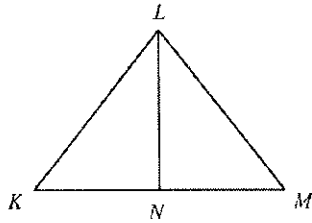


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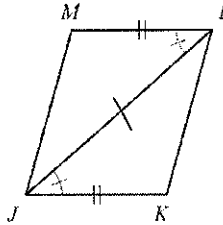
1 In this figure, $\overline{LN} \perp \overline{KM}$.



What information would a student need to prove $\triangle KLN \sim \triangle MLN$?

- A $\angle LKN \cong \angle LMN$
- B $\angle LNK \cong \angle LNM$
- C $\angle KLN \cong \angle LNM$
- D $\angle LKN \cong \angle LNM$

2 This figure shows quadrilateral JKLM.



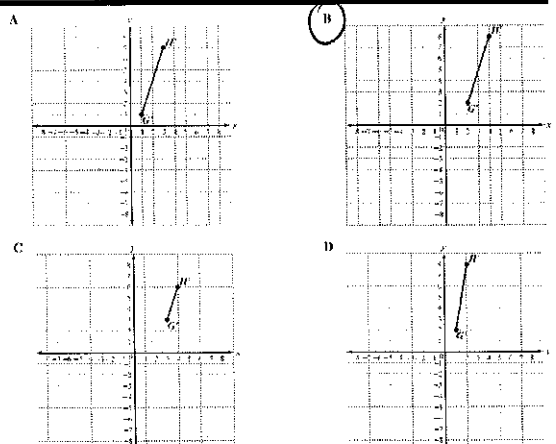
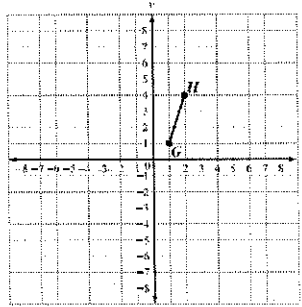
What information will NOT be used to prove that JKLM is a parallelogram?

- A Show that $\angle JLM \cong \angle LJK$.
- B Show that $\overline{JK} \cong \overline{LM}$.
- C Show that $\triangle JKL \cong \triangle LMJ$.
- D Show that $\triangle JKL \cong \triangle JLM$.

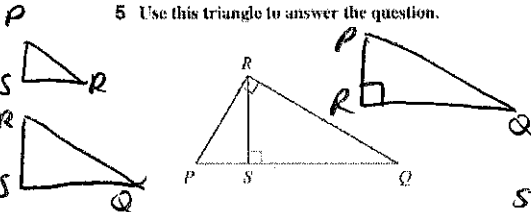
4 Which transformation of $\triangle HIJ$ does NOT result in a congruent triangle?

- A a reflection across the x-axis, followed by a rotation of 180° about the origin
- B a rotation by 180° about the origin, followed by a translation of 2 units left and 3 units down
- C a translation of 1 unit right and 2 units up, followed by a dilation by a factor of 3
- D a dilation by a factor of 2, followed by a dilation by a factor of 0.5

3 Which figure represents the dilation of segment GH about the origin by a scale factor of 2?



5 Use this triangle to answer the question.



This is a proof of the Pythagorean theorem.

Step	Justification
1 $\triangle PQR \sim \triangle PRS \sim \triangle QSR$	AA postulate
2 $\frac{PQ}{QR} = \frac{QR}{SQ}$ and $\frac{PQ}{PR} = \frac{PR}{PS}$	Corresponding sides of similar triangles are congruent
3 $QR^2 = PQ \cdot SQ$ and $PR^2 = PQ \cdot PS$	Multiplication property of equality
4 $QR^2 + PR^2 = PQ \cdot SQ + PQ \cdot PS$	Addition property
5 $QR^2 + PR^2 = PQ(SQ + PS)$	Distributive property
6 $QR^2 + PR^2 = PQ(PQ)$	Segment addition postulate
7 $QR^2 + PR^2 = PQ^2$	Simplify

In which step is there a mistake in the proof?

- A Step 1
- B Step 2
- C Step 4
- D Step 6

6 Use line segment \overline{HI} to answer the question.

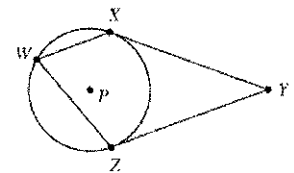


Which step should be first to draw a line perpendicular to \overline{HI} at point J?

- A Place the compass on point H and set its width to less than \overline{HJ} .
- B Place the compass on point H and set its width to more than \overline{HJ} .
- C Place the compass on point J and set its width to less than \overline{HJ} .
- D Place the compass on point J and set its width to more than \overline{HJ} .

state says B

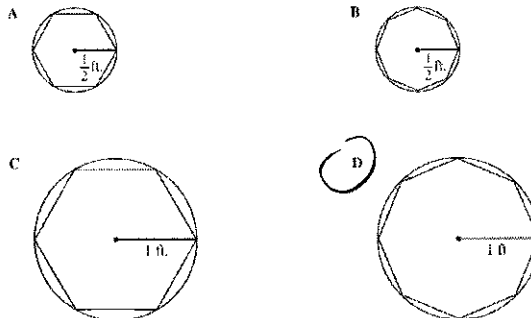
8 Circle P has tangents \overline{XY} and \overline{ZY} and chords \overline{WX} and \overline{WZ} , as shown in this figure. The measure of $\angle ZWX = 70^\circ$.



