Module 1 Quiz
Ready to Go On?

Objective: Assess students’ mastery of concepts and skills in this section.

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Answers
17. Possible answer: A male lion weighs about 412.4 lb.

1-1 Measuring and Constructing Segments
Find the length of each segment.

1. \( \overline{SV} \) 6.5
2. \( \overline{TR} \) 6
3. \( \overline{ST} \) 3.5
4. The diagram represents a straight highway with three towns, Henri, Joaquin, and Kenard. Find the distance from Henri \( H \) to Joaquin \( J \).
5. Sketch, draw, and construct a segment congruent to \( \overline{CD} \).
6. \( Q \) is the midpoint of \( \overline{PR} \), \( PQ = 2z \), and \( PR = 8z - 12 \). Find \( z \), \( PQ \), and \( PR \).

1-2 Measuring and Constructing Angles

7. Name all the angles in the diagram.
   \( \angle LMN \), \( \angle NML \), or \( \angle 1 \); \( \angle NMP \), \( \angle PMN \), or \( \angle 2 \); \( \angle LMP \), \( \angle PLM \)
   Classify each angle by its measure:
   acute, obtuse
8. \( m\angle PVQ = 21^\circ \)
9. \( m\angle RVT = 96^\circ \)
10. \( m\angle PVS = 143^\circ \)
11. \( \overline{RS} \) bisects \( \angle QRT \), \( m\angle QRS = (3x + 8)^\circ \), and \( m\angle QRT = (9x - 4)^\circ \). Find \( m\angle QRT \).
12. Use a protractor and straightedge to draw a 130° angle. Then bisect the angle.

1-3 Using Inductive Reasoning to Make Conjectures
Find the next item in each pattern.

13. 1, 10, 18, 25, \( \ldots \) 31
14. July, May, March, \( \ldots \)
15. \( \frac{1}{8}, \frac{1}{4}, \frac{3}{2}, \ldots -1 \)
16. \( \#, \#, \# \ldots \# \)

17. A biologist recorded the following data about the weight of male lions in a wildlife park in Africa. Use the table to make a conjecture about the average weight of a male lion.

<table>
<thead>
<tr>
<th>ID Number</th>
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<tbody>
<tr>
<td>A19025M</td>
<td>387.2</td>
</tr>
<tr>
<td>A19045M</td>
<td>420.5</td>
</tr>
<tr>
<td>A19205M</td>
<td>440.6</td>
</tr>
<tr>
<td>A19565M</td>
<td>398.7</td>
</tr>
<tr>
<td>A19745M</td>
<td>415.0</td>
</tr>
</tbody>
</table>

18. Complete the conjecture "The sum of two negative numbers is \( \ldots \) negative"
19. Show that the conjecture "If an even number is divided by 2, then the result is an even number" is false by finding a counterexample.
   Possible answer: 6

1-4 Conditional Statements

20. Identify the hypothesis and conclusion of the conditional statement
   "An angle is obtuse if its measure is 107°."
   Write a conditional statement from each of the following.

21. A whole number is an integer.
   If a number is a whole number, then it is an integer.

22. If a figure is a square, then it is a rect.

23. The diagonals of a square are congruent.
   If a figure is a square, then its diags. are \( \sim \).

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Determine if each conditional is true. If false, give a counterexample.

24. If an angle is acute, then it has a measure of 30°. F; possible answer: an \( \angle \) that measures 60°

25. If \( 9x - 11 = 2x + 3 \), then \( x = 2 \). T

26. Write the converse, inverse, and contrapositive of the statement "If a number is even, then it is divisible by 4." Find the truth value of each.

Converse: If a number is divisible by 4, then the number is even; T.
Inverse: If a number is not even, then the number is not divisible by 4; T.
Contrapositive: If a number is not divisible by 4, then the number is not even; F.

**1-5 Using Deductive Reasoning to Verify Conjectures**

27. Determine if the following conjecture is valid by the Law of Detachment.
   Given: If Sue finishes her science project, she can go to the movie. Sue goes to the movie. not valid
   Conjecture: Sue finished her science project.

28. Use the Law of Syllogism to draw a conclusion from the given information.
   Given: If one angle of a triangle is 90°, then the triangle is a right triangle. If a triangle is a right triangle, then its acute angle measures are complementary.
   If \( 1 \triangle \) of a \( \triangle \) is 90°, then its acute \( \angle \) measures are comp.

