

Chapter 3

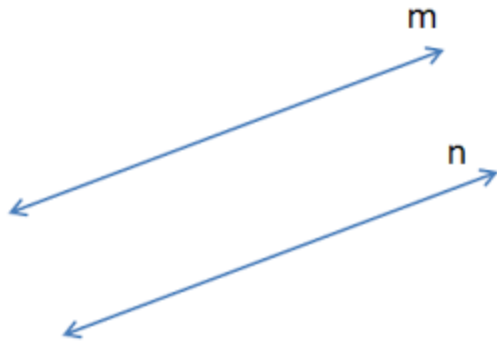
Parallel and Perpendicular Lines

A decorative graphic consisting of several horizontal bars. A thick yellow bar spans the width of the slide. Below it, on the right side, are several thinner white bars of varying lengths, creating a stepped effect.

3.1 Identify Pairs of Lines and Angles

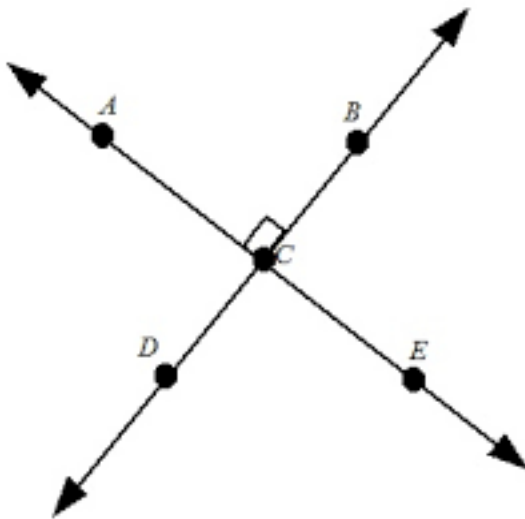
Parallel Lines

- Lines _____
- Parallel Symbol: _____



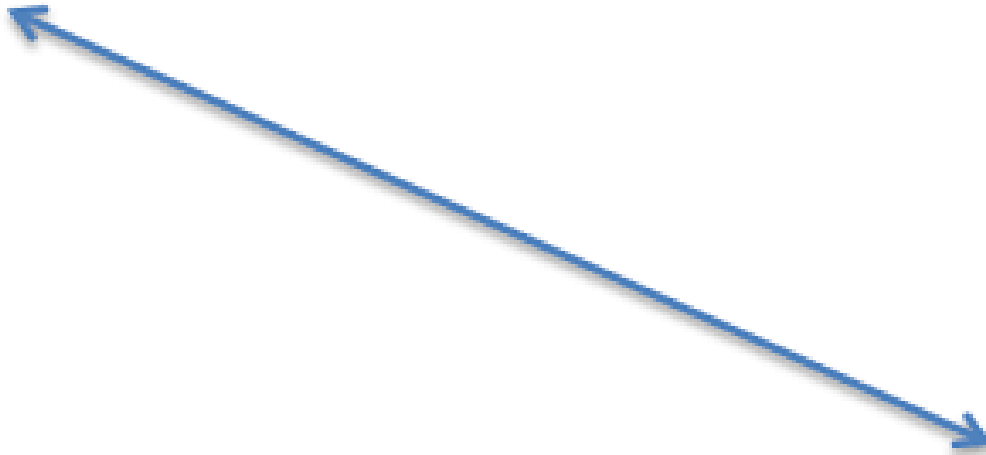
Perpendicular Lines

- Lines that _____
- Perpendicular Symbol: _____



Postulate 13: Parallel Postulate

- For any _____ and a _____ not on the line, there is _____ through the _____ parallel to the _____



Postulate 14: Perpendicular Postulate

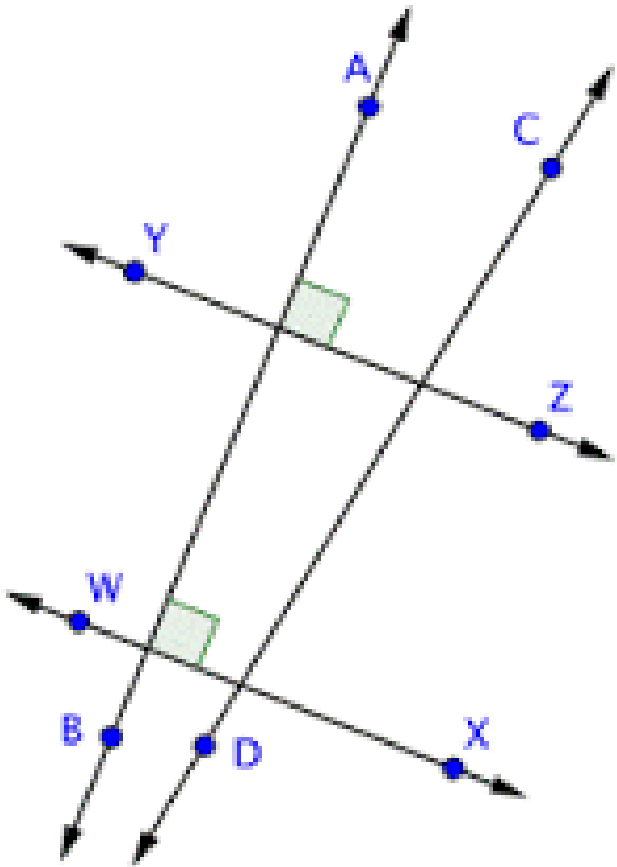
- For any _____ and a _____ not on the line, there is _____ through the _____ to the line.



EX: Identify parallel and perpendicular lines in the picture.

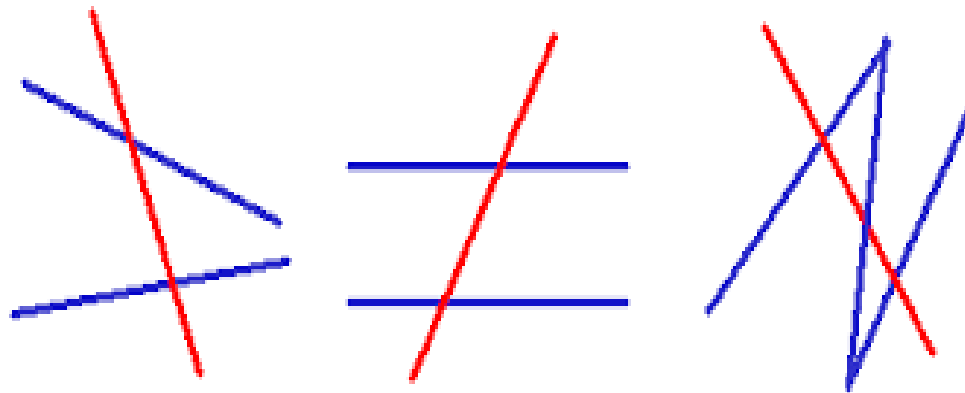


EX: Name all parallel and perpendicular lines.



