Geometry—Chapter 3

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Geometry—Chapter 3-1

Vocabulary

3—1

Perpendicular lines → Two lines that intersect to form a right angle.

Notation: $\perp$

Parallel Lines → In a plane, lines that do not intersect.

Notation: $\parallel$, or arrows on the lines in a diagram/figure denoting parallel.

Skew lines → lines that do not intersect and are not in the same plane.

Transversal → line that intersects 2 or more lines in a plane. (lines <u>do not</u> have to be parallel)

Types of non-adjacent angles that are formed when a transversal cuts two intersecting lines.

Corresponding angles → Angles on the same side of the transversal; one is exterior and one is interior.

Alternate interior angles → angles on different sides of the transversal; both are interior.

Alternate exterior angles → angles on different sides of the transversal; both are exterior.

Consecutive interior angles / Same-side interior angles → interior angles on the same side of the transversal.

Geometry—Chapter 3-2

Postulates and Theorems

- If two parallel lines are cut by a transversal, then corresponding angles are congruent.

- If two parallel lines are cut by a transversal, then alternate interior angles are congruent.

- If two parallel lines are cut by a transversal, then alternate exterior angles are congruent.

- If two parallel lines are cut by a transversal, then same-side interior angles are supplementary.

- In a plane. if a line is perpendicular to one of two parallel lines, then it is perpendicular to the other also.

Chapter 3-3

Slopes of Lines

$$m = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\Delta y}{\Delta x} = \frac{y_1 - y_2}{x_1 - x_2} = \text{rate of change}$$

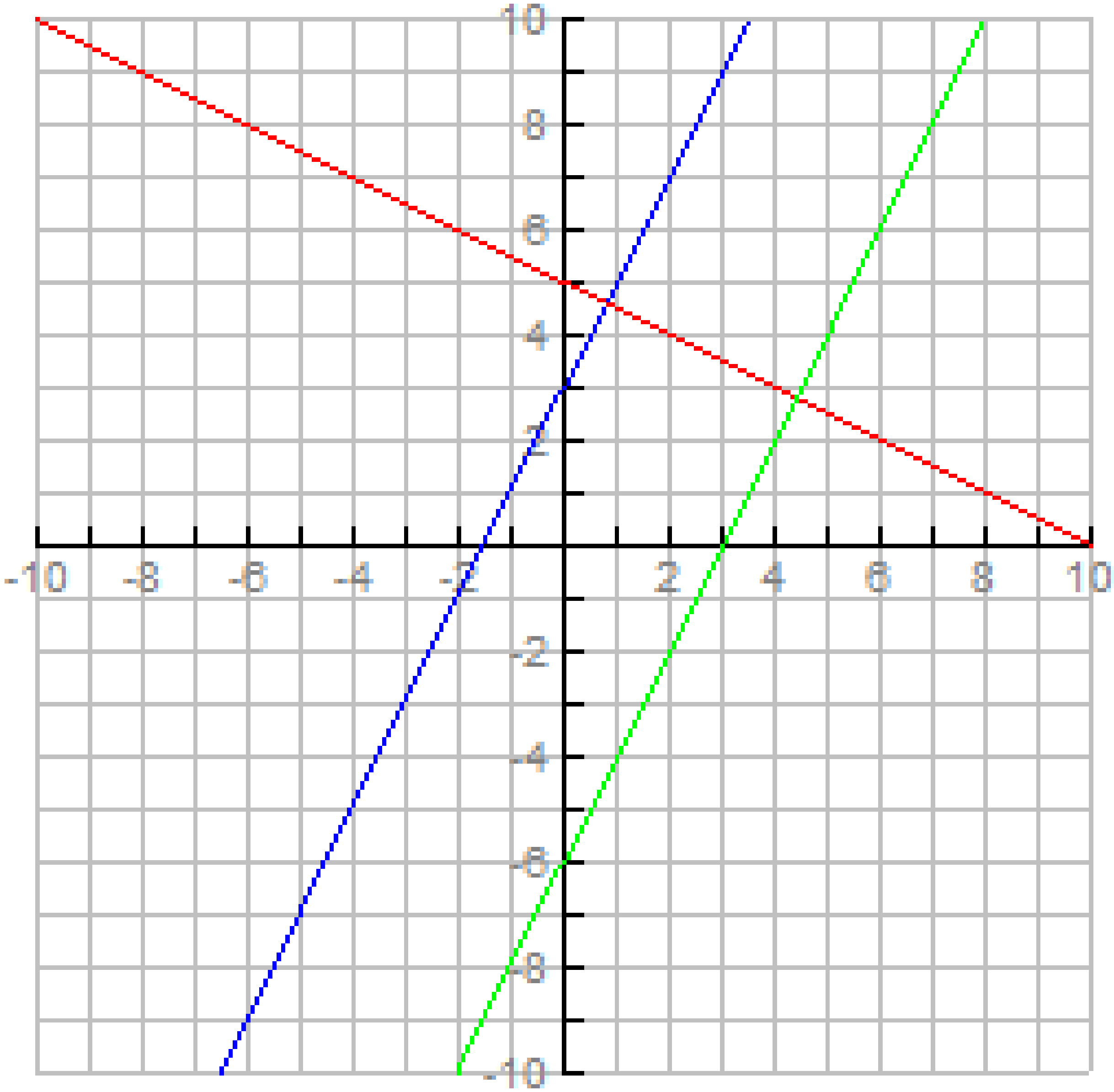
given the coordinates $(x_{1,} y_1)$ and $(x_{2,} y_2)$

