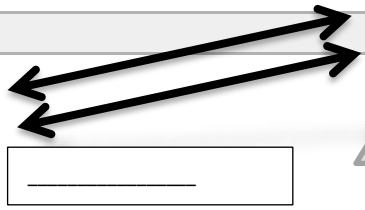
Geometry

3.1 Pairs of Lines and Angles

Pairs of Lines



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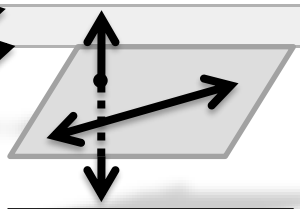


_____

Parallel Lines (_____)

- Lines that do _____ and are_____
- Lines go in the _____ direction

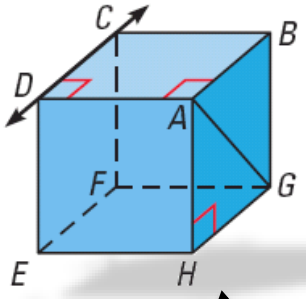
Skew Lines

- Lines that do _____ and are _____
- Lines go in _____ directions

Name the lines through point H that appear skew to $\overleftrightarrow{CD}$

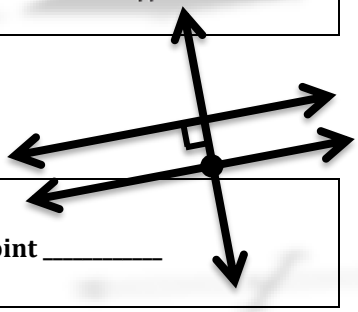
Name the lines containing point H that appear parallel to $\overleftrightarrow{CD}$

Name a plane that is parallel to plane CDE and contains point H



In a plane, two lines are either

- _____
- _____



Parallel Postulate

If there is a line and a point not on the line, then there is exactly _____ line through the point _____ to the given line.

Perpendicular Postulate

If there is a line and a point not on the line, then there is exactly _____ line through the point _____ to the given line.

Pairs of Angles

Transversal

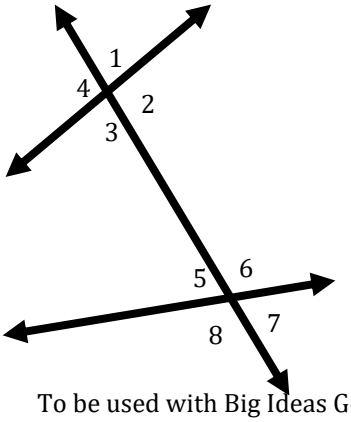
- Line that intersects _____ _____ lines

Interior ∠

- angles that are _____ the lines
- _____

Exterior ∠

- angles that are _____ the lines
- _____



Geometry 3.1 Name: _____

Alternate interior angles

- interior angles on _____ sides of the transversal
- _____

Alternate exterior angles

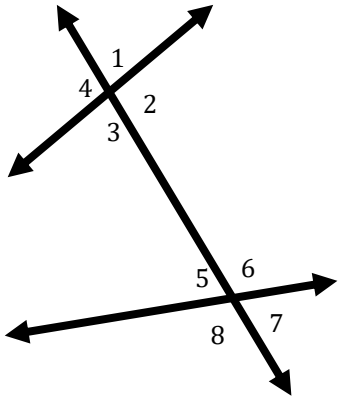
- exterior angles on _____ sides of the transversal
- _____

Consecutive interior angles

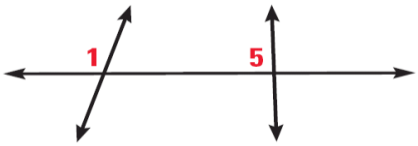
- interior angles on the _____side of the transversal
- _____

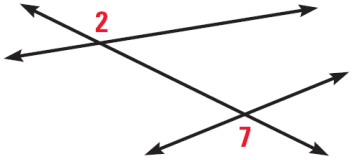
Corresponding angles

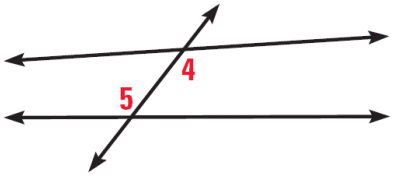
- angles on the same _____ relative to the transversal
- _____



Classify the pair of numbered angles







Assignment: 125 #2, 4, 6, 8, 9, 10, 11, 12, 14, 15, 16, 20, 21, 22, 24, 28, 32, 33, 35, 36 = 20 total