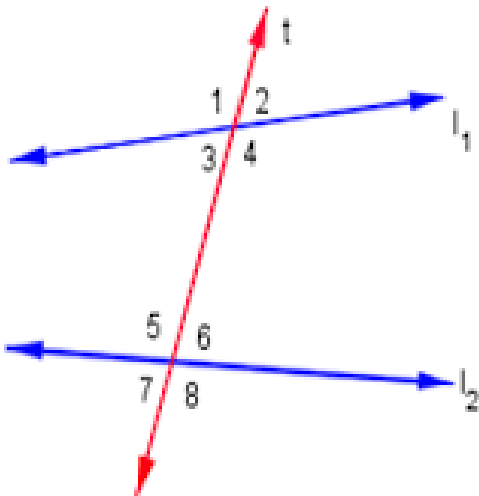
Transversal

- A _____ that _____
two or more other _____.

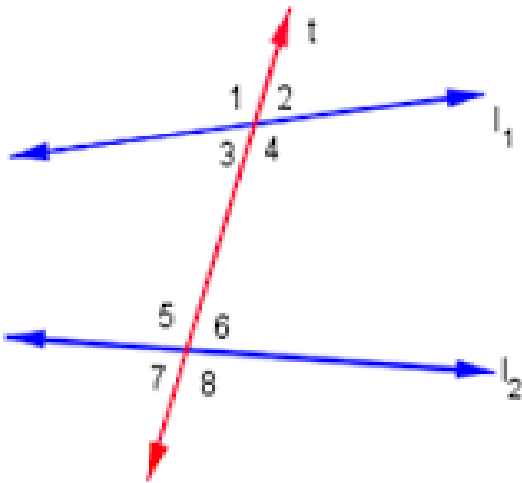


Angles Formed by Transversals

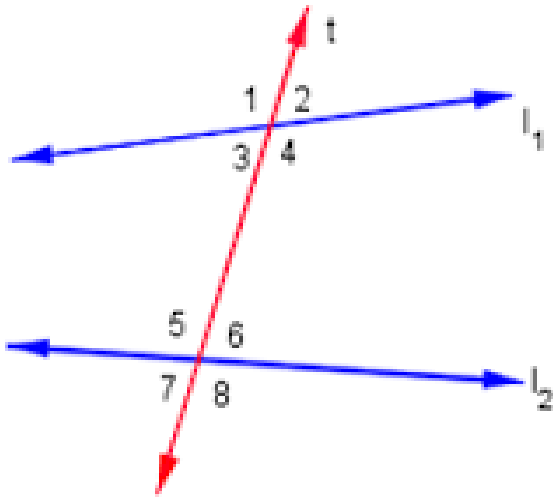
- 1) Corresponding Angles: Angles that have _____ positions – positions that _____.



- 2) Alternate Interior Angles: Angles that lie _____ and on _____ of the transversal.

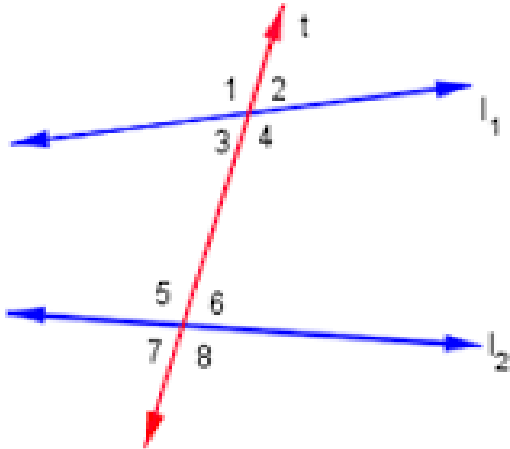


- 3) Alternate Exterior Angles: Angles that lie _____ and on _____ sides of the transversal.



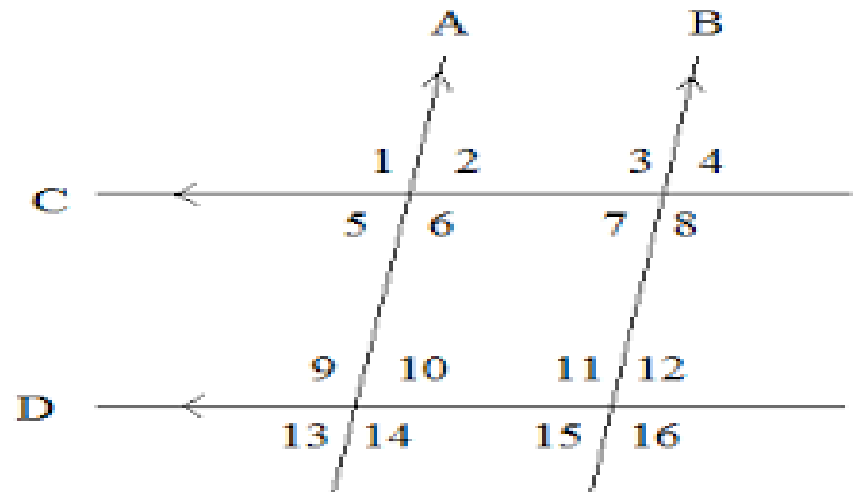
- 4) Same Side Interior Angles: Angles that lie _____ and on the _____ of the transversal.

▫ Also called: _____



EX: Classify each angle pair.

- $\angle 13$ and $\angle 15$
- $\angle 4$ and $\angle 11$
- $\angle 9$ and $\angle 16$
- $\angle 3$ and $\angle 6$



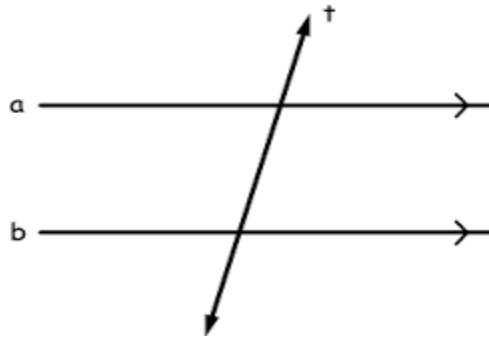
3.2

Use Parallel Lines and Transversals

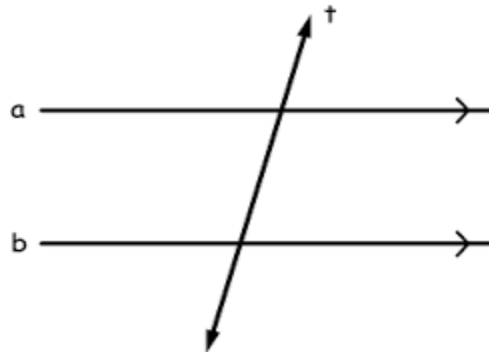
A series of horizontal stripes in yellow and white, extending across the width of the slide below the title.

