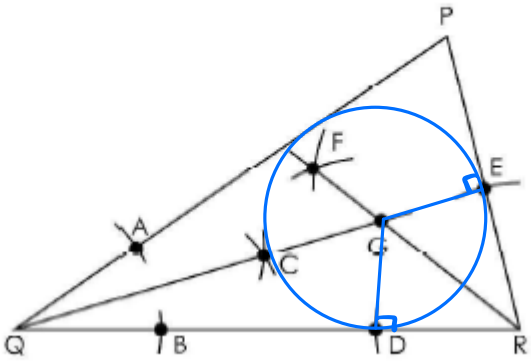
CONDITIONAL

$P(B|\text{cube}) = \frac{5}{20}$



Question 42

The first few steps to construct a circle inscribed in triangle PRQ are shown.



Adam and his friend Jason make the following claims about how they can identify the next step in the construction.

- Adam: Use the fact that the radius drawn to the point of tangency is perpendicular to the tangent line of a circle.
- Jason: Use the fact that the radius drawn perpendicular to a chord bisects the chord.

Complete the sentence to create a statement about whose claim is correct.

[ ] is correct because this fact can be used to determine the length of the [ ] of the circle by constructing a perpendicular line from point [ ] to any of the sides of the triangle.

Drop Down Choices:

[ ] is correct because this fact can be used to determine the length

- Adam
- Jason

of the [ ] of the circle by constructing a perpendicular line

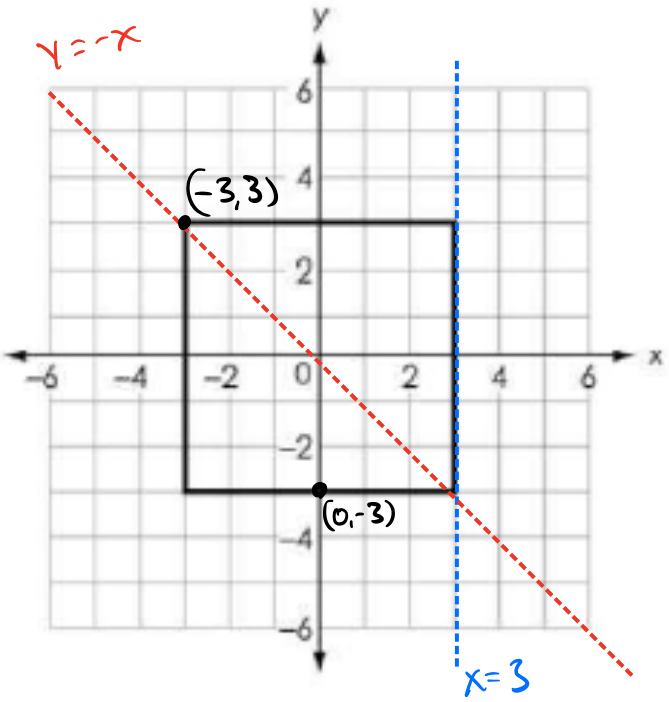
- chord
- diameter
- radius

from point [ ] to any of the sides of the triangle.

- C
- E
- G

Question 43

A square is shown.



Select all of the transformations that carry the square onto itself.

- [ ] a reflection over the line $x = 3$ NO
- [x] a reflection over the line $y = -x$
- [x] a 90-degree clockwise rotation about the origin
- [x] a 360-degree clockwise rotation about the point $(-3, 3)$
- [ ] a 180-degree clockwise rotation about the point $(0, -3)$ NO

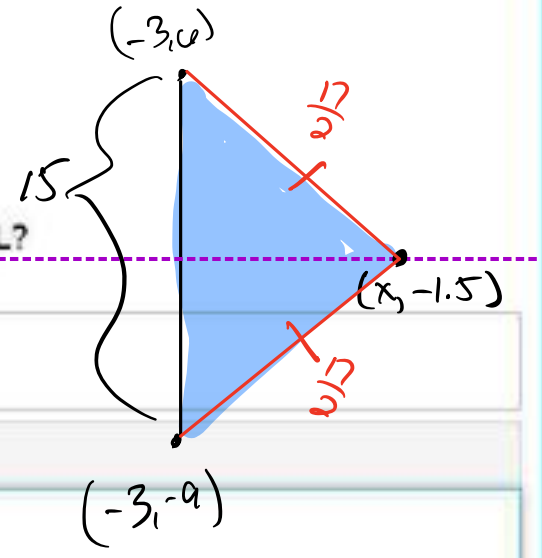
Question 45

Isosceles triangle JKL has a perimeter of 32 units and the given vertices.

- J (−3, −9)
- K (−3, 6)
- L (x, −1.5)

What is a possible x-coordinate for point L?

