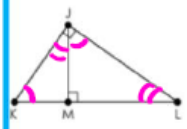
Question 4 (2018)



Mark is proving the Pythagorean Theorem. He draws right triangle JKL with altitude $\overline{JM}$. First he proves $\triangle JKL \sim \triangle MKJ$ and $\triangle JKL \sim \triangle MJL$ using the Angle-Angle criterion. The rest of his proof is shown with some steps missing.

Statements	Reasons
1. $\triangle JKL \sim \triangle MKJ$ and $\triangle JKL \sim \triangle MJL$	1. Angle-Angle criterion
2. $\frac{JK}{LK} = \frac{MK}{JK}$ and $\frac{LJ}{LK} = \frac{ML}{LJ}$	2. Corresponding sides of similar triangles are proportional
3. $(JK)^2 = LK \cdot MK$ and $(LJ)^2 = LK \cdot ML$	3. Multiplication property of equality
4.	4.
5.	5.
6. $MK + ML = LK$	6. Segment addition postulate
7. $(JK)^2 + (LJ)^2 = (LK)^2$	7. Substitution

$(JK)^2 = LK \cdot MK$
$+(LJ)^2 = LK \cdot ML$

Which two steps are missing from the proof?

(A)

4. $(JK)^2 + (LJ)^2 = LK \cdot MK + LK \cdot ML$	4. Addition property of equality ✓
5. $(JK)^2 + (LJ)^2 = LK(MK + ML)$	5. Distributive property

(B)

4. $(JK)^2 + (LJ)^2 = LK \cdot MK + LK \cdot ML$	4. Addition property of equality
5. $(JK)^2 + (LJ)^2 = LK(LK + LK)$ ✗	5. Distributive property

(C)

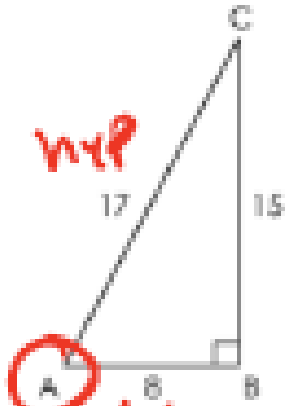
4. $(JK)^2 \cdot (JK)^2 = LK \cdot MK \cdot LK \cdot ML$	4. Multiplication property of equality
5. $(JK)^2 \cdot (LJ)^2 = LK(MK \cdot ML)$	5. Distributive property

(D)

4. $(JK)^2 \cdot (JK)^2 = LK \cdot MK \cdot LK \cdot ML$	4. Multiplication property of equality
5. $(JK)^2 \cdot (LJ)^2 = LK(LK \cdot LK)$	5. Distributive property

Question 8 (2018)

A right triangle ABC is shown.



Hyp
Adj
15

What is cos A?

8/17

Question 9 (2018)

Line k has a slope of -5. Line j is perpendicular to line k and passes through the point $(5, 9)$.

Create the equation for line j.

$y - 9 = \frac{1}{5}(x - 5)$

Point	Slope	Point-Slope form
$(5, 9)$ (x_1, y_1)	$m_k = -5$ $\perp m_k = m_j = \frac{1}{5}$ (m)	$y - y_1 = m(x - x_1)$ $y - 9 = \frac{1}{5}(x - 5)$

(j)

Question 11 (2018)

Jeremy wants to know the density of a rock in grams per cubic centimeter. The rock has a mass of 1.08 kilograms and a volume of 400 cubic centimeters.

What is the density of the rock, in **grams** per cubic centimeter $\left(\frac{g}{cm^3}\right)$?

1080/400 $\frac{g}{cm^3}$ 2.7

$\text{Density} = \frac{1.08\ kg}{400\ cm^3}$

$= \frac{1080\ g}{400\ cm^3}$

Question 12 (2018)

The two-way table shows the number of births, in thousands, in the United States for the years 2010 and 2011.

	Jan.	Feb	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
2010	324	303	340	327	325	338	346	359	350	342	337	326	4017
2011	322	299	330	315	328	335	348	362	346	331	328	32[illegible]	3966

A baby born in 2011 is randomly selected.

What is the probability that the baby was born in February?

299 / 3966

Question 15 (2018)

A total of 50 students play either soccer or lacrosse.

- 20 girls play lacrosse.
- 20 boys play either soccer or lacrosse.
- 20 students play soccer.

What is the probability that a student plays soccer or is a girl?

40/50

	Soccer	lacrosse	total
Boys	10	10	20
Girls	10	20	30
total	20	30	50

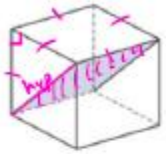
$Prob(S \text{ or } G) = P(S) + P(G) - P(S \text{ and } G)$

$= \frac{20}{50} + \frac{30}{50} - \frac{10}{50}$

$= \frac{40}{50}$

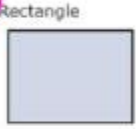
Question 16 (2018)

A cube is sliced as shown.