Geometry

3.2 Parallel Lines and Transversals

Postulate and Theorems

Corresponding Angles Postulate

If 2 || lines are cut by _____, then the corresponding ∠s are ≅

Alternate Interior Angles Theorem

If 2 || lines are cut by _____, then the _____∠s are ≅

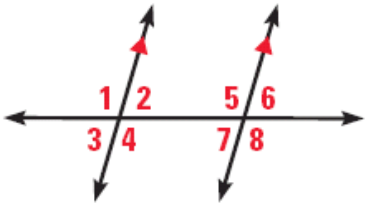
Alternate Exterior Angles Theorem

If 2 || lines are cut by _____, then the _____∠s are ≅

Consecutive Interior Angles Theorem

If 2 || lines are cut by _____, then the consecutive Interior ∠s are _____

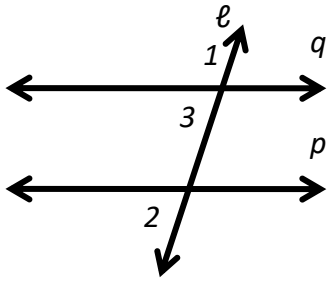
If m∠1 = 105°, find m∠4, m∠5, and m∠8. Tell which postulate or theorem you use in each case.



If m∠3 = 68° and m∠8 = (2*x* + 4)°, what is the value of *x*?

Prove that if 2 || lines are cut by a transversal, then the exterior angles on the same side of the transversal are supplementary.
Given: *p* || *q*
Prove: ∠1 and ∠2 are supplementary.

Statements	Reasons



Assignment: 131 #2, 4, 5, 6, 8, 10, 12, 14, 15, 18, 20, 22, 23, 24, 26, 29, 30, 32, 33, 38 = 20 total

Geometry

3.3 *Proofs with Parallel Lines*

Corresponding Angles Converse

If 2 lines are cut by _____ so the _____ ∠s are ≅, then the lines are ||.

Alternate Interior Angles Converse

If 2 lines are cut by transversals, so the _____∠s are _____, then the lines are ||.

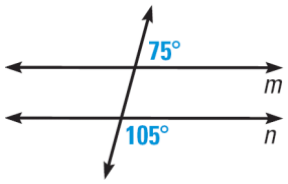
Alternate Exterior Angles Converse

If 2 lines are cut by transversals, so the _____ ∠ are ≅, then the lines are _____.

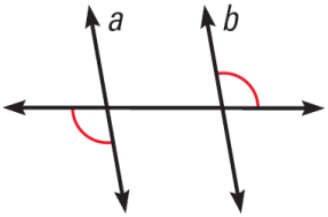
Consecutive Interior Angles Converse

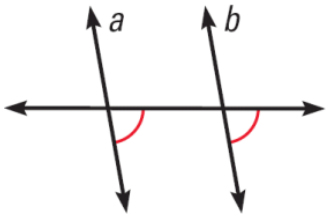
If 2 lines are cut by transversals, so the _____ ∠ are supp., then the lines are _____.

Is there enough information to conclude that $m \parallel n$?

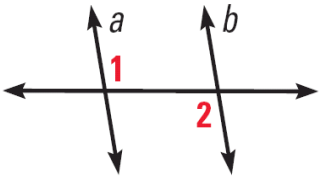


Can you prove that the lines are parallel? Explain.





m ∠1 + m ∠2 = 180°



Transitive Property of Parallel Lines

If two lines are _____ to the same line, then they are _____ to each other.

Instructions for Paragraph proofs

Paragraph proofs

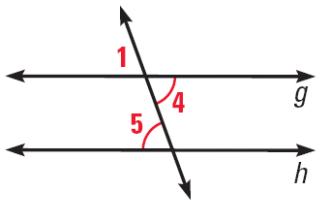
- The proof is written in _____.
- Still need to have the _____ and _____.

Geometry 3.3 Name: _____

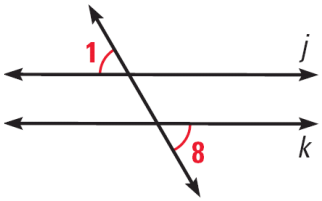
Write a paragraph proof to prove that if 2 lines are cut by a transversal so that the alternate interior ∠s are ≅, then the lines are ||.

Given: ∠4 ≅ ∠5

Prove: $g \parallel h$



If you use the diagram at the right to prove the Alternate Exterior Angles Converse, what GIVEN and PROVE statements would you use?