For Two Parallel Lines Cut by a Transversal:

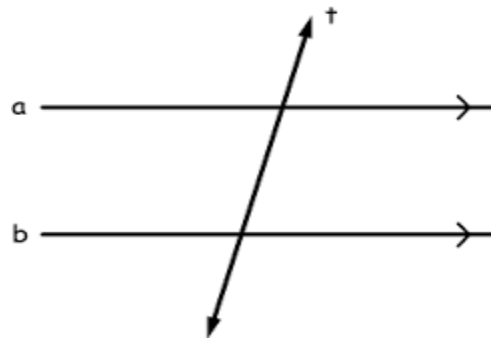
- 1) Corresponding Angles are _____



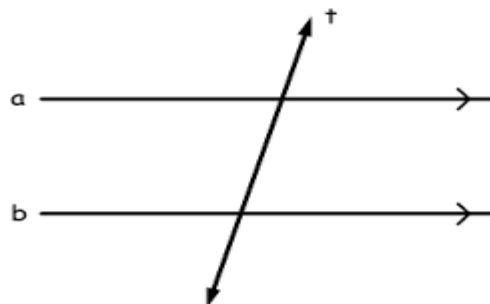
- 2) Alternate Interior Angles are _____



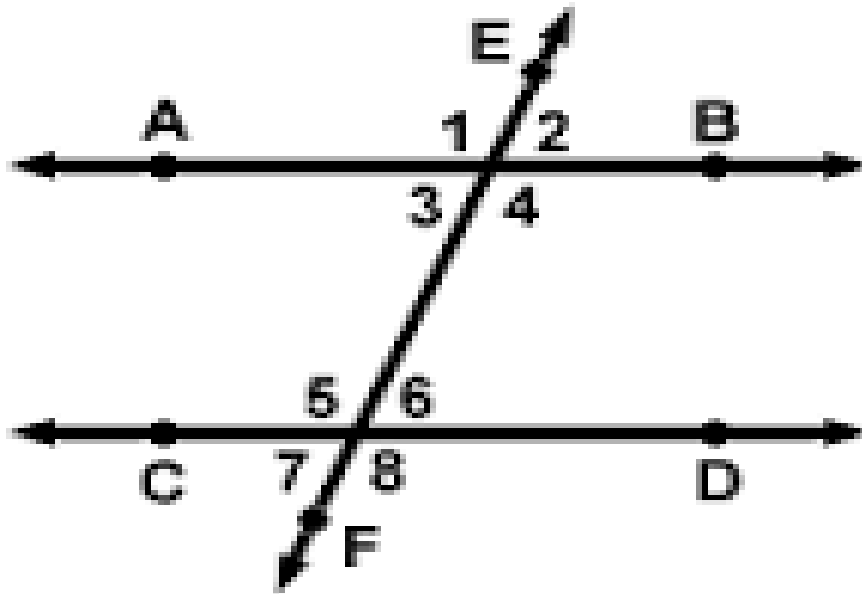
- 3) Alternate Exterior Angles are _____



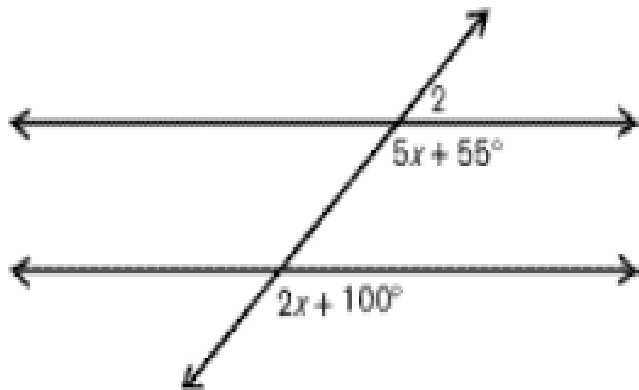
- 4) Same Side Interior Angles are _____



EX: Find the measure of the numbered angles if the $m\angle 1 = 110^\circ$.

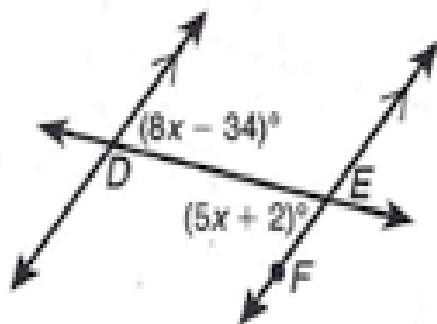


EX: Find the value of x .

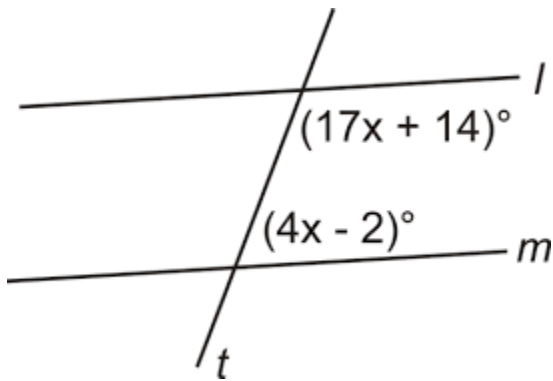


EX: Find the value of x .

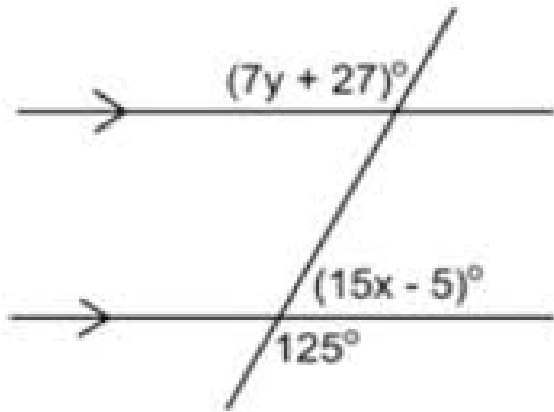
Ex.3: Find the value of x .



EX: Find the value of x .



EX: Find the value of x and y .



3.4

Find and Use Slopes of Lines

A decorative graphic consisting of several horizontal bars. It starts with a thick yellow bar, followed by a white bar, and then a series of thinner yellow and white bars that create a stepped, staircase-like effect extending across the width of the slide.

