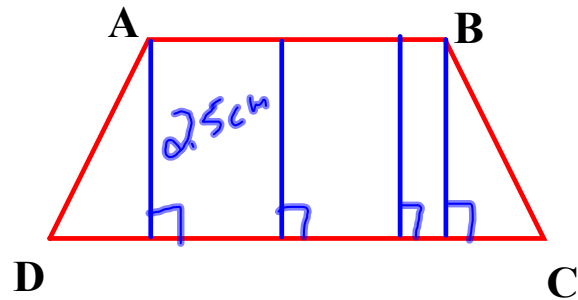
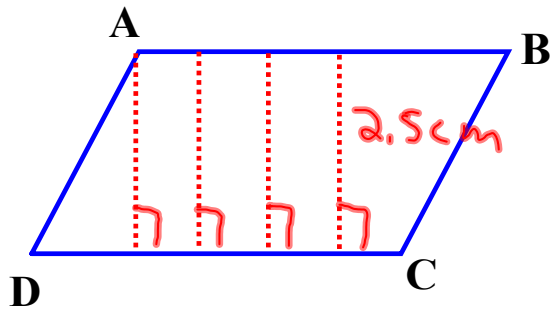
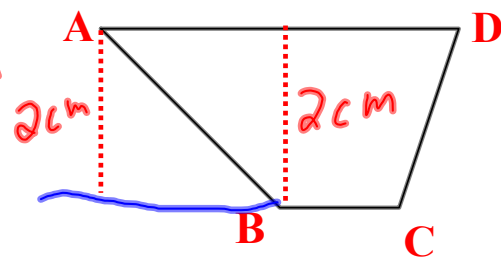
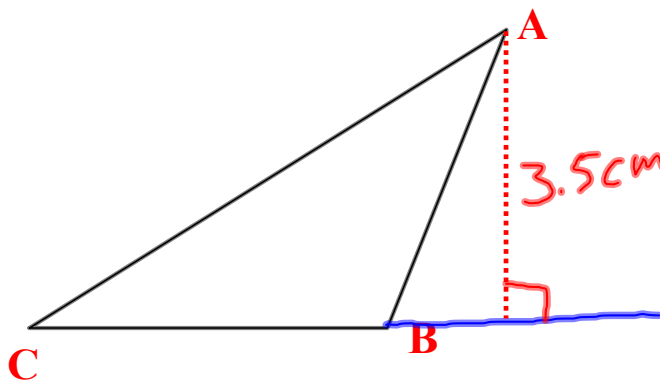


- 1) Draw a line that represents the distance from AB to BC.
- 2) Use a ruler to find the distance.
- 3) What is special about the line you drew?



- 1) Draw a line that represents the distance from point A to side BC.
- 2) Use a ruler to find the distance.
- 3) What is special about the line you drew?



Sec. 3.6 - Perpendiculars & Distance

The **distance** between a point & line or between two parallel lines is always the length of the **perpendicular line** that connects the two.

