Parallel and Perpendicular Lines Review

1. Solve for x in each picture. Then plug back in to find each angle measure.

a. *same-side interior → supplementary*

$13x + 6$ $13\cdot8+6 = \boxed{110°}$

$9x - 2$ $9\cdot8-2 = \boxed{70°}$
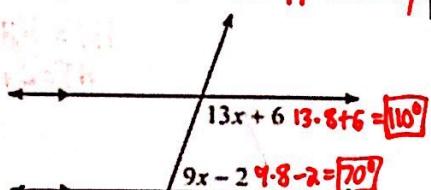
$(13x+6)+(9x-2)=180$

$22x+4=180 \rightarrow 22x=176 \rightarrow x=8$
$\quad -4 \quad -4$

b. *corresponding → congruent*

$75°$
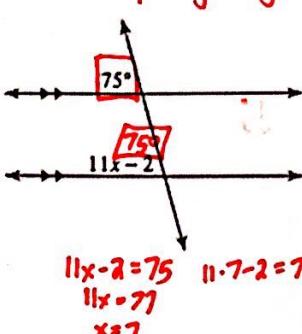
$11x - 2$

$11x-2=75$ $11\cdot7-2=75$
$11x=77$
$x=7$

c. *Alternate Interior → congruent*

$60°$

$60°$

$8x$

$8x-4=60°$ $8\cdot8-4=60°$
$8x=64$
$x=8$
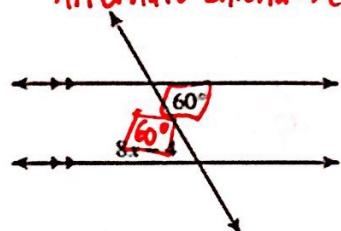
2. Tell whether each statement is true or false. Then write the converse of the following statements, and state whether the converse is true or false.

a. If an angle has a measure less than 90 degrees, then it is acute. → True

Converse: If an angle is acute, then it has a measure less than 90 degrees → Also true

b. If a figure has four right angles, then it is a square. → False (could be a rectangle)

Converse: If a figure is a square, then it has four right angles. (True)

3. What is the difference between the corresponding angles theorem and the converse of the corresponding angles theorem? Explain in your own words.

Corr. Angles Theorem: If 2 lines are parallel, then corresponding angles are congruent. (If ⫽, then ≅)

Converse: If corresponding angles are congruent, then the lines are parallel (If ≅, then ⫽)

4. Use the given information to show that c || d. State which converse you used.
Given: m∠1 = 2x°, m∠3 = (3x − 31)°, x = 31

→ should be ≅

$m∠1 = 2\cdot31 = \underline{62°}$
$m∠3 = 3\cdot31-31 = 93-31 = \underline{62°}$
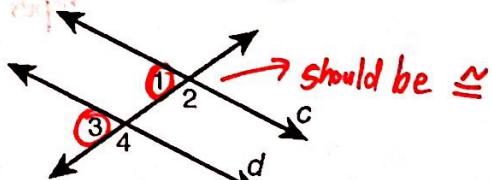
Since m∠1 = m∠3, c||d because of the corresponding angles converse.

5. Use the given information to show that j || k. State which converse you used
Given: m∠3 = 12x°, m∠5 = 18x°, x = 6

→ should add to 180°

$m∠3 = 12\cdot6 = \underline{72°}$ $72+108=180$ ✓
$m∠5 = 18\cdot6 = \underline{108°}$
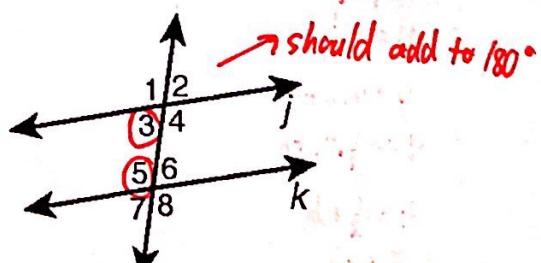
The angles are supplementary, so j||k because of the same-side interior angles converse.

6.

$RT = \underline{16}$

7.

$AB = \underline{5}$

8.