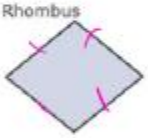


What is the shape of the cross section?

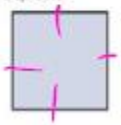
Ⓐ Rectangle



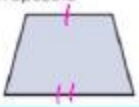
Ⓑ Rhombus



Ⓒ Square



Ⓓ Trapezoid



Question 18 (2018)

Events A and B are independent.

P(A and B) = 0.25

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

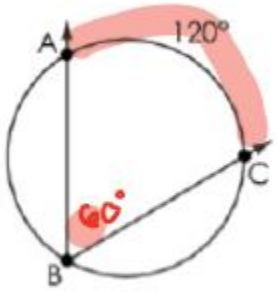
Enter possible probabilities for events A and B.

$P(A) =$ 0.5

$P(B) =$ 0.5

Question 19 (2018)

Angle ABC is inscribed in a circle as shown.



What is the measure, in degrees, of ∠ABC?

60° degrees

Question 21 (2018)

A parallelogram and incomplete proof are shown.

Given: WXYZ is a parallelogram.
Prove: $\overline{WX} \cong \overline{YZ}$

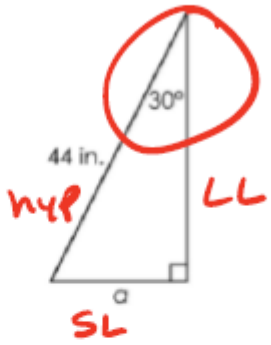
Place reasons in the table to complete the proof.

Statements	Reasons
1. WXYZ is a parallelogram.	1. Given
2. $\overline{WX} \parallel \overline{YZ}$ $\overline{WZ} \parallel \overline{XY}$	2. Definition of a parallelogram
3. $\angle ZWY \cong \angle XYW$ $\angle ZYW \cong \angle XWY$	3. Alt int ∠ are ≅
4. $\overline{WY} \cong \overline{WY}$	4. Reflexive prop
5. $\triangle WYZ \cong \triangle YWX$	5. ASA
6. $\overline{WX} \cong \overline{YZ}$	6. CPCTC

Corresponding angles are congruent.	SSS	Transitive property
Alternate exterior angles are congruent.	SAS	Reflexive property
Alternate interior angles are congruent.	ASA	Angle addition postulate
Corresponding parts of congruent triangles are congruent.	AA	Corresponding parts of congruent triangles are similar.

Question 23 (2018)

A triangle is shown.



$\sin(30°) = \frac{a}{44}$

$44\sin(30°) = a$

What is the length, in inches (in.), of side *a*?

22 in.

1	2	3
4	5	6
7	8	9
	0	
.	-	

Question 29 (2018)

Points A, B and C lie on a circle with center Q.

arc twice as big this arc

- The area of sector AQB is twice the area of sector BQC.
- The length of arc AB is 28 centimeters.

What is the length, in centimeters, of arc BC?

14 centimeters

Question 31 (2018)

Which term is defined as two intersecting lines that form four right angles in a plane?

Ⓐ skew lines

Ⓑ straight lines

Ⓒ parallel lines

Ⓓ perpendicular lines

Question 34 (2018)

A cone and a sphere have the same volume. The height of the cone is 96 units.

What could be the values for the radius of the cone and the sphere? Round your answers to the nearest hundredth as needed.

Radius of Cone: _____ *units*

Radius of Sphere: 2.88 *units*

r = radius Sphere
R = radius cone

$V_S = V_C$

$\frac{4}{3}\pi r^3 = \frac{1}{3}\pi R^2 h$

$\frac{4}{3}\pi r^3 = \frac{1}{3}\pi R^2 (96)$

$4r^3 = R^2 \cdot 96$

$4r^3 = (1)^2 \cdot 96$

$4r^3 = 96$

$r^3 = 24$

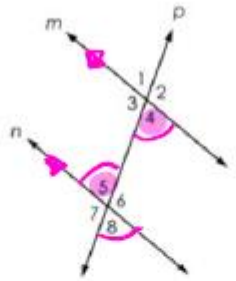
$r = \sqrt[3]{24}$

$r \approx 2.88$

Question 39 (2018)

Given: $m \parallel n$ and transversal p

Prove: $\angle 5 \cong \angle 4$



Prove: Alt INT ∠ Thm

Part of a proof is shown. Place statements and reasons in the table to complete the proof.