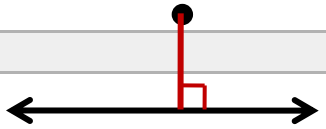
Assignment: 138 #2, 4, 6, 10, 12, 14, 16, 20, 22, 24, 26, 28, 30, 32, 35, 39, 41, 44, 45, 49 = 20 total

Geometry

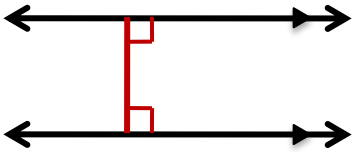
3.4 Proofs with Perpendicular Lines

Distance

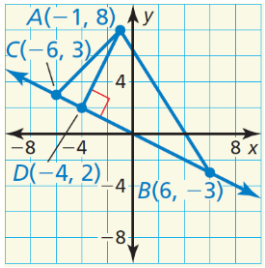
From _____ to line: length of _____ from point and ⊥ to line



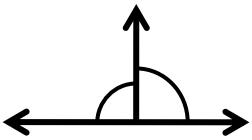
Between two parallel lines: length of _____ ⊥ to both lines



Find the distance from point A to $\overleftrightarrow{BC}$.

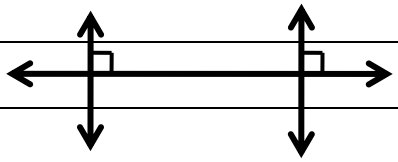


If two lines _____ to form a linear pair of _____ angles, then the lines are perpendicular.



Perpendicular Transversal Theorem

If a trans. is _____ to 1 of 2 _____ lines, then it is _____ to the other.



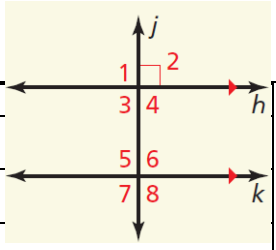
Lines ⊥ to a Transversal Theorem

In a plane, if 2 lines are _____ to the _____ line, then they are _____ to each other.

Prove the Perpendicular Transversal Theorem using the diagram and the Alternate Interior Angles Theorem.

Given: $h \parallel k, j \perp h$

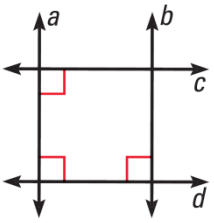
Prove: $j \perp k$



Statements	Reasons
1.	1.
2.	2.
3.	3
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.

Is $b \parallel a$?

Is $b \perp c$?

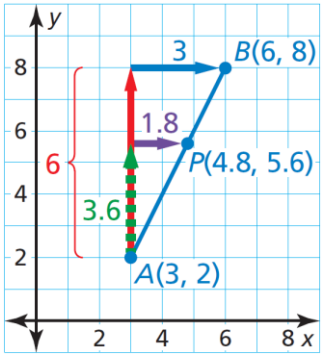


Assignment: 146 #2, 10, 12, 14, 16, 18, 20, 21, 24, 26, 34, 40, 42, 45, 46 = 15 total

Geometry

3.5A Equations of Parallel and Perpendicular Lines

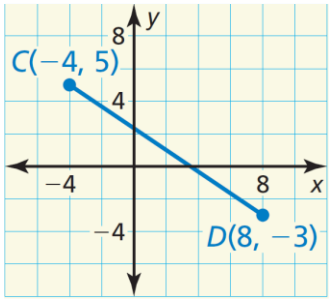
Partitioning a Directed Line Segment



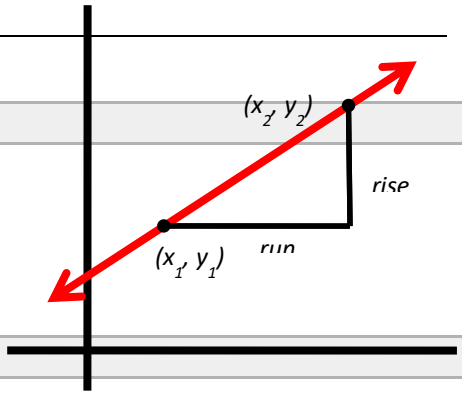
Segment from _____ to _____

1. Want the _____ of _____ to _____ to be something like 3 to 2
2. That means there are _____ pieces
3. Point _____ is _____ of the way from _____
4. Find the _____ and _____
5. Multiply the _____ and _____ by the fraction _____ and add to point _____
6. The _____ is the coordinates of _____

Find the coordinates of point *F* along the directed line segment *CD* so that the ratio of *CF* to *FD* is 3 to 5.