$3x + 1 = 5x - 3$
$1 = 2x - 3$
$4 = 2x$
$2 = x$

$HJ = 3(2) + 1$
$HJ = 6 + 1$

$HJ = \underline{7}$
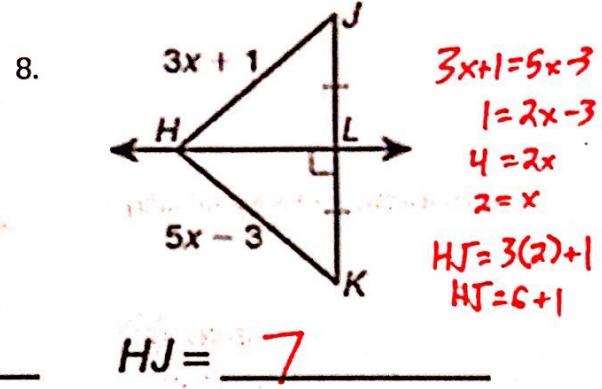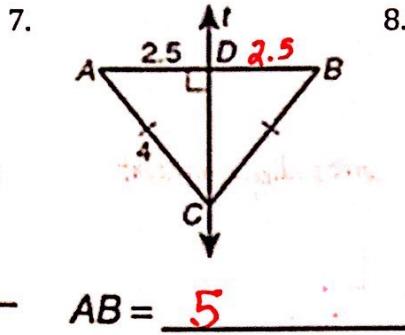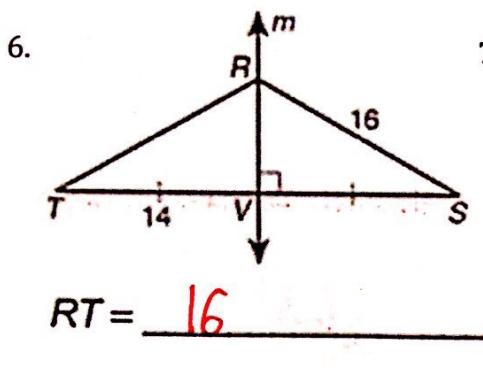
9. For each slope given, identify what slope the parallel and perpendicular line would have.

slope	parallel	perpendicular
$\frac{2}{5}$	$\frac{2}{5}$	$-\frac{5}{2}$
$-\frac{9}{8}$	$-\frac{9}{8}$	$\frac{8}{9}$
8	8	$-\frac{1}{8}$
1	1	-1
0	0	undefined
$\frac{1}{2}$	$\frac{1}{2}$	-2

Are the following lines parallel perpendicular or neither? How do you know?

10. $y = 2x + 10$, $y = -2x + 1$

Neither (not same or opposite reciprocal)

11. $y = 5$, $x = 2$

Perpendicular
($y = 5$ is horizontal, $x = 2$ is vertical)

12. $y = -4x + 1$, $y = \frac{1}{4}x + 2$

Perpendicular (opposite reciprocal slopes)

13. $y = 10x$, $y = 4 + 10x$

Parallel
(Same slope)

Write the equation of a line that is parallel AND a line that is perpendicular to a given line through the given point.

14. $y = 2x + 9$, $(-1, 4)$

Parallel

$m = 2$
$y = mx + b$
$4 = 2 \cdot -1 + b$
$4 = -2 + b$
$6 = b$

$\boxed{y = 2x + 6}$

Perp
$\overset{x \quad y}{}$

$m = -\frac{1}{2}$
$y = mx + b$
$4 = -\frac{1}{2} \cdot -1 + b$
$4 = \frac{1}{2} + b$
$3.5 = b$

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

15. $y = -\frac{1}{4}x - 5$, $(8, 2)$
$\overset{x \quad y}{}$

Parallel

$m = -\frac{1}{4}$
$y = mx + b$
$2 = -\frac{1}{4} \cdot 8 + b$
$2 = -2 + b$
$4 = b$

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

Perp

$m = 4$
$y = mx + b$
$2 = 4 \cdot 8 + b$
$2 = 32 + b$
$-30 = b$

$\boxed{y = 4x - 30}$