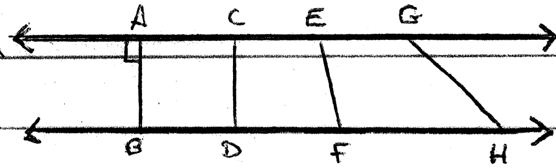
Geometry, Ch 03-6, Exer., pg 186 #1, 5-10, 13-17, 23, 24, 26, 27

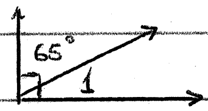
1. The length of which segment shown is call the DISTANCE between the two parallel lines?



$\overline{AB}$ is the distance between the two parallel lines because it is the only perpendicular segment.

Find $m\angle 1$.

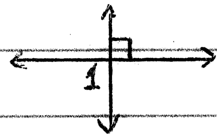
5.



$\angle 1 + 65° = 90°$

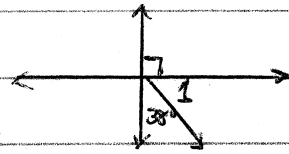
$\angle 1 = 25°$

6.



$\angle 1 = 90°$

7.

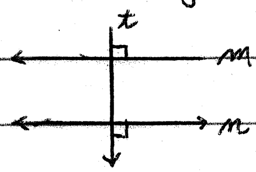


$\angle 1 + 38° = 90°$

$\angle 1 = 52°$

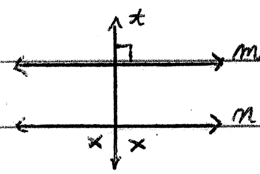
Explain how you would show that $m \parallel n$.

8.



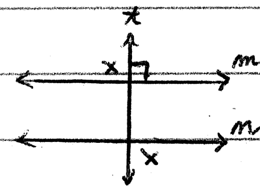
m and n are both perpendicular to the transversal $\therefore m \parallel n$

9



$x = x$; two congruent angles that form a linear pair. n must be $\perp$ to t. Since m and n are both perpendicular to the transversal, $m \parallel n$.

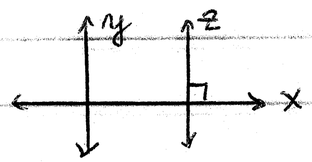
10.



The measure of x at line m must be 90°. By Alt Exterior Angles, the x at line n must also be 90. Since m and n are both perpendicular to the transversal, $m \parallel n$.

Explain why the statement about the figure is incorrect.

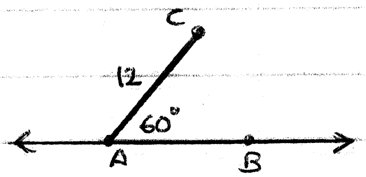
13.



"y and z are parallel."

Line y may *seem* perpendicular to x, and if so, would be parallel to line z. However, there is no info to confirm this.

14.



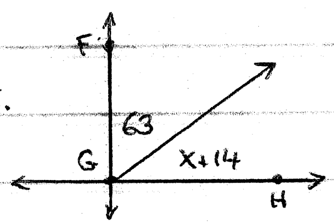
"The distance of point C to $\overleftrightarrow{AB}$ is 12."

Segment AC has a measure of 12. However this segment is not perpendicular to $\overleftrightarrow{AB}$, and thus not the distance.

ASK ABOUT: TRIGONOMETRY

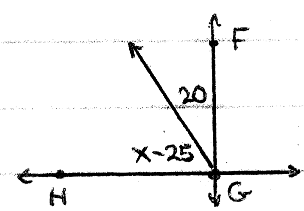
In the diagrams, $\overleftrightarrow{FG} \perp \overleftrightarrow{GH}$. Find the value of x.

15.