$x = 7$



$32 - 15 = 17$

$d = \sqrt{(\Delta x)^2 + (\Delta y)^2}$

$\frac{17}{2} = \sqrt{(x - -3)^2 + (6 - -1.5)^2}$

$\left(\frac{17}{2}\right)^2 = (x+3)^2 + (7.5)^2$

$72.25 = (x+3)^2 + 56.25$

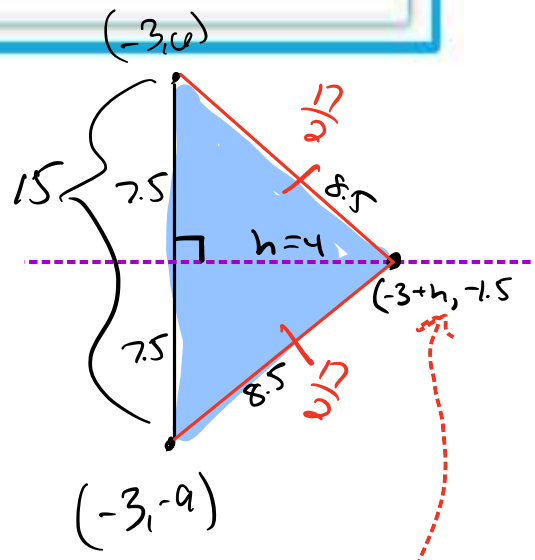
$16 = (x+3)^2$

$\pm 4 = x + 3$

$-3 \pm 4 = x$

$-7, 1 = x$

OR



$h^2 + 7.5^2 = 8.5^2$

$h = \pm\sqrt{8.5^2 - 7.5^2}$

$h = \pm 4$

$-3 - 4 = -7$

$-3 + 4 = 1$

$x = -7$ or $x = 1$

Question 47

Triangle ABC lies on the coordinate plane with vertices located at A (8, 6), B (2, – 5), and C (– 5, 1). The triangle is transformed using the rule $(x, y) \rightarrow (x + 3, 2y)$ to create triangle A′B′C′.

Determine the coordinates of triangle A′B′C′.

A′ (	11	,	12)
B′ (	5	,	-10)
C′ (	-2	,	2)

$A(8,6) \rightarrow (8+3, 2(6)) = (11, 12)$

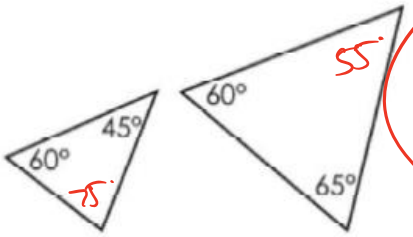
$B(2,-5) \rightarrow (2+3, 2(-5)) = (5, -10)$

$C(-5,1) \rightarrow (-5+3, 2(1)) = (-2, 2)$

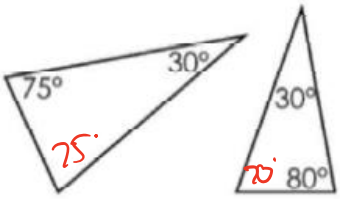
Question 48

Which pair of triangles is similar?

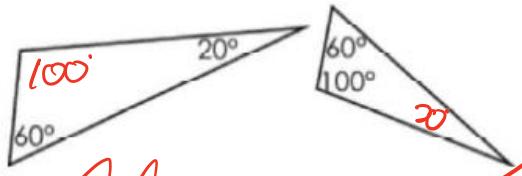
Ⓐ



Ⓑ

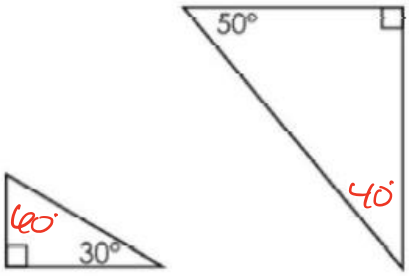


Ⓒ



AA Sim.

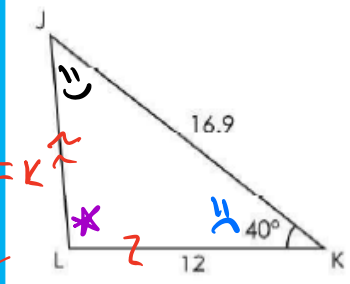
Ⓓ



 Name_____

Question 49

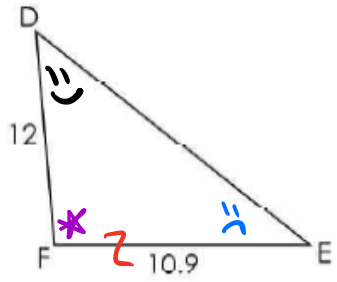
Triangle JKL is shown.



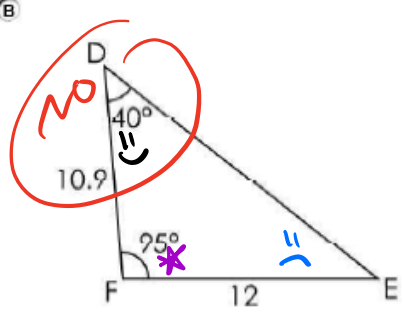
Triangle DEF is congruent to triangle JKL.

Which triangle could be DEF?

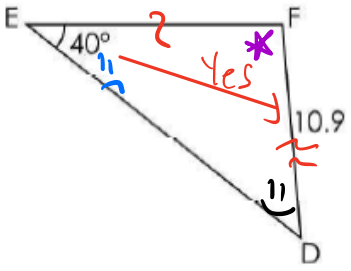
Ⓐ



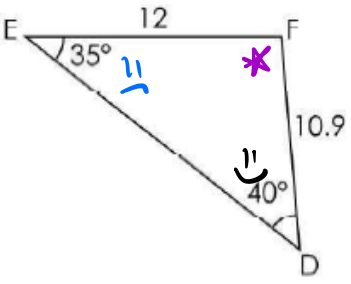
Ⓑ



Ⓒ



Ⓓ



$10.9 = K$

$K^2 = 12^2 + 16.9^2 - 2(12)(16.9)\cos(40°)$

LAW OF COSINES

$K = \sqrt{12^2 + 16.9^2 - 2(12)(16.9)\cos(40°)}$

$K \approx 10.9$