Slope

- Ratio of _____ to _____
between any _____

4 Types of Slope

- Negative: _____
- Positive: _____



- Zero: _____

- Undefined: _____

EX: Find the slope between the points.

- $(6, 4)$ and $(8, 2)$
- $(-2, 4)$ and $(-3, 0)$

- $(6, 4)$ and $(6, 0)$

- $(0, 4)$ and $(6, 0)$

EX: Tell which line is steeper.

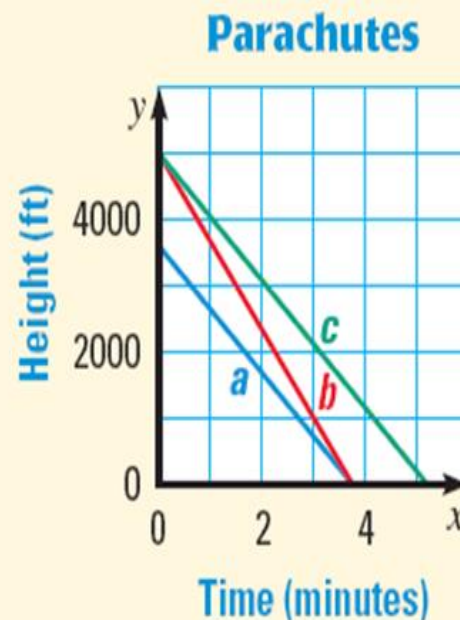
- Line 1: $(4, 5)$ and $(3, 1)$
- Line 2: $(6, 3)$ and $(5, -2)$

- Line 1: $(-2, 4)$ and $(-3, 0)$
- Line 2: $(-5, 5)$ and $(-3, -1)$

EX:

A skydiver made jumps with three parachutes. The graph shows the height of the skydiver from the time the parachute opened to the time of the landing for each jump. Which statement is true?

- Ⓐ The parachute opened at the same height in jumps *a* and *b*.
- Ⓑ The parachute was open for the same amount of time in jumps *b* and *c*.
- Ⓒ The skydiver descended at the same rate in jumps *a* and *b*.
- Ⓓ The skydiver descended at the same rate in jumps *a* and *c*.

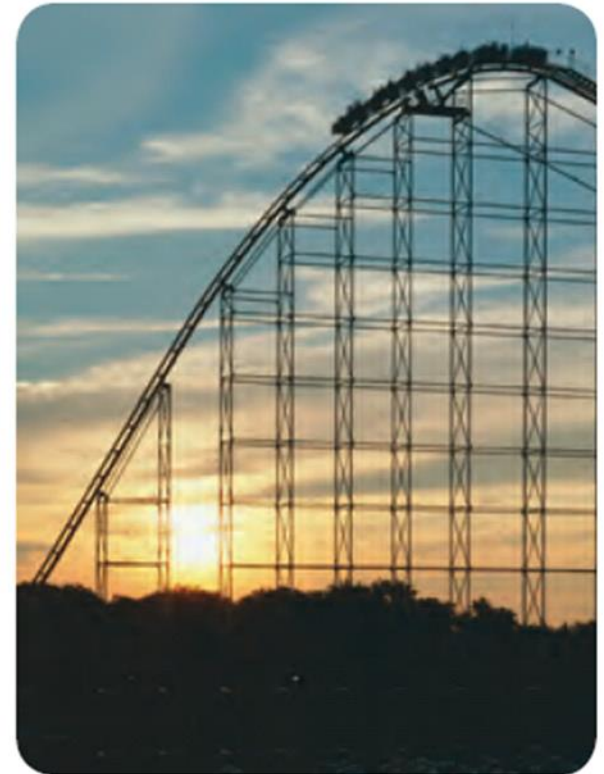


In the previous Example:

- Which parachute was in the air the longest amount of time?
- What do the x and y intercepts represent in this situation?

EX:

- **During the climb on the Magnum *XL*-200 roller coaster, you move 41 feet upward for every 80 feet you move horizontally. At the crest of the hill, you have moved 400 feet forward.**



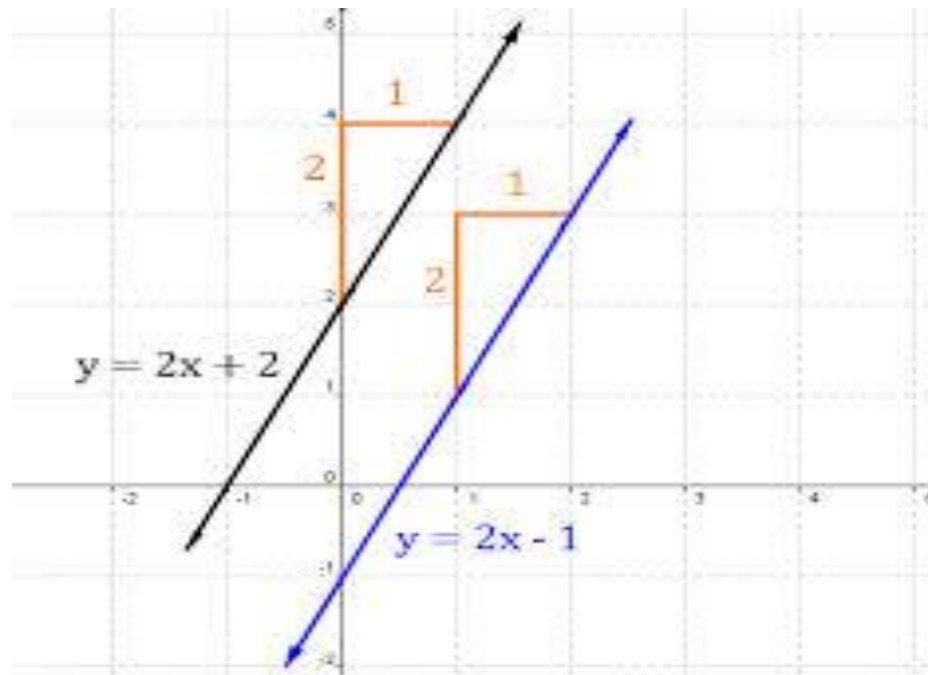
- **A) Making a Table: Make a table showing the height of the Magnum at every 80 feet it moves horizontally. How high is the roller coaster at the top of its climb?**

- **B) Calculating : Write a fraction that represents the height the Magnum climbs for each foot it moves horizontally. What does the numerator represent?**

- **C) Using a Graph: Another roller coaster, the Millennium Force, climbs at a slope of 1. At its crest, the horizontal distance from the starting point is 310 feet. Compare this climb to that of the Magnum. Which climb is steeper?**

