Geometry

3.6 Prove Theorems About Perpendicular Lines

intersect

congruent

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

perpendicular

four

right

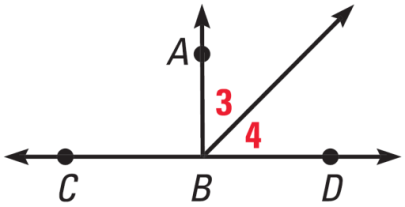
If two lines are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, then they intersect to form \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ angles.

angles

angles

Adjacent

If two sides of two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ are perpendicular, then the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are complementary.

Given that ∠ABC ≅ ∠ABD, what can you conclude about ∠3 and ∠4?

They are complementary

Prove that if two lines are perpendicular, then they intersect to form four right angles.

a

b

1

2

3

4

Given: a ⊥ b

Prove: ∠1, ∠2, ∠3, ∠4 are rt ∠s

|  |  |
| --- | --- |
| Statements | Reasons |
| 1. a ⊥ b | 1. (given) |
| 2. ∠1 is rt angle | 2. (def lines) |
| 3. m∠1 = 90° | 3. (def rt angle) |
| 4. m∠1 + m∠2 = 180 | 4. (linear pair postulate) |
| 5. 90 + m∠2 = 180 | 5. (substitution) |
| 6. m∠2 = 90 | 6. (subtraction) |
| 7. ∠2 is rt angle | 7. (def rt angle) |
| 8. ∠3 ≅ ∠1, ∠4 ≅ ∠2 | 8. (vertical angles are ) |
| 9. m∠3 = m∠1, m∠4 = m∠2 | 9. (def ) |
| 10. m∠3 = 90, m∠4 = 90 | 10. (substitution) |
| 11. ∠3 is rt ∠, ∠4 is rt ∠ | 11. (def rt ) |

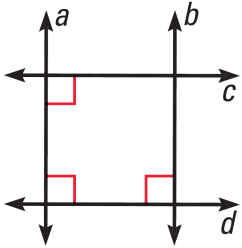
## Perpendicular Transversal Theorem

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

## Lines ⊥ to a Transversal Theorem

same

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

Is b || a?

Yes, lines perpendicular to transversal theorem

Is b ⊥ c?

Yes, c || d by the lines ⊥ to trans theorem; b ⊥ c by the ⊥ trans theorem

# Distance

segment

point

From \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to line: length of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from point and ⊥ to line

segment

Between two parallel lines: length of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ⊥ to both lines

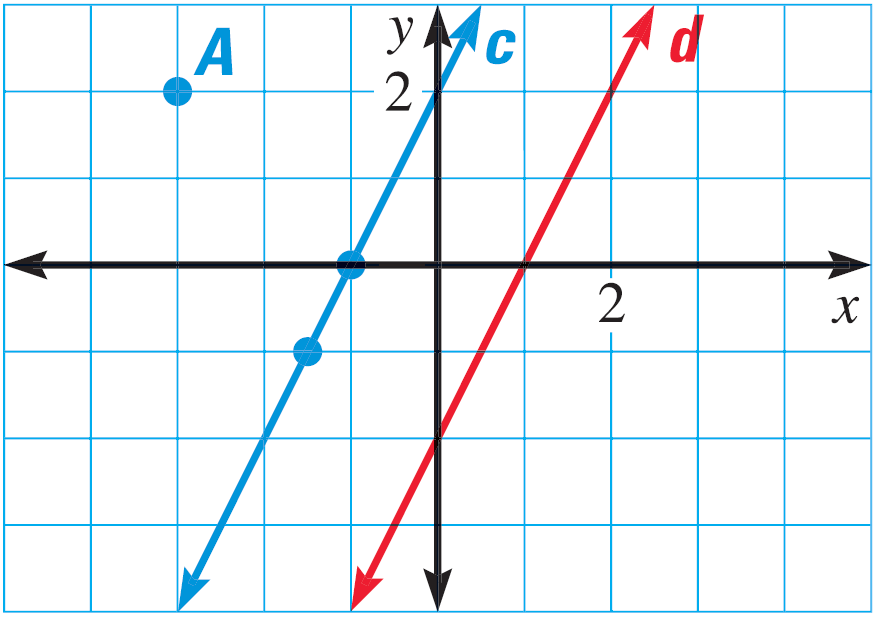
What is the distance from point A to line d?

Slope of line c = 2 (rise = 2, run = 1)

Slope of ⊥ line = -1/2

Follow slope from A(-3, 2) to line cd; intersection at (1, 0)

Calculate distance



**e**

What is the distance from line c to line e?

Point on line c: (0, 2)

Follow slope from (0, 2) to line e

Point of intersection (4, 0)

Distance =

Assignment: 194 #2-10 even, 14-26 even, 30-46 even = 21 total

Extra Credit: 197 #2, 8 = +2