**PARCC Assessment Readiness**

**Selected Response**

1. Identify the hypothesis and conclusion of the conditional statement.
   If it is raining then it is cloudy.
   - Hypothesis: It is raining.
   - Conclusion: It is cloudy.
   - Hypothesis: It is cloudy.
   - Conclusion: It is raining.
   - Hypothesis: Clouds make rain.
   - Conclusion: Rain does not make clouds.
   - Hypothesis: Rain and clouds happen together.
   - Conclusion: Rain and clouds do not happen together.

2. Complete the conjecture.
   The sum of two odd numbers is ______.
   - even
   - sometimes odd, sometimes even
   - odd
   - even most of the time

3. Find the length of \( BC \).
   \( BC = -7 \)
   \( BC = -9 \)
   \( BC = 7 \)
   \( BC = 8 \)

4. Determine if the conjecture is valid by the Law of Detachment.
   Given: If Tommy makes cookies tonight, then Tommy must have an oven. Tommy has an oven.
   Conjecture: Tommy made cookies tonight.
   - The conjecture is valid, because if Tommy didn’t have an oven then he didn’t make cookies tonight.
   - The conjecture is not valid, because if Tommy didn’t have an oven then he didn’t make cookies tonight.
   - The conjecture is valid, because Tommy could have an oven but he could make something besides cookies tonight.
   - The conjecture is not valid, because Tommy could have an oven but he could make something besides cookies tonight.

**Mini-Tasks**

5. \( BD \) bisects \( \angle ABC \), \( m\angle ABD = (7x - 1)^\circ \), and \( m\angle DBC = (4x + 8)^\circ \). Find \( m\angle ABD \). 20°

6. Point \( C \) is the midpoint of \( AB \) and point \( D \) is the midpoint of \( CE \). If \( AB = 20 \), what is \( AD \)? 15
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Answers
1. Converse: If the sum of the measures of 2 ∠s is 180°, then the ∠s are supp. Biconditional: 2 ∠s are supp. if and only if the sum of their measures is 180°.

11.  1. \( \overline{AB} \cong \overline{EF} \) (Given)
2. \( AB = EF \) (Def. of ≅ segs.)
3. \( EF = AB \) (Sym. Prop. of ≅)
4. \( EF \cong AB \) (Def. of ≅ segs.)

2-2 Algebraic Proof
4. \( 4y - 1 = 27 \) (Given); \( m = 21 \) (Add. Prop. of =)
Solve each equation. Write a justification for each step.

3. \( m - 8 = 13 \)
4. \( 4y - 1 = 27 \)
5. \( -\frac{x}{3} = 2 \) (Given);
\( -x = 6 \) (Mult. Prop. of =);
\( x = -6 \) (Div. Prop. of =)

6. \( m \angle XYZ = m \angle PQR \), so \( m \angle XYZ \) Sym. Prop. of =
7. \( \overline{AB} \cong \overline{EF} \) Reflex. Prop. of ≅
8. \( \angle 4 \cong \angle A \), and \( \angle 1 \cong \angle 1 \). So \( \angle 4 \cong \angle 1 \) Trans. Prop. of ≅
9. \( k = 7 \), and \( m = 7 \). So \( k = m \). Trans. Prop. of =

2-3 Geometric Proof
10. Fill in the blanks to complete the two-column proof.

Given: \( m \angle 1 + m \angle 3 = 180° \)
Prove: \( \angle 1 \cong \angle 4 \)

\[ \begin{array}{|c|c|}
\hline
\text{Statements} & \text{Reasons} \\
\hline
1. \( m \angle 1 + m \angle 3 = 180° \) & a. Given \\
2. b. ? & 2. Def. of supp. ∠
3. \( \angle 3 \) and \( \angle 4 \) are supplementary. & 3. Lin. Pair Thm.
4. \( \angle 3 \cong \angle 3 \) & c. ?
\hline
\end{array} \]

11. Use the given plan to write a two-column proof of the Symmetric Property of Congruence.

Given: \( \overline{AB} \cong \overline{EF} \)
Prove: \( \overline{EF} \cong \overline{AB} \)

Plan: Use the definition of congruent segments to write \( \overline{AB} \cong \overline{EF} \) as a statement of equality. Then use the Symmetric Property of Equality to show that \( \overline{EF} \cong \overline{AB} \). So \( \overline{EF} \cong \overline{AB} \) by the definition of congruent segments.
**MODULE 3 QUIZ**

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**Answers**

4. \( \angle 8 = 59^\circ \) and \( \angle 6 = 59^\circ \), so \( \angle 8 \equiv \angle 6, a \parallel b \) by the Conv. of Corr. \( \triangle \) Post.