Parallel Lines

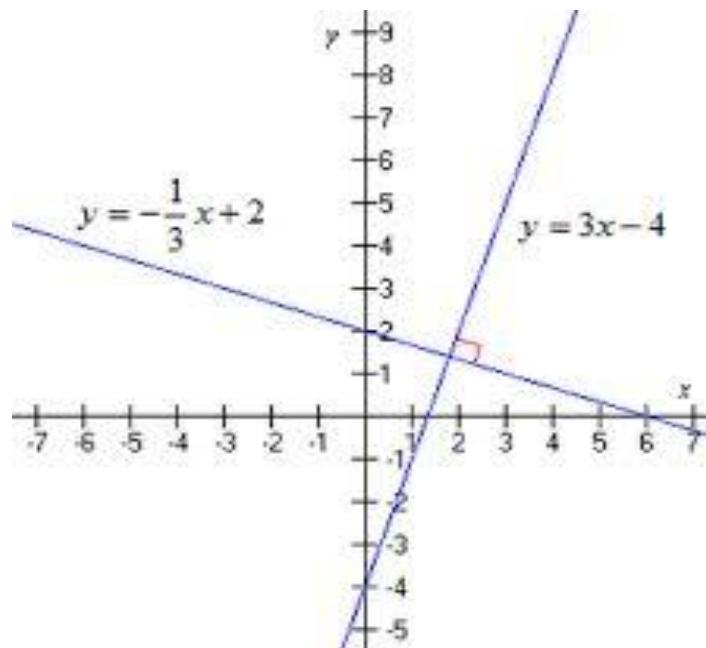
- Have _____.
- EX:



Perpendicular Lines

- Have _____ that are _____
_____ of each other.

▫ EX:



EX: Tell whether they are parallel or not. Explain.

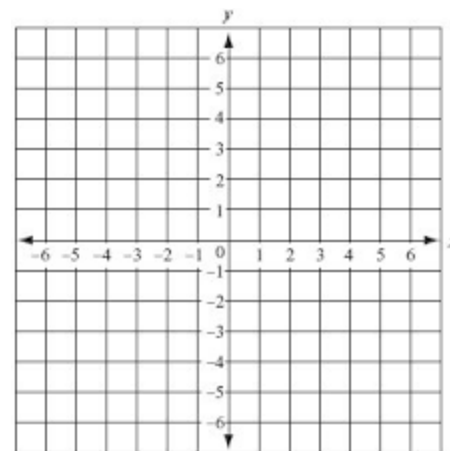
- Line m passes through $(-1, 3)$ and $(4, 1)$
- Line n passes through $(-2, -1)$ and $(3, -3)$

EX: Tell whether the lines are perpendicular or not. Explain.

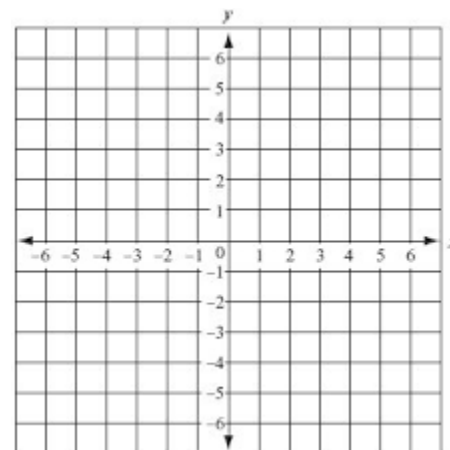
- Line t passes through $(0, 2)$ and $(6, 5)$
- Line s passes through $(2, 4)$ and $(4, 0)$

EX: Graph the line through the given point with the given slope.

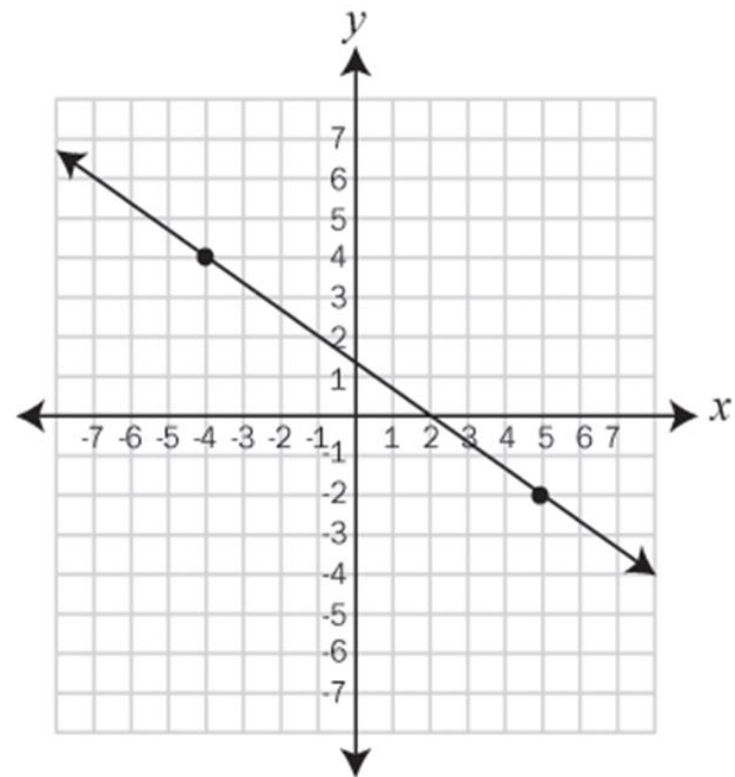
- $P(-1, 2)$, slope $= \frac{1}{4}$



- $P(2, 1)$, slope $= \frac{-3}{2}$



EX: Find the slope of the line n perpendicular to line h and passing through point P.



3.5

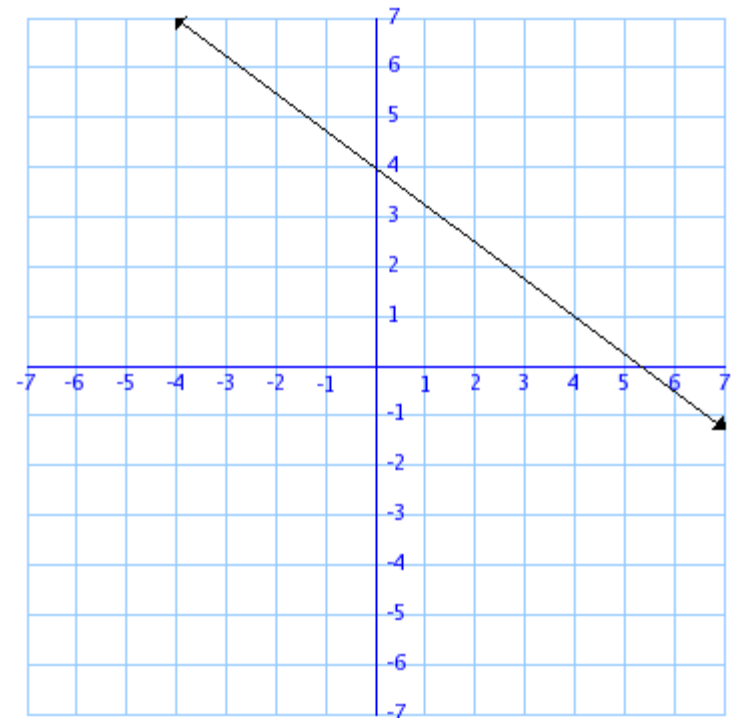
Write and Graph Equations of Lines

A decorative graphic consisting of several horizontal bars. It starts with a thick yellow bar, followed by a white bar, and then a series of thinner yellow and white bars that create a stepped, staircase-like effect extending across the width of the slide.