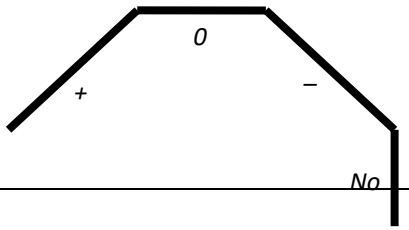
Slope



Slope = _____

_____ = _____

Slope Types



Positive Slope _____
Zero Slope _____
Negative Slope _____
No Slope (Undefined) _____

Slopes of Parallel Lines

In a coordinate plane, 2 _____ lines are _____ if they have the same slope.
And, any 2 _____ lines are _____.
Example of || slopes: $m_1 = 2$; $m_2 = 2$

Slopes of Perpendicular Lines

In a _____ plane, 2 nonvertical lines are _____ if the products of their slopes are -1.
Or, Slopes are negative _____.
And, _____ lines are _____ to vertical lines
Example of perpendicular slopes: $m_1 = 2$; $m_2 = -½$

Tell whether the lines are *parallel*, *perpendicular*, or *neither*.

Line 1: through (–2, 8) and (2, –4)

Line 2: through (–5, 1) and (–2, 2)

Assignment: 154 #1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 53, 54, 57 = 13 total

Geometry

3.5B Equations of Parallel and Perpendicular Lines

Slope-intercept form of a line

$y = mx + b$

m = _____

b = _____

Write Equations of Lines

To write equations of lines using _____

Find the _____

Find the-_____

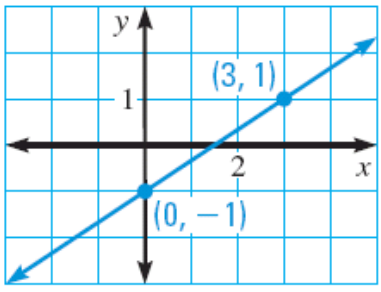
It is given or,

Plug the _____ and a _____ into _____ and solve for ___

Write the _____ of the line by plugging in ___ and ___ into _____

Write an equation of the line that passes through (1, 5) and is parallel to the line with the equation $y = 3x - 5$.

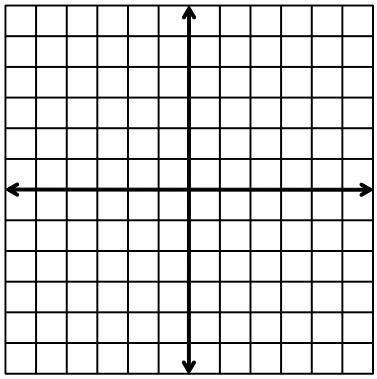
Write an equation of the line perpendicular to the line in the graph and passing through (3, 1).



Find the Distance from a Point to a Line

1. Find the _____ of the line _____ to the given line and passing through the _____.
2. Use a _____ or _____ of _____ to find where the lines _____.
3. Find the _____ between the given _____ and the point of _____.

Find the distance from the point (6, −2) to the line $y = 2x - 4$.

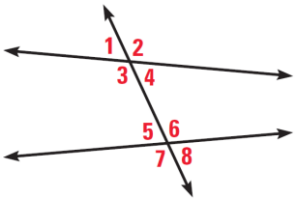


Assignment: 154 #12, 14, 16, 18, 20, 22, 24, 36, 38, 46, 62, 64 = 12 total

Name: _____

Geometry Chapter 3 Review

Classify the pairs of angles as *corresponding*, *alternate interior*, *alternate exterior*, or *consecutive interior*.

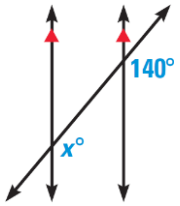


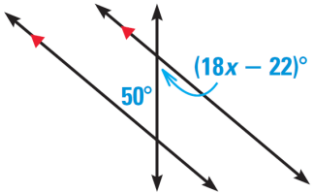
1. ∠1 and ∠8
2. ∠2 and ∠6
3. ∠3 and ∠5
4. ∠4 and ∠5

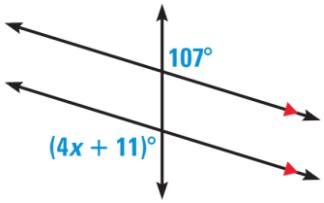
If the lines are parallel, tell whether the angle pair is *congruent*, *supplementary*, *complementary*, or *neither*.