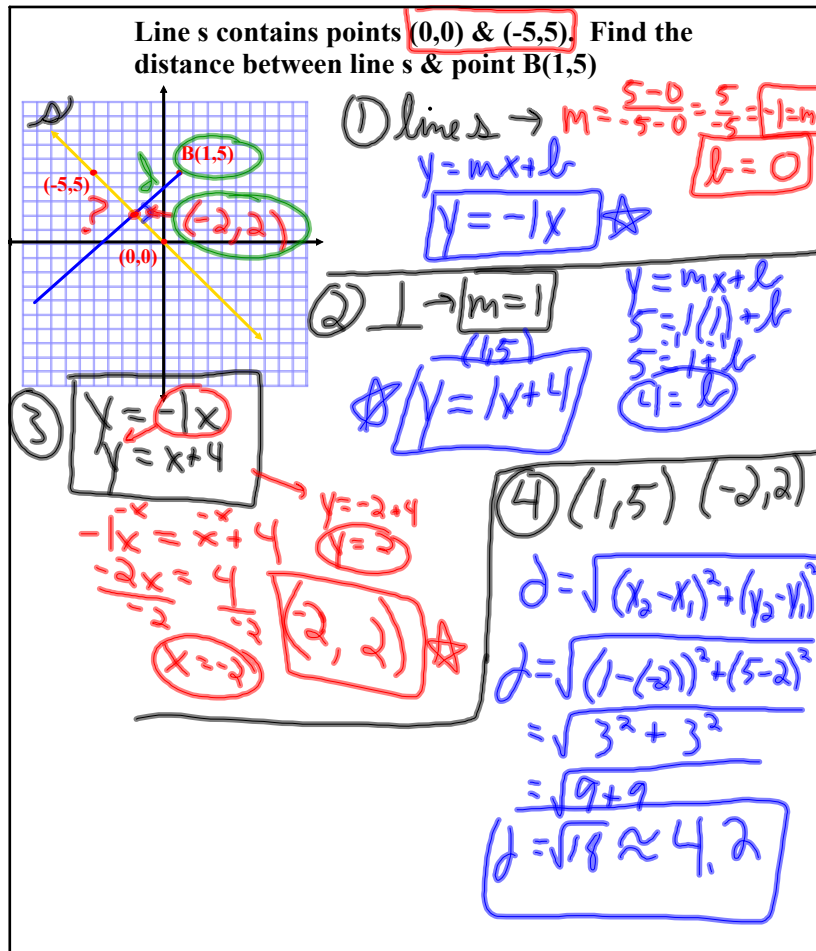


Distance from a Point to a Line on the Coordinate Plane

Steps:

- 1) Find the equation of the given line.
- 2) Write the equation of the line perpendicular to the given line & through the given point.
- 3) Solve the system of equations to determine the point of intersection of the two lines.
- 4) Use the Distance Formula to determine the distance between the given point & the point found in step 3.

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

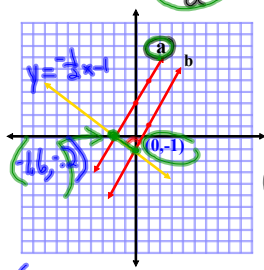


Distance between Parallel Lines

Steps:

- 1) Find the equation of the line perpendicular to the given lines. (Find the slope using the negative reciprocal of the given lines. Find a point using the y-intercept of one of the given lines.)
- 2) Use a system of equations to determine the point of intersection of the perpendicular line & the other line that the point from step 1 was not on.
- 3) Use the Distance Formula to determine the distance between the given point & the point found in step 3.

Find the distance between the parallel lines a & b with equations $y=2x+3$ & $y=2x-1$ respectively.



① $m = -\frac{1}{2}$
 $b = -1$
 $y = mx + b$
 $y = -\frac{1}{2}x - 1$

② $y = -\frac{1}{2}x - 1$
 $y = 2x + 3$

$$-\frac{1}{2}x - 1 = 2x + 3$$

$$-1 = 2\frac{1}{2}x + 3$$

$$-\frac{4}{2} = \frac{5}{2}x + \frac{6}{2}$$

$$-\frac{8}{2} = \frac{5}{2}x + \frac{6}{2}$$

$$-\frac{8}{2} - \frac{6}{2} = \frac{5}{2}x$$

$$-\frac{14}{2} = \frac{5}{2}x$$

$$-7 = \frac{5}{2}x$$

$$-7 \cdot \frac{2}{5} = \frac{5}{2}x \cdot \frac{2}{5}$$

$$-\frac{14}{5} = x$$

$$-1.6 = x$$

$(-1.6, -2)$
 $y = 2(-1.6) + 3$
 $y = -3.2 + 3$
 $y = -0.2$

③ $(-1.6, -2)(0, -1)$

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

$$= \sqrt{(-1.6 - 0)^2 + (-2 - (-1))^2}$$

$$= \sqrt{(-1.6)^2 + (-0.8)^2}$$

$$= \sqrt{2.56 + 0.64}$$

$$= \sqrt{3.2}$$

$$d \approx 1.8$$

Homework:

p.218, # 9-13 all, 15, 17, 22, 23,
27, 31, 33, 39, 41, 48-50 all, 52,
 53, 64