Slope-Intercept Form

- ---

 - m is the _____
 - b is the _____
 - EX:

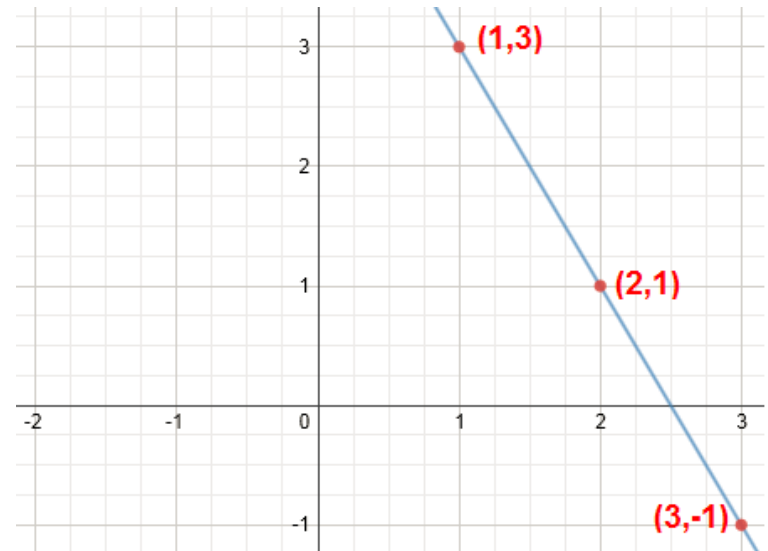


Point-Slope Form



-
- m is the _____
 - (x_1, y_1) is an _____
 - x and y _____
 - EX:

EX: Write an equation of the line shown (in slope-intercept form).



EX: Write an equation of the line that passes through the given point P and has the given slope.

- $P(-2, 5), m = \frac{1}{4}$

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

- $P(-1, 1), y - 2x = -3$

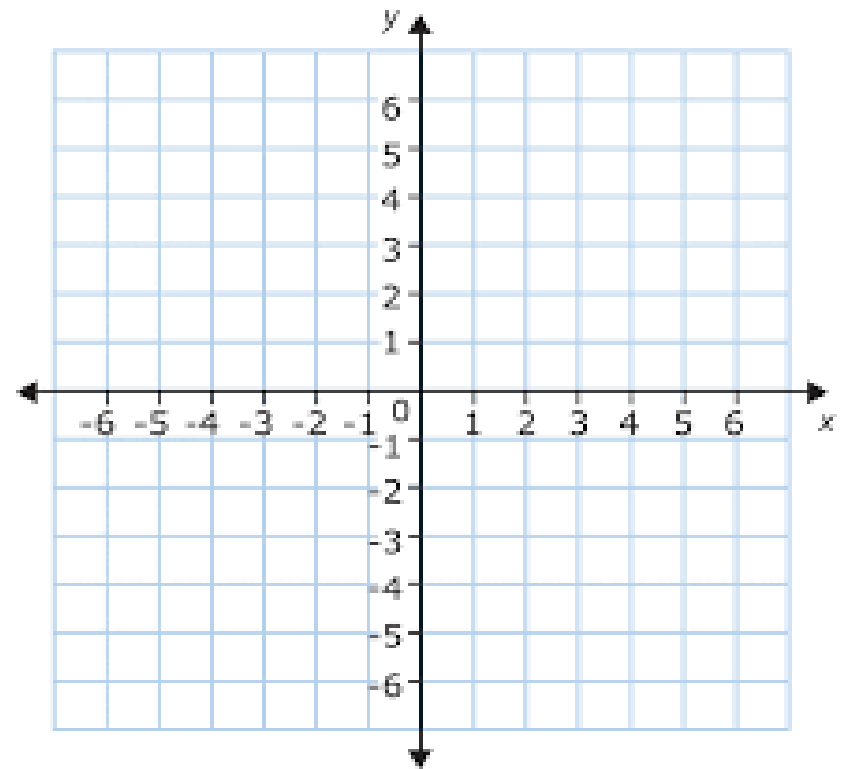
- $P(5, -6), y - 2 = -4(x + 2)$

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

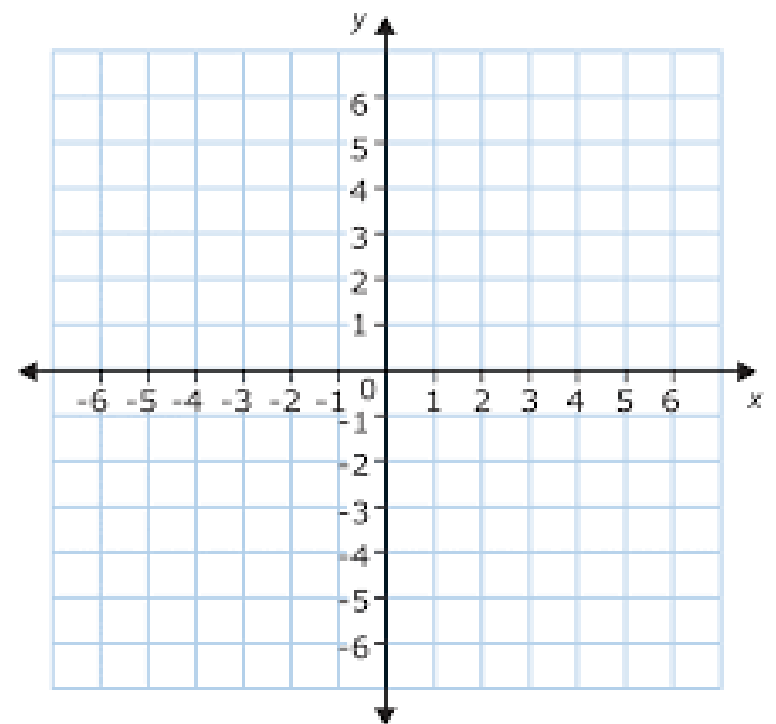
- $P(1, 5), y = 3x - 5$

EX: Graph the equation.