5. Corresponding Angles
6. Alternate Interior Angles
7. Alternate Exterior Angles
8. Consecutive Interior Angles

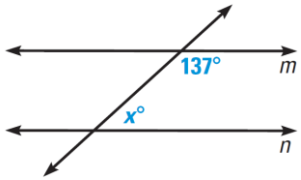
Find the value of *x*.

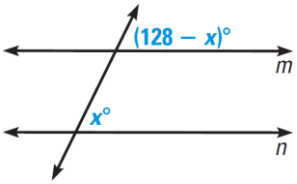
9.


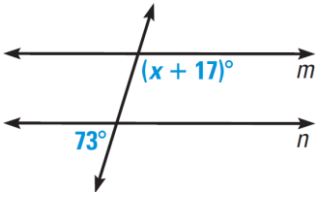
10.


11.


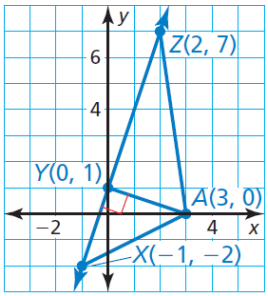
Find the value of *x* that makes *m* ∥ *n*.

12.


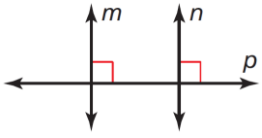
13.


14.


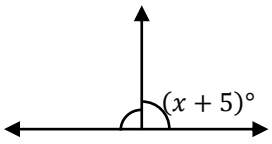
Find the distance from point *A* to $\overleftrightarrow{XZ}$.

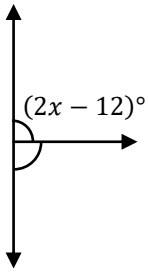
15.


Which theorem specifies that *m* ∥ *n*?

16.


$\overline{AB} \perp \overline{BC}$. Find the value of *x*.

17.


18.


19. Find the coordinates of point *P* along the directed line segment *AB* so that *AP* to *PB* is the given ratio 4 to 5.
A(−4, 2) and *B*(6, 22)

Find the slope of the line that passes through the points.

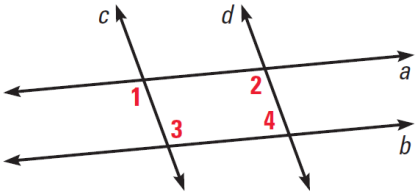
20. (3, −1), (3, 4)
21. (2, 7), (−1, −3)
22. Are the lines passing through each pair of points *parallel*, *perpendicular*, or *neither*?
Line 1: (−7, 3) and (−5, −1)
Line 2: (−1, −4) and (3, −2)

Write an equation of the line that passes through point *P* and is parallel to the line with the given equation.

23. $P(0, 2), y = -x + 3$

Write an equation of the line that passes through point *P* and is perpendicular to the line with the given equation.

24. $P(1, 3), y = 2x - 1$
25. Write a two-column proof.
Given: $a \parallel b, \angle 2 \cong \angle 3$
Prove: $c \parallel d$



Name: _____

Answers

1. Alternate Exterior
2. Corresponding
3. Consecutive Interior
4. Alternate Interior
5. Congruent
6. Congruent
7. Congruent
8. Supplementary
9. 140
10. 4
11. 24
12. 43
13. 64
14. 90
15. $\sqrt{10}$
16. Lines Perpendicular to a Transversal Theorem
17. 85
18. 51
19. $\left(\frac{4}{9}, \frac{98}{9}\right)$
20. Undefined
21. $\frac{10}{3}$
22. Perpendicular
23. $y = -x + 2$
24. $y = -\frac{1}{2}x + \frac{7}{2}$
25.

$a \parallel b, \angle 2 \cong \angle 3$	Given
$m\angle 2 = m\angle 3$	Definition of $\cong$
$\angle 2$ and $\angle 4$ are supplementary	Consecutive Interior Angles Theorem
$m\angle 2 + m\angle 4 = 180°$	Definition of Supplementary
$m\angle 3 + m\angle 4 = 180°$	Substitution
$\angle 3$ and $\angle 4$ are supplementary	Definition of Supplementary
$c \parallel d$	Consecutive Interior Angles Converse

OR

$a \parallel b, \angle 2 \cong \angle 3$	Given
$\angle 1 \cong \angle 3$	Alternate Interior Angles Theorem
$\angle 1 \cong \angle 2$	Transitive
$c \parallel d$	Corresponding Angles Converse