Slope:

- Positive
- Negative
- Zero
- Undefined

Parallel lines→non-vertical (Oblique Lines) lines with the *same slope*

Perpendicular lines→two oblique lines in which the slopes are negative reciprocals of each other. In other words the product of the their slopes is -1.


10
8
6
4
2
-2
-4
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-8
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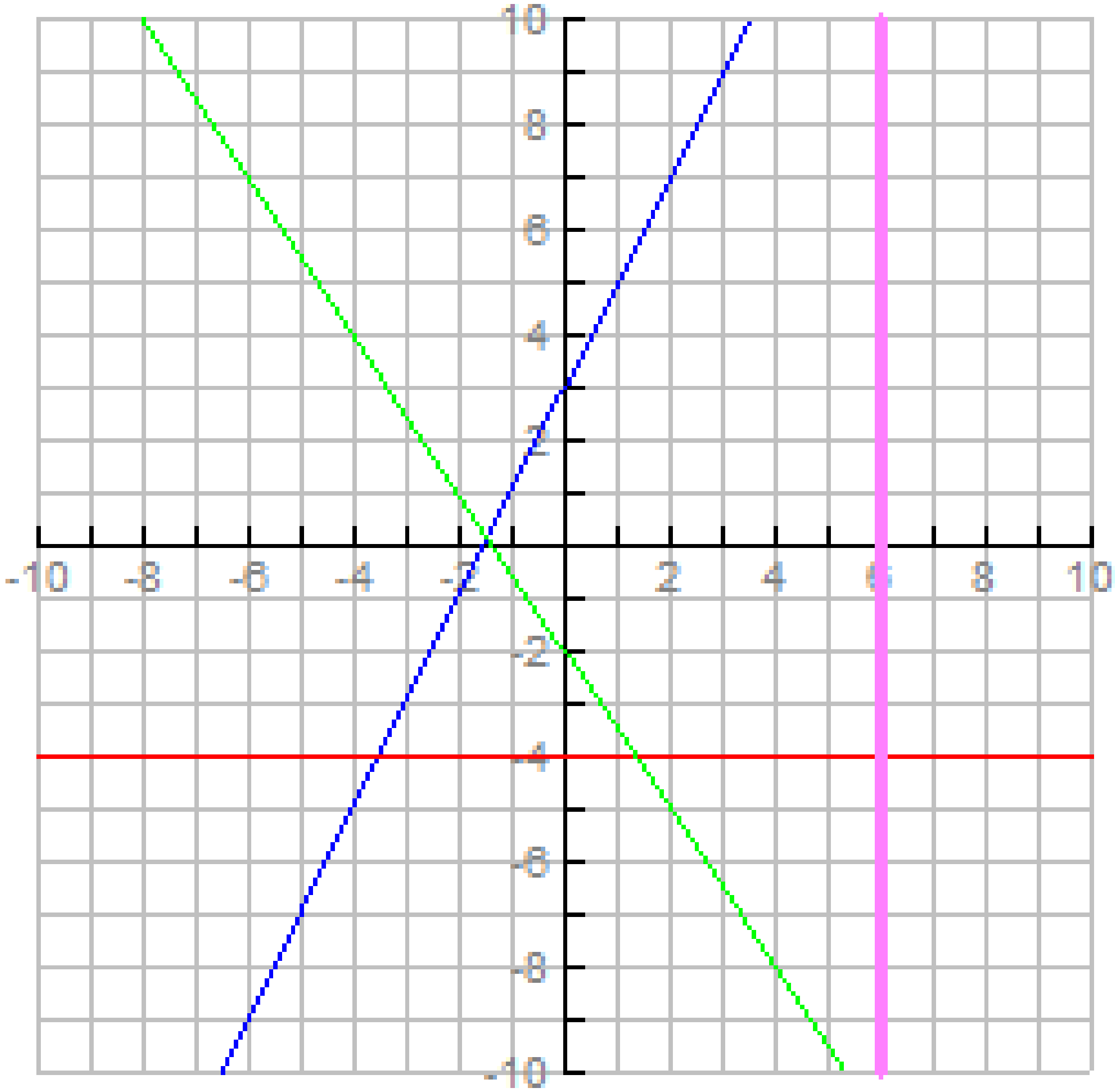
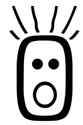
10