- $3x + 4y = 12$

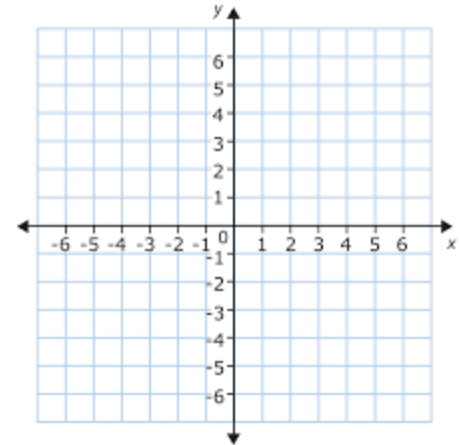


- $4y = -x + 8$

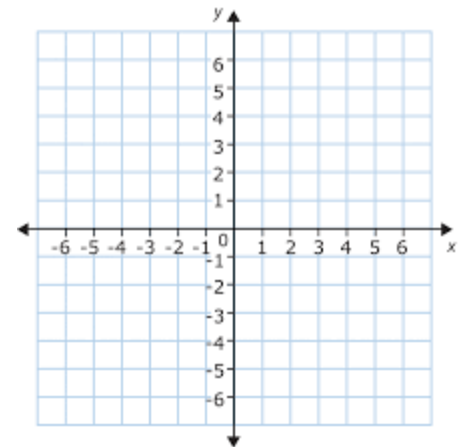


EX: Graphing Horizontal and Vertical Lines

- $y - 4 = -2$



- $-x - 1 = 3$

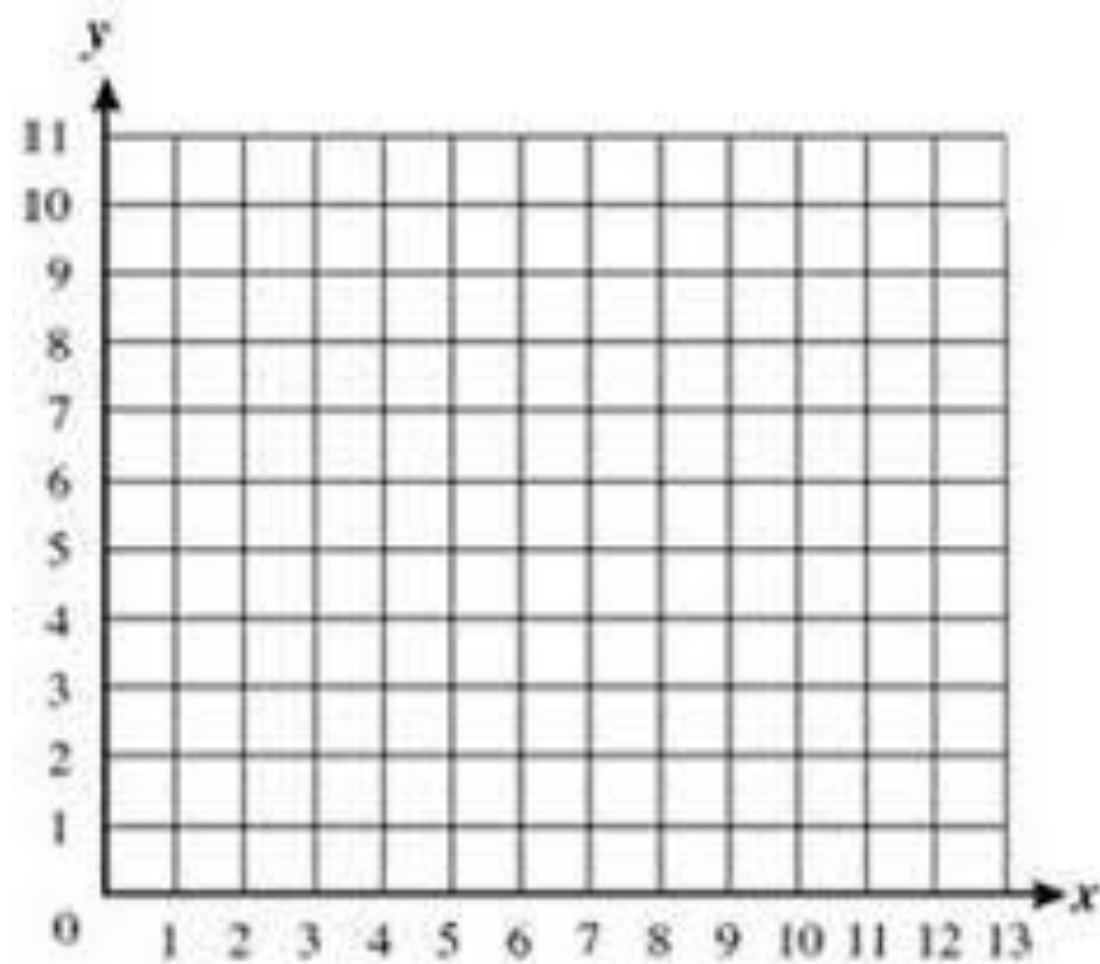


EX:

- Toni's puppy weighed 10 pounds when it was 2 months old. It gained 2 pounds a month for 6 months. Write an equation for the puppy's weight during this time.
- Tell what the slope and y-intercept mean in this situation.

EX:

- One bank charges \$1.50 for each use of its debit card. Another bank charges \$10 per month for an unlimited number of debit card uses. How many times per month would you need to use your debit card to make the bank that charges a flat rate the better choice? Use a graph to support your answer.