5. \( \angle 1 \equiv \angle 5 \)

6. \( \angle 8 \) and \( \angle 7 \) are supp., so \( a \parallel b \) by the Conv. of Same-Side Int. \( \triangle \) Thm.

7. \( \angle 2 \equiv \angle 4 \), so \( a \parallel b \) by the Conv. of Alt. Int. \( \triangle \) Thm.

8. The tower shown is supported by guy wires such that \( \angle 1 = (3x + 12)^\circ \), \( \angle 2 = (4x - 2)^\circ \), and \( x = 14 \). Show that the guy wires are parallel.

9. \( \angle 8 \) and \( \angle 4 \) are supp., so \( \angle 1 \equiv \angle 2 \). The guy wires are \( \parallel \) by the Conv. of the Corr. \( \triangle \) Post.

10. Write and solve an inequality for \( x \).
\[ x - 5 < 8; x < 13 \]

11. Write a two-column proof.

Given: \( \angle 1 \equiv \angle 2, \ell \perp n \)

Prove: \( \ell \perp p \)

1. \( \angle 1 \equiv \angle 2, \ell \perp n \) (Given)
2. \( p \parallel n \) (Conv. of Alt. Int. \( \triangle \) Thm.)
3. \( \ell \perp p \) (\( \perp \) Transv. Thm.)
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**4-1  Congruence and Transformations**

Apply the transformation $M$ to the polygon with vertices $A(5, 2), B(-3, 4),$ and $C(-1, -6)$. Identify and describe the transformation.

1. $M: (x, y) \rightarrow (x - 2, y + 3)$
   - $A'(3, 5), B'(-5, 7), C'(-3, -3)$; translation 2 units left and 3 units up

2. $M: (x, y) \rightarrow (x, -y)$
   - $A'(5, -2), B'(-3, -4), C'(-1, 6)$; reflection across the $x$-axis

3. $M: (x, y) \rightarrow (-y, x)$
   - $A'(-2, 5), B'(-4, -3), C'(6, -1)$; rotation about $(0, 0), 90^\circ$ counterclockwise

4. $M: (x, y) \rightarrow (3x, 3y)$
   - $A'(15, 6), B'(-9, 12), C'(-3, -18)$; dilation with scale factor 3 and center $(0, 0)$

**4-2  Angle Relationships in Triangles**

Find each angle measure.

5. $m\angle M \quad 51^\circ$

6. $m\angle ABC \quad 125^\circ$

**4-3  Congruent Triangles**

Given: $\triangle JKL \cong \triangle DEF$. Identify the congruent corresponding parts.

7. $KL \equiv \ ? \ EF$

8. $DF \equiv \ ? \ JL$

9. $\angle K \equiv \ ? \ \angle F$

10. $\angle F \equiv \ ? \ \angle L$

Given: $\triangle ABC \cong \triangle CDA$. Find each value.

11. $x \quad 25$

12. $CD \quad 7$
MODULE 5 QUIZ

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Answers

1. It is given that $AC \cong BC$. $DC \cong DC$ by the Reflex. Prop. of $\cong$. By the Rt. $\triangle$ Thm., $\triangle ACD \cong \triangle BCD$. Therefore $\triangle ACD \cong \triangle BCD$ by SAS.

2. 1. $JK$ bisects $\angle MJN$. (Given)
   2. $\triangle MJK \cong \triangle NJK$ (Def. of $\cong$ bisect)
   3. $MJ \cong NJ$ (Given)
   4. $JK \cong JK$ (Reflex. Prop. of $\cong$)
   5. $\triangle MJK \cong \triangle NJK$ (SAS Steps 3, 2, 4)

3. $\triangle RSU$ and $\triangle TUS$ yes

4. $\triangle ABC$ and $\triangle DCB$ no; $\triangle AC \cong DB$

5. Draw a diagram of the triangle formed by the lighthouses and the ship. Label each measure.

6. Is there enough data in the table to pinpoint the location of the ship? Why? Yes; the $\triangle$ is uniquely determined by ASA.

7. $\triangle ABC$ and $\triangle DCB$
   Prove: $\angle D \cong \angle B$

8. $\triangle ABC$ and $\triangle DCB$
   Prove: $\angle QR \cong \angle PS$ bisects $\angle QPR$.

Observer in two lighthouses $K$ and $L$ spot a ship $S$.

5. Draw a diagram of the triangle formed by the lighthouses and the ship. Label each measure.

6. Is there enough data in the table to pinpoint the location of the ship? Why? Yes; the $\triangle$ is uniquely determined by ASA.