What happens if the slope of one is undefined and the slope of the other is zero?????





Geometry—Chapter 3-4

Proving Lines parallel

To show that two lines are parallel, you must show that one of the following statements is true.

Corres. $\measuredangle$ s are $\cong$

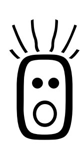
Alt int $\measuredangle$ s are $\cong$

Alt ext $\measuredangle$ s are $\cong$

Same-side int $\measuredangle$ s are supple

that lines are $\perp$ to the same line

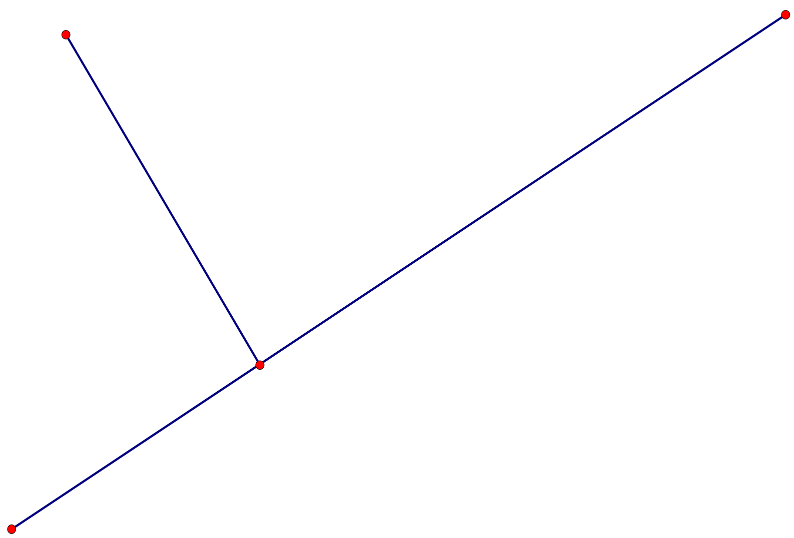
then lines are parallel



Geometry—Chapter 3-5

Parallels and Distance

The shortest segment from a point to a line is the perpendicular segment from the point to the line.



Now we want to find the distance from the point to a line or the distance from one line to another in a coordinate plane.