What is the measure, in degrees, of $\angle XYZ$?

- A 20°
- B 35°
- C 40°
- D 55°

7 Which polygon inscribed in a circle has an area closest to π square feet?



$\pi(1)^2 = \pi$

- 9 Which statement is true for any two circles?
- A The ratio of the areas of the circles is the same as the ratio of their radii.
 - B** The ratio of the circumferences of the circles is the same as the ratio of their radii.
 - C The ratio of the areas of the circles is the same as the ratio of their diameters.
 - D The ratio of the areas of the circles is the same as the ratio of their circumferences.

- 10 The graph of a circle has its center at (2, 3) with a radius of 10 units. Which point does NOT lie on the circle?
- $(x-2)^2 + (y-3)^2 = 100$
- A (-4, -5)
 - B (8, 11)
 - C** (-2, 6)
 - D (-4, 11)

- 11 In soccer, a shutout is a game where the winning team does not allow the other team to score a goal.
- If the set W represents all wins, and S represents all shutouts, which set describes the set of shutout wins?
- A** $W \cap S$ (both)
 - B $W \cup S$
 - C $W \cup W'$
 - D $(W) \cup S'$

12 Which two-way frequency table shows that $P(W|Y) = 0.25$?

A

	Event Y	Event Z	Total
Event W	12	24	36
Event X	36	28	64
Total	48	52	100

B

	Event Y	Event Z	Total
Event W	12	36	48
Event X	26	26	52
Total	38	62	100

C

	Event Y	Event Z	Total
Event W	25	21	46
Event X	12	42	54
Total	37	63	100

D

	Event Y	Event Z	Total
Event W	10	26	36
Event X	40	24	64
Total	50	50	100

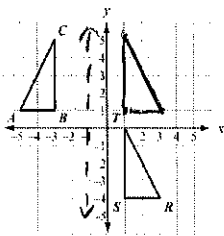
- 13 Which is an equation for the circle with a center at (-2, 3) and a radius of 3?
- A. $x^2 + y^2 + 4x - 6y + 22 = 0$
 - B. $2x^2 + 2y^2 + 3x - 3y + 4 = 0$
 - C** $x^2 + y^2 + 4x - 6y - 4 = 0$
 - D. $3x^2 + 3y^2 + 4x - 6y + 4 = 0$
- $(x+2)^2 + (y-3)^2 = 9$
 $x^2 + 4x + 4 + y^2 - 6y + 9 = 9$
 $x^2 + y^2 + 4x - 6y + 4 = 0$

- 14 What is the center of the circle given by the equation $x^2 + y^2 - 10x - 11 = 0$?
- A** (5, 0)
 - B. (0, 5)
 - C. (-5, 0)
 - D. (0, -5)
- $(x^2 - 10x + 25) + y^2 = 11 + 25$
 $(x-5)^2 + y^2 = 36$

- 15 Bianca spins two spinners that have four equal sections numbered 1 through 4. If she spins a 4 on at least one spin, what is the probability that the sum of her two spins is an odd number?
- A. $\frac{1}{4}$
 - B. $\frac{7}{16}$
 - C** $\frac{4}{7}$
 - D. $\frac{11}{16}$
- 1-4 ✓ 4-1 ✓
 2-4 ✓ 4-2 ✓
 3-4 ✓ 4-3 ✓
 4-4

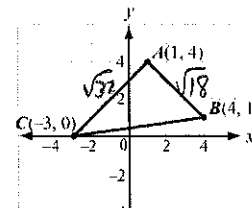
- 16 Each letter of the alphabet is written on a card using a red ink pen and placed in a container. Each letter of the alphabet is also written on a card using a black ink pen and placed in the same container. A single card is drawn at random from the container. What is the probability that the card has a letter written in black ink, the letter A, or the letter Z?
- A. $\frac{1}{2}$
 - B** $\frac{7}{13}$
 - C. $\frac{15}{26}$
 - D. $\frac{8}{13}$
- $\frac{26}{52} + \frac{2}{52} + \frac{2}{52} - \frac{2}{52} = \frac{28}{52} = \frac{7}{13}$
 ↑
 overlap - black A and black Z

17 Which sequence of transformations maps $\triangle ABC$ to $\triangle RST$?



- A. Reflect $\triangle ABC$ across the line $x = -1$. Then translate the result 1 unit down.
- B** Reflect $\triangle ABC$ across the line $x = -1$. Then translate the result 5 units down.
- C. Translate $\triangle ABC$ 6 units to the right. Then rotate the result 90° clockwise about the point (1, 1).
- D. Translate $\triangle ABC$ 6 units to the right. Then rotate the result 90° counterclockwise about the point (1, 1).

18 Triangle ABC has vertices as shown.



What is the area of the triangle?

- A. $\sqrt{72}$ square units
- B** 12 square units
- C. $\sqrt{288}$ square units
- D. 24 square units

$A = \frac{1}{2}bh = \frac{1}{2}(\sqrt{32})(\sqrt{18})$