5. $\triangle RSU$ and $\triangle TUS$

7. Given: $CD \parallel BE$, $DE \parallel CB$
   Prove: $\angle D \cong \angle B$

8. Given: $PQ \parallel QR$, $PR \parallel RS$
   Prove: $QS$ bisects $\angle PQR$.

5. $\triangle RSU$ and $\triangle TUS$

7. Given: $CD \parallel BE$, $DE \parallel CB$
   Prove: $\angle D \cong \angle B$

8. Given: $PQ \parallel QR$, $PR \parallel RS$
   Prove: $QS$ bisects $\angle PQR$. 

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5-4 Isosceles and Equilateral Triangles

Find each value.

9. \( m\angle C \)
   \[ 100^\circ \]

10. \( ST \)
   \[ 6 \]

11. Given: Isosceles \( \triangle JKL \) has coordinates \( J(0, 0), K(2a, 2b), \) and \( L(4a, 0) \).
    \( M \) is the midpoint of \( JK \), and \( N \) is the midpoint of \( KL \).
    Prove: \( \triangle KMN \) is isosceles.

PARCC Assessment Readiness

Selected Response

1. A pilot uses triangles to find the angle of elevation \( \angle A \) from the ground to her plane. How can she find \( m\angle A \)?

   \[ \triangle ABO \cong \triangle DCO \text{ by SAS and } \angle A \cong \angle C \text{ by CPCTC, so } m\angle A = 40^\circ \text{ by substitution.} \]
   \[ \triangle ABO \cong \triangle DCO \text{ by CPCTC and } \angle A \cong \angle C \text{ by SAS, so } m\angle A = 40^\circ \text{ by substitution.} \]
   \[ \triangle ABO \cong \triangle DCO \text{ by ASA and } \angle A \cong \angle C \text{ by CPCTC, so } m\angle A = 40^\circ \text{ by substitution.} \]
   \[ \triangle ABO \cong \triangle DCO \text{ by CPCTC and } \angle A \cong \angle C \text{ by ASA, so } m\angle A = 40^\circ \text{ by substitution.} \]

2. Given the lengths marked on the figure and that \( AD \) bisects \( BE \), use SSS to explain why \( \triangle ABC \cong \triangle DEC \).

   \[ AC \cong CD, AB \cong ED, BC \cong CE \]
   \[ AC \cong CD, AB \cong ED, BC \cong CE \]
   \[ AC \cong CB, AB \cong ED, CD \cong CE \]
   \[ \text{The triangles are not congruent.} \]

Mini-Task

3. Determine if you can use ASA to prove \( \triangle CBA \cong \triangle CED \). Explain.

   \[ \text{The triangles are not congruent.} \]

Answers

8. 1. \( PQ \cong RQ \) (Given)
   2. \( PS \cong RS \) (Given)
   3. \( QS \cong QS \) (Reflex. Prop. of \( \equiv \))
   4. \( \triangle PQS \cong \triangle QR \) (SSS Steps 1, 2, 3)
   5. \( \angle PQS \cong \angle RQS \) (CPCTC)
   6. \( QS \) bisects \( \angle PQR \) (Def. of bisect)

11. It is given that \( \triangle JKL \) has coords. \( J(0, 0), K(2a, 2b), \) and \( L(4a, 0) \). \( M \) is the mdpt. of \( JK \), and \( N \) is the mdpt. of \( KL \). By the Mdpt. Formula, the coords. of \( M \) are \( \left( \frac{2a + 0}{2}, \frac{2b + 0}{2} \right) = (a, b) \) and the coords. of \( N \) are \( \left( \frac{2a + 4a}{2}, \frac{2b + 0}{2} \right) = (3a, b) \). By the Dist. Formula, \( MK = \sqrt{(2a - a)^2 + (2b - b)^2} = \sqrt{a^2 + b^2} \) and \( NK = \sqrt{(3a - 2a)^2 + (b - 2b)^2} = \sqrt{a^2 + b^2} \). Thus \( MK \cong NK \). So \( \triangle KMN \) is isosc. by the def. of an isosc. \( \triangle \).

Mini-Task

3. \( \triangle AC \cong \triangle DC \) is given. \( \angle CAB \cong \angle CDE \) because both are right angles. By the Vertical Angles Theorem, \( \angle ACB \cong \angle CED \). Therefore, \( \triangle CBA \cong \triangle CED \) by ASA.
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**MODULE 6 QUIZ**

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Find each measure.