WOW!! Here comes the

Distance Formula

$$\text{Distance} = d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

where $(x_{1,} y_1)$ and $(x_{2,} y_2)$ are points on the graph. NOTE: The subscript is just that **SUB** not superscript which is an exponent.

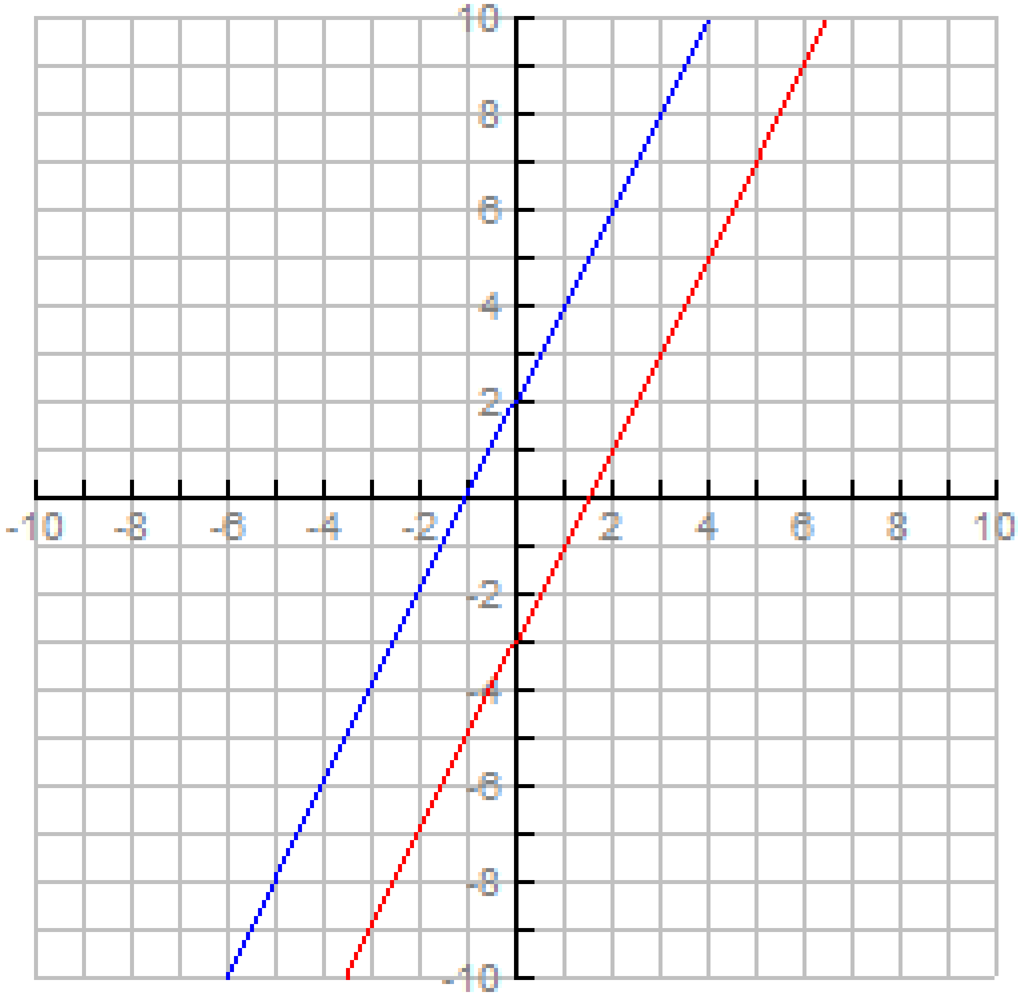
*The distance between two parallel lines is the distance between one of the lines and any point on the other line. Wait—the distance must be the *perpendicular* distance between the lines.

Ex: Find the distance between the parallel lines whose equations are:

$$y = 2x + 2$$

$$y = 2x - 3$$

Graph:



Now no matter what point you choose—parallel lines are always **equidistant** (always the same)

Remember the Distance Formula