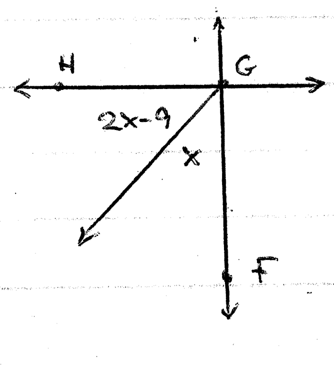
$$(x+14) + (63) = 90$$
$$x + 77 = 90$$
$$x = 13$$

16.



$$(x-25) + (20) = 90$$
$$x - 5 = 90$$
$$x = 95$$

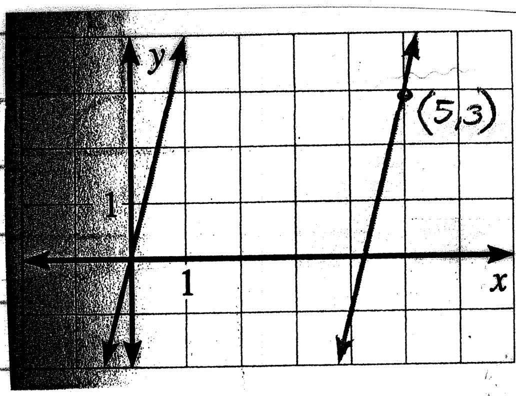
17.



$$(2x-9) + (x) = 90$$
$$3x - 9 = 90$$
$$3x = 99$$
$$x = 33$$

Use the Distance Formula to find the distance between the two parallel lines.

23.



① The line on the left has a slope of 4, and passes thru the origin [Thus, its y-intercept is zero]

Equation for line on the left:

$y = 4x + 0$

$y = 4x$

② Since they're parallel, the line on the right must have the same slope of 4. Use this slope and any point on the line to get its equation. The most accessable point is (5,3).

$y = mx + b$

$3 = 4(5) + b$

$3 = 20 + b$

$-17 = b$

Equation for line on the right: $y = 4x - 17$

③ Select a refence point on one of the lines [let's use (0,0) from the left line] and find equation of the perpendicular. Remember that the slope of the perp. is the negative reciprocal, and thus $-\frac{1}{4}$

$y = mx + b$

$0 = -\frac{1}{4}(0) + b$

$0 = 0 + b$

$0 = b$

Equation of perpendicular line through (0,0):

$y = -\frac{1}{4}x + 0$

$y = -\frac{1}{4}x$

④ Find the intersection of the left line's perpendicular with the equation for the right line:

Left Line Perp	=	Right Line
$-\frac{1}{4}x$	=	$4x - 17$
$-\frac{1}{4}x$	=	$\frac{16}{4}x - 17$
$-\frac{17}{4}x$	=	-17
x	=	4

$y = 4(4) - 17$

$y = 16 - 17$

$y = -1$

Int Point is $(4, -1)$

⑤ What is distance between original reference point $(0,0)$ and intersection point $(4,-1)$?

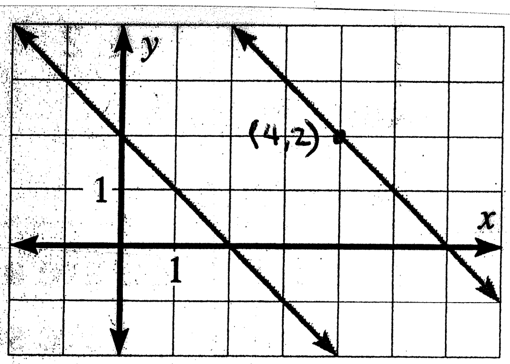
$$D = \sqrt{(4-0)^2 + (-1-0)^2}$$

$$D = \sqrt{(4)^2 + (-1)^2}$$

$$D = \sqrt{16+1}$$

$$D = \sqrt{17} \text{ or } 4.1$$

24.