1. \( PQ = 9.6 \)
2. \( JM = 58 \)
3. \( AC = 51 \)

4. Write an equation in point-slope form for the perpendicular bisector of the segment with endpoints \( M(-1, -3) \) and \( N(7, 1) \).
   \[ y + 1 = -2(x - 3) \]

5. \( PX, PY, \) and \( PZ \) are the perpendicular bisectors of \( \triangle RST \). Find \( PS \) and \( XT \).

6. \( JK \) and \( HK \) are angle bisectors of \( \triangle GHJ \).
   Find \( \angle GJK \) and the distance from \( K \) to \( PQ \).

7. Find the circumcenter of \( \triangle TVO \) with vertices \( T(9, 0) \), \( V(0, -4) \), and \( O(0, 0) \).
   \( (4.5, -2) \)

8. In \( \triangle DEF \), \( BD = 87 \), and \( WE = 38 \). Find \( BW \), \( CW \), and \( CE \).
   \( BE = 57 \)

9. Paula cuts a triangle with vertices at coordinates \((0, 4)\), \((8, 0)\), and \((10, 8)\) from grid paper. At what coordinates should she place the tip of a pencil to balance the triangle? \((6, 4)\)

10. Find the orthocenter of \( \triangle PSV \) with vertices \( P(2, 4) \), \( S(8, 4) \), and \( V(4, 0) \).
   \( (4, 2) \)

11. Find \( ZV \), \( PM \), and \( \angle RZV \) in \( \triangle JMP \).
   \( ZV = 45° \)
   \( PM = 106 \)
   \( \angle RZV = 36° \)

12. What is the distance \( XZ \) across the pond? \( 78 \) m

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**Answers**

12. RS = TV = 48, so RS ≅ TV.
RV = TS = 28, so RV ≅ TS. Thus both pairs of opp. sides of RSTV are ≅. RSTV is a □ because quad. with opp. sides ≅ □.

13. m∠G = m∠J = 55°, and m∠K = 125°. Since 125° + 55° = 180°, ∠K is supp. to ∠G and ∠J. So 1 2 of GHJK is supp. to both of its cons. ∠. GHJK is a □ because quad. with ∠ supp. to cons. ∠ → □.

14. Slope of CD = slope of EF = 4/5; slope of DE = slope of FC = -3; both pairs of opp. sides have the same slope, so CD || EF and DE || FC; CDEF is a □ by def.

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**MODULE 8 QUIZ**

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**Organizer**

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**Answers**

4. A′(0, 0), B′(3, 6), C′(9, –6); dilation with scale factor 3.
5. A′(5, 3), B′(4, –2), C′(–1, 0); dilation with scale factor 0.5.
6. Yes; dilate ABC with a scale factor 2 and center at (0, 0), then translate 10 units right.
7. No, there is no combination of transformations that will map ABC to XYZ.
8. 1. ABCD is a □. (Given)
   2. AD || BC (Def. of □)
   3. ∠EDG ≅ ∠FBG (Alt. Int. ∠ Thm.)
   4. ∠EDG ≅ ∠FBG (Vert. ∠ Thm.)
   5. ∆EDG ~ ∆FBG (AA ~ Steps 3, 4)

3. Leonardo da Vinci’s famous portrait the Mona Lisa is 30 in. long and 21 in. wide. Janelle has a refrigerator magnet of the painting that is 3.5 cm wide. What is the length of the magnet? 5 cm

**8-2 Similarity and Transformations**

Apply the dilation to the polygon with the given vertices. Name the coordinates of the points. Identify and describe the transformation.

4. D : (x, y) → (3x, 3y); A(0, 0), B(1, 2), C(3, –2)
5. D : (x, y) → (0.5x, 0.5y); A(10, 6), B(8, –4), C(–2, 0)

Determine whether the two polygons are similar. Support your answer by describing a transformation.

6. A(0, 0), B(–2, 0), C(–2, 1)
   X(10, 0), Y(5, 0), Z(6, 2)
7. A(0, 0), B(1, 3), C(–1, 4)
   X(5, 0), Y(3, 9), Z(–2, 8)

**8-3 Triangle Similarity: AA, SSS, and SAS**

8. Given: □ABCD
   Prove: ∆EDG ~ ∆FBG

9. Given: MQ = 1/3MN, MR = 1/3MP
   Prove: ∆MQR ~ ∆MNP

**8-4 Applying Properties of Similar Triangles**

Find the length of each segment.

10. 18/3 = 6
   11. AB and AC

**Ready to Go On?**

Diagnose and Prescribe

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