

Unit 2 Test Review

Geometry

Determine the converse, inverse, and contrapositive of the conditional statements. Indicate whether each statement is true or false.

1. Conditional statement: If R is the midpoint of \overline{QS} , then $\overline{QR} \cong \overline{RS}$. 

Converse: If $\overline{QR} \cong \overline{RS}$, then R is the midpoint of \overline{QS} . (T)

Inverse: If R is not the midpoint of \overline{QS} , then $\overline{QR} \not\cong \overline{RS}$. (T)

Contrapositive: If $\overline{QR} \not\cong \overline{RS}$, then R is not the midpoint of \overline{QS} .

Tell whether each conclusion uses inductive or deductive reasoning.

2. A sign in the cafeteria says that a car wash is being held on the last Saturday of May. Tomorrow is the last Saturday of May, so Justin concludes that the car wash is tomorrow. deductive
3. So far, at the beginning of every Latin class, the teacher has had students review vocabulary. Latin class is about to start, and Jerry assumes that they will first review vocabulary. inductive

Write the final statement and determine whether each conjecture is valid by the Law of Detachment or Syllogism.

4. Given: If you ride the Titan roller coaster in Arlington, Texas, then you will drop 255 feet.
If you drop 255 feet, then you will be scared. Law of Syllogism

If you ride the Titan rollercoaster in Arlington, TX, then you will be scared.

5. Given: A segment that is a diameter of a circle has endpoints on the circle.

\overline{GH} has endpoints on a circle.

not a valid argument

Write a biconditional from each given conditional and converse.

6. Conditional: If two angles share a side, then they are adjacent.

Converse: If two angles are adjacent, then they share a side.

Biconditional: Two angles share a side iff they are adjacent.

Identify the property that justifies each statement.

7. If $\angle ABC \cong \angle DEF$, then $\angle DEF \cong \angle ABC$.

Symmetric property

8. $\angle 1 \cong \angle 2$ and $\angle 2 \cong \angle 3$, so $\angle 1 \cong \angle 3$.

transitive property

9. $\overline{WX} \cong \overline{XW}$

reflexive property

Write a justification for each step.

10. $CE = CD + DE$

$$6x = 8 + (3x + 7)$$

$$6x = 15 + 3x$$

$$3x = 15$$

$$x = 5$$

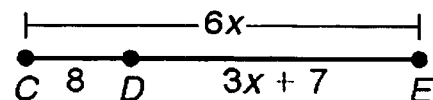
segment + postulate

Substitution prop.

combine like terms

subtraction prop.

division prop



Write a justification for each step.

11. $m\angle PQR = m\angle PQS + m\angle SQR$

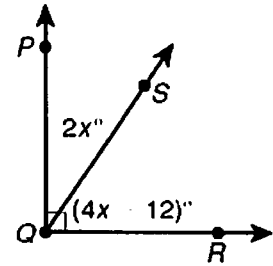
$90^\circ = 2x^\circ + (4x - 12)^\circ$

$90 = 6x - 12$

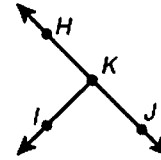
$102 = 6x$

$17 = x$

angle + postulate
substitution prop
combine like terms
addition prop =
division prop =



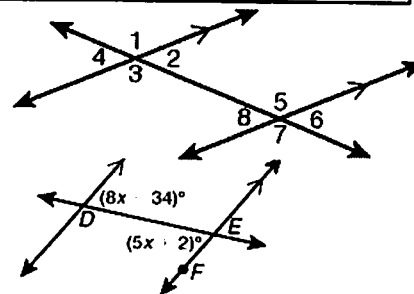
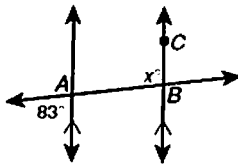
12. Given: $\angle HKJ$ is a straight angle, \overline{KI} bisects $\angle HKJ$.



Prove: $\angle IKJ$ is a right angle.