① Equation on left:

slope $= -1$, y-intercept $= 2$

$y = -x + 2$

② Equation on right:

Slope $= -1$, through $(4,2)$

$y = mx + b$

$2 = -1(4) + b$

$6 = b$

$y = -x + 6$

③ Perp. from reference point. Use $(4,2)$ of right equation, although any point from either equation would work.

$$\left.\begin{array}{l}\text{If slope is } -1 \\ \perp \text{ slope is } +1 \\ \text{Using } (4,2)\end{array}\right\}$$

$y = mx + b$

$2 = 1(4) + b$

$-2 = b$ $\qquad y = x - 2$

④ Intersection point:

Left Line = Rt Line's Perp.

$-x + 2 = x - 2$

$4 = 2x$

$2 = x$

$y = -x + 2$

$y = -(2) + 2 = 0$

Int Point

$(2,0)$

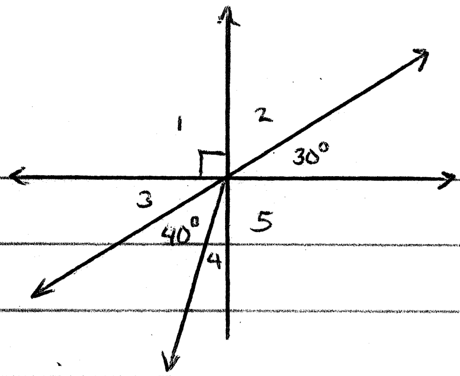
⑤ Distance between $(4,2)$ and $(2,0)$?

$D = \sqrt{(4-2)^2 + (2-0)^2}$

$D = \sqrt{(2)^2 + (2)^2} = \sqrt{4+4} = \sqrt{8}$

$D = 2\sqrt{2} = 2.8$

26. Find unknown angle measures in diagram at the right.



$\boxed{\angle 1 = 90°}$, right angle symbol.

$\angle 2$ and 30° form a linear pair with a 90° angle. Thus $\angle 2$ and 30° must be a total of 90° themselves.

$$\angle 2 + 30° = 90°$$

$$\boxed{\angle 2 = 60°}$$

$\angle 3$ is a vertical angle with 30°. Thus $\boxed{\angle 3 = 30°}$

$\angle 3$, 40°, and $\angle 4$ form a 90° angle.

$$\angle 3 + 40° + \angle 4 = 90°$$

$$30° + 40° + \angle 4 = 90°$$

$$70° + \angle 4 = 90°$$

$$\boxed{\angle 4 = 20°}$$

$\angle 5$ is a vertical angle with 90°. Thus $\boxed{\angle 5 = 90°}$

27. Find the distance between the lines with equations

$y = \frac{3}{2}x + 4$ and $-3x + 2y = -1$

$2y = 3x - 1$

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

* Note that since these lines have the same slope, they are parallel

Find a reference point to use on $y = \frac{3}{2}x + 4$.

Let's use $x = 0$: $y = \frac{3}{2}(0) + 4$

$y = 4$

Ref. Point $(0,4)$

Perp thru the ref. point: $\left.\begin{matrix} \perp m = -\frac{2}{3} \\ \text{point} = (0,4) \end{matrix}\right\}$

$y = mx + b$

$4 = -\frac{2}{3}(0) + b$

$4 = b$

$\therefore\ y = -\frac{2}{3}x + 4$

Intersection point:

Perp line = Other line

$6\left[-\frac{2}{3}x + 4\right] = 6\left[\frac{3}{2}x - \frac{1}{2}\right]$

$-4x + 24 = 9x - 3$

$27 = 13x$

$\frac{27}{13} = x$

$y = \frac{3}{2}\left(\frac{27}{13}\right) - \frac{1}{2} = 2.6$

Int Point = $(2.1, 2.6)$ Yikes!

Distance between reference point $(0,4)$ and Int Point $(2.1, 2.6)$

$D = \sqrt{(2.1-0)^2 + (2.6-4)^2}$

$D = \sqrt{(2.1)^2 + (-1.4)^2} = \sqrt{4.41 + 1.96} = \sqrt{6.37}$

$D = \sqrt{6.37} = 2.5$