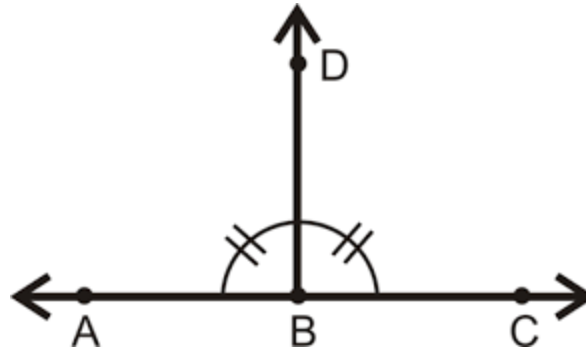
3.6

Theorems About Perpendicular Lines



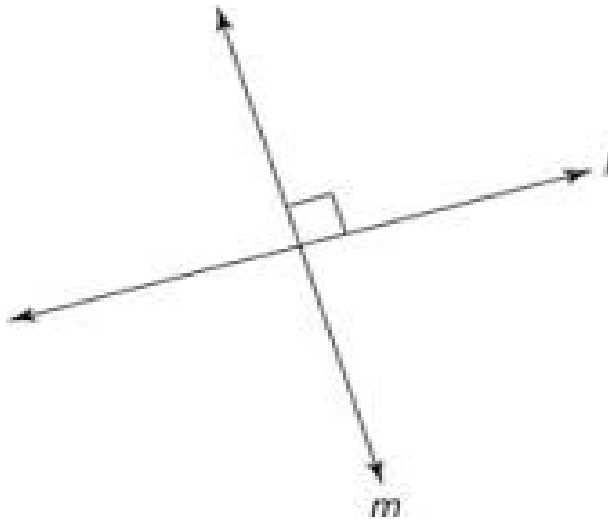
Theorem 1:

- If _____ to form a pair of _____, then the lines are _____.



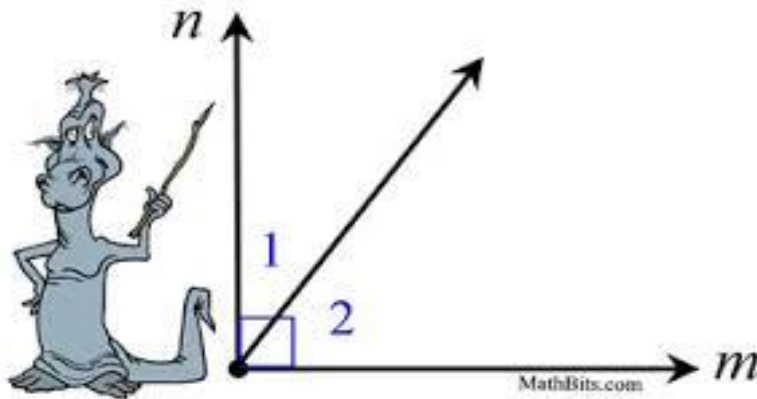
Theorem 2:

- If _____ are _____, then they _____ to form _____.



Theorem 3

- If two _____ are _____, then the angles are _____.



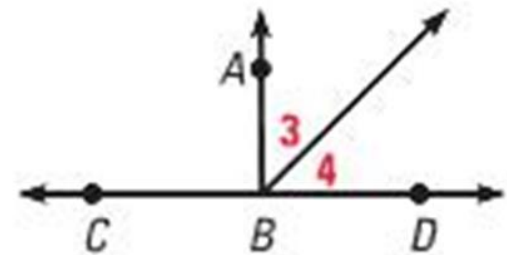
EX:

In the diagram, $\overleftrightarrow{AB} \perp \overleftrightarrow{BC}$. What can you conclude about $\angle 1$ and $\angle 2$?



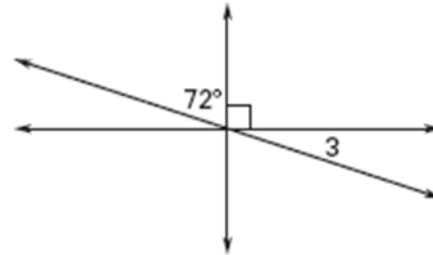
EX:

1. Given that $\angle ABC \cong \angle ABD$, what can you conclude about $\angle 3$ and $\angle 4$?
Explain how you know.

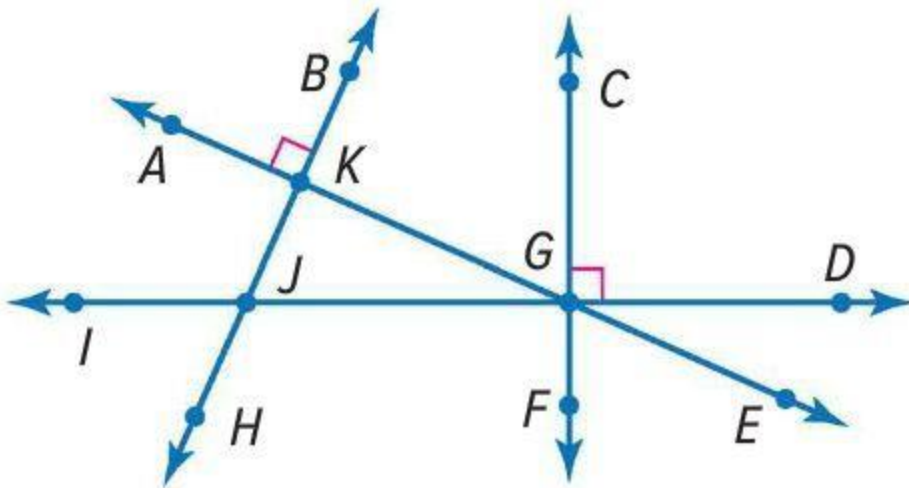


EX:

1. Find $m \angle 3$.

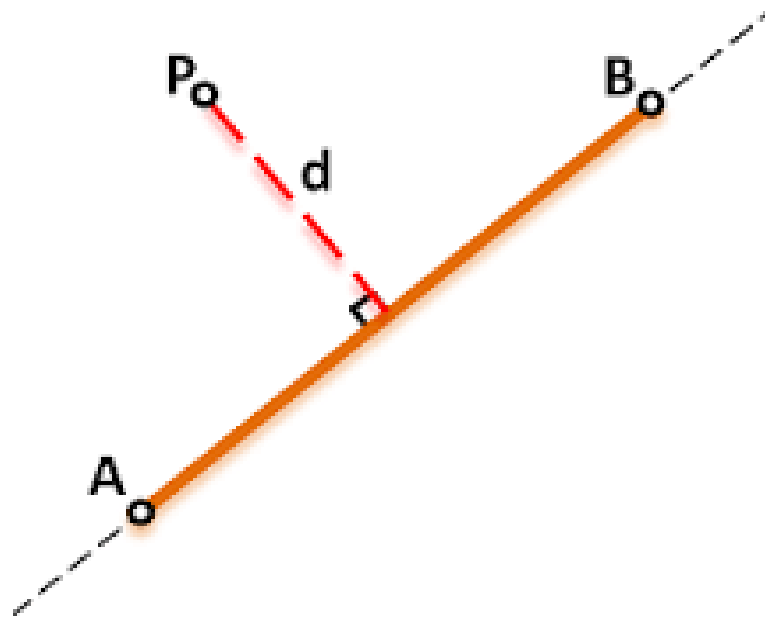


EX: Given that _____, find x .



Distance From a Point to a Line:

- Shortest distance from a _____ to a _____ is the _____.



Distance between Parallel Lines:

- The _____ of any _____ between the lines.