Statements	Reasons
1. a. $\angle HKJ$ is a straight \angle	1. Given
2. $m\angle HKJ = 180^\circ$	2. b. def. straight \angle
3. c. \overline{KI} bisects $\angle HKJ$	3. Given
4. $\angle IKJ \cong \angle IKH$	4. Def. of \angle bisector
5. $m\angle IKJ = m\angle IKH$	5. Def. of $\cong \angle$
6. d. $m\angle IKJ + m\angle IKH = m\angle HKJ$	6. \angle Add. Post.
7. $2m\angle IKJ = 180^\circ$	7. e. Subst. (Steps 2 & 5)
8. $m\angle IKJ = 90^\circ$	8. Div. Prop. of =
9. $\angle IKJ$ is a right angle.	9. f. def right \angle

Find each angle measure.



13. $m\angle ABC$ 97°

14. $m\angle DEF$ 62°

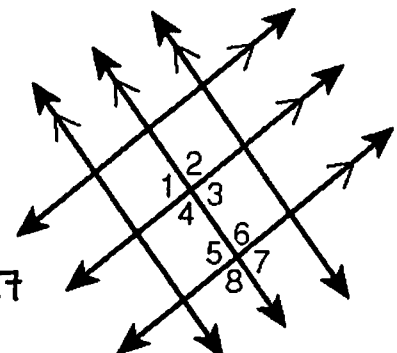
Give two examples of each kind of angle pair in the figure.

15. alternate interior angles $\angle 3, \angle 5$ or $\angle 4, \angle 6$

16. alternate exterior angles $\angle 2, \angle 8$ or $\angle 1, \angle 7$

17. same-side interior angles $\angle 4, \angle 5$ or $\angle 3, \angle 6$

18. Corresponding angles $\angle 1, \angle 5$ or $\angle 4, \angle 8$ or $\angle 2, \angle 6$ or $\angle 3, \angle 7$



19. Given $p \parallel q$, $m\angle 1 = 100^\circ$, and $m\angle 2 = 61^\circ$, find the measures of all the numbered angles.

$$m\angle 3 = 80^\circ, m\angle 4 = 80^\circ, m\angle 5 = 100^\circ, m\angle 6 = 119^\circ$$

$$m\angle 7 = 61^\circ, m\angle 8 = 61^\circ, m\angle 9 = 119^\circ$$

$$m\angle 10 = 39^\circ, m\angle 11 = 141^\circ, m\angle 12 = 141^\circ$$

What is the relationship between $\angle 1$ and $\angle 4$?

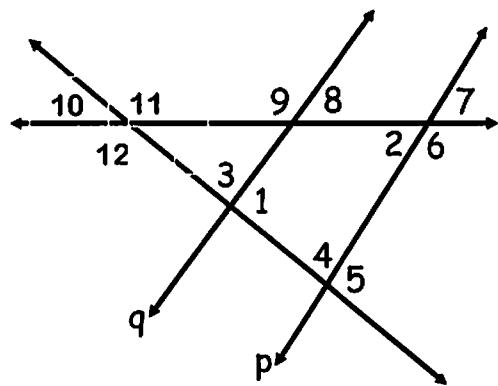
Same side interior \angle 's

What is the relationship between $\angle 2$ and $\angle 8$?

alternate interior \angle 's

What is the relationship between $\angle 6$ and $\angle 9$?

alternate exterior \angle 's

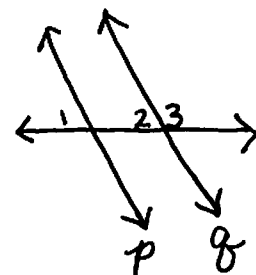


Complete the two-column proof to show that same-side exterior angles are supplementary.

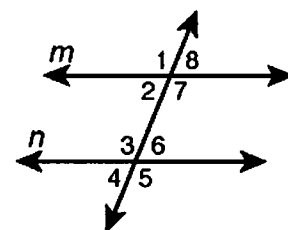
20. Given: $p \parallel q$

Prove: $m\angle 1 + m\angle 3 = 180^\circ$

Statements	Reasons
1. $p \parallel q$	1. Given
2. a. $m\angle 2 + m\angle 3 = 180^\circ$	2. Lin. Pair Thm.
3. $\angle 1 \cong \angle 2$	3. b. corresponding \angle 's post.
4. c. $m\angle 1 = m\angle 2$	4. Def. of $\cong \angle$
5. d. $m\angle 1 + m\angle 3 = 180^\circ$	5. e. Substitution prop



Use the figure for Exercises 21–24. Tell whether lines m and n must be parallel from the given information. If they are, state your reasoning. (Hint: The angle measures may change for each exercise, and the figure is for reference only.)