Statements	Reasons
1. $m \parallel n$ and transversal p	1. Given
2. $\angle 5 \cong \angle 8$	2. Vertical ∠ Th'm
3. $\angle 8 \cong \angle 4$	3. Corr ∠'s Post
4. $\angle 5 \cong \angle 4$	4. Transitive

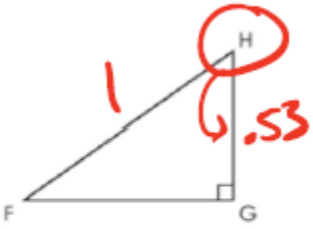
$\angle 8 \cong \angle 1$	Vertical angles theorem
$\angle 1 \cong \angle 4$	Corresponding angles postulate
$\angle 8 \cong \angle 4$	Transitive property
$\angle 5 \cong \angle 8$	Alternate exterior angles theorem
$\angle 5 \cong \angle 7$	Reflexive property
$\angle 4 \cong \angle 7$	Angle addition postulate

False

False

Question 40 (2018)

Right triangle FHG is shown.



1 .53 $\sin F = \frac{.53}{1}$

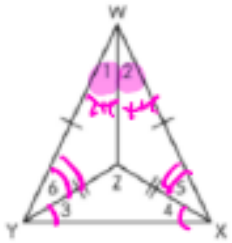
The sine of $\angle F$ is 0.53.

What is the cosine of $\angle H$? Round your answer to the nearest hundredth as needed.

0.53

Question 44 (2018)

Triangle YWX is shown.



Given: $\overline{WY} \cong \overline{WX}$, $\overline{ZY} \cong \overline{ZX}$

Prove: $\overline{WZ}$ bisects $\angle YWX$

Place statements and reasons in the blank boxes to complete the proof.

Statements	Reasons
$\overline{WY} \cong \overline{WX}$ $\overline{ZY} \cong \overline{ZX}$	Given
$\angle WYX \cong \angle WXY$ $\angle 3 \cong \angle 4$	Base angles of △ are ≅
$m\angle WYX = m\angle WXY$ $m\angle 3 = m\angle 4$	Measures of congruent angles are equal.
$m\angle WYX = m\angle 6 + m\angle 3$ $m\angle WXY = m\angle 5 + m\angle 4$	L + Post
$m\angle 6 + m\angle 3 = m\angle 5 + m\angle 4$	Substitution
$m\angle 6 + m\angle 3 = m\angle 5 + m\angle 3$	Substitution
$m\angle 6 = m\angle 5$	Add'n Prop =
$\triangle WYZ \cong \triangle WXZ$	SAS
$\angle YWZ \cong \angle XWZ$	CPCTC
$\overline{WZ}$ bisects $\angle YWX$	Def'n ∠ bisector

1 pt

2 pt

$m\angle 6 + m\angle 3 = m\angle 5 + m\angle 3$	$\triangle WYZ \cong \triangle WXZ$	Addition Property of Equality
$m\angle 6 = m\angle 5 + m\angle 4 - m\angle 3$	$\triangle WYX \cong \triangle ZYX$	Substitution
$m\angle 6 + m\angle 3 = m\angle 3 + m\angle 4$	Corresponding parts of congruent triangles are congruent.	Angle Addition Postulate
Base angles of isosceles triangles are congruent.	Definition of angle bisector	Reflexive Property
Corresponding parts of similar triangles are congruent.		

Question 45 (2018)

The equation of a line is shown.

$6x - 3y = 5$ ⟹ $-3y = -6x + 5$, $y = 2x - 5/3$, $m = 2$

A dilation centered at the origin with a scale factor of 6 is applied to this line.

A. What is the slope of the line after the dilation? No change. Same slope

B. What is the value of the y-intercept of the line after the dilation? Changes. $y\text{-int} \cdot SF$, $-5/3 \cdot 6/1 = -30/3 = -10$

A. 2 (6/3)

B. −10 (−30/3)

Question 47 (2018)

Triangle MNO is transformed to produce triangle PQR.

Select all of the transformations that would guarantee triangles MNO and PQR are congruent.

- [ ] a dilation, then a translation
- [ ] a reflection, then a dilation
- [x] a reflection, then a rotation
- [x] a rotation, then a translation
- [x] a translation, then a reflection

Question 48 (2018)

Rosa collects data on what students at her school like to eat at the movie theater. She asks a random sample of 120 students two questions:

- Do you like to eat popcorn at the movie theater?
- Do you like to eat candy at the movie theater?

Her data are partially shown in the table. Of the students she asks, 60% of those who like to eat popcorn also like to eat candy.

Complete the table to show the number of students in each category.

	Like Popcorn	Don't Like Popcorn	Total
Like Candy	42	16	58
Don't Like Candy	28	34	62
Total	70	50	120

.60(70) = 42