21. $\angle 7 \cong \angle 3$

yes; converse of alt. int. \angle 's thm

23. $\angle 7 \cong \angle 6$

no

22. $m\angle 3 = (15x + 22)^\circ$, $m\angle 1 = (19x - 10)^\circ$, $x = 8$

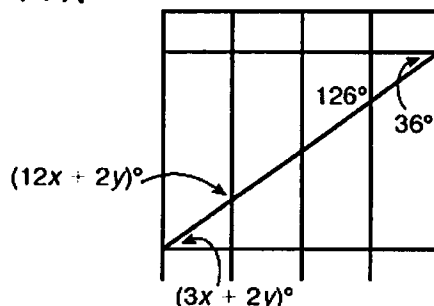
$m\angle 3 = 142^\circ$; $m\angle 1 = 142^\circ$; yes; converse corr. \angle 's post.

24. $m\angle 2 = (5x + 3)^\circ$, $m\angle 3 = (8x - 5)^\circ$, $x = 14$

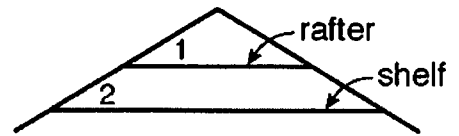
$m\angle 2 = 73^\circ$, $m\angle 3 = 107^\circ$; yes; converse of same side int \angle 's thm

25. In the diagram of the gate, the horizontal bars are parallel and the vertical bars are parallel. Find x and y .

$$x = 10, y = 3$$

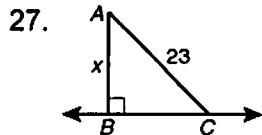


26. A bedroom has sloping ceilings as shown. Marcel is hanging a shelf below a rafter. If $m\angle 1 = (8x - 1)^\circ$, $m\angle 2 = (6x + 7)^\circ$, and $x = 4$, show that the shelf is parallel to the rafter above it.

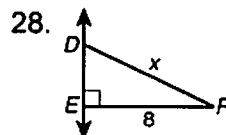


$m\angle 1 = 31^\circ$ & $m\angle 2 = 31^\circ$; converse corr. \angle 's post.

Name the shortest segment from the point to the line and write an inequality for x .



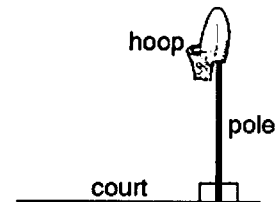
\overline{AB} ; $23 > x$ or $x < 23$



\overline{FE} ; $x > 8$ or $8 < x$

Use the drawing of a basketball goal.

In each exercise, justify Esperanza's conclusion with one of the completed theorems from Exercises 29-30.



29. Esperanza knows that the basketball pole intersects the court to form a linear pair of angles that are congruent. She concludes that the pole and the court are perpendicular.

$\angle \cong \text{lin pr } \angle \text{'s} \rightarrow \perp \text{ lines}$

30. Esperanza knows that the hoop and the court are both perpendicular to the pole. She concludes that the hoop and the court are parallel to each other.

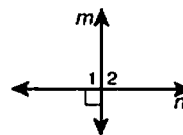
$2 \text{ coplanar lines } \perp \text{ to same line} \rightarrow \parallel \text{ lines}$

Complete the two-column proof.

31. Given: $m \perp n$

Prove: $\angle 1$ and $\angle 2$ are a linear pair of congruent angles.

Proof:



Statements	Reasons
1. a. <u>$m \perp n$</u>	1. Given
2. b. <u>$m\angle 1 = 90^\circ$, $m\angle 2 = 90^\circ$</u>	2. Def. of \perp
3. <u>$\angle 1 \cong \angle 2$</u>	3. c. <u>def $\cong \angle$'s</u>
4. <u>$m\angle 1 + m\angle 2 = 180^\circ$</u>	4. Add. Prop. of 5
5. d. <u>$\angle 1 \text{ & } \angle 2 \text{ are lin pr } \cong \angle$'s</u>	5. Def. of linear pair