Worksheet #3 (Parallel Lines Cut by a Transversal)

Name: ________________ Date: ________________ Period: ________________

Use the figure at the right to answer problems 1–8.

Classify each pair of angles as one of the following:

(a) alternate interior angles  (b) corresponding angles
(c) alternate exterior angles  (d) vertical angles
(e) supplementary angles  (f) none

1. \( \angle{C} \) \& \( \angle{16} \)
2. \( \angle{E} \) \& \( \angle{11} \)
3. \( \angle{A} \) \& \( \angle{15} \)
4. \( \angle{D} \) \& \( \angle{15} \)
5. \( \angle{b} \) \& \( \angle{9} \) \& \( \angle{11} \)
6. \( \angle{f} \) \& \( \angle{9} \) \& \( \angle{15} \)
7. \( \angle{e} \) \& \( \angle{13} \) \& \( \angle{14} \)
8. \( \angle{a} \) \& \( \angle{14} \) \& \( \angle{11} \)

9. \( \angle{2} = 97^\circ \) \( \angle{6} = 83^\circ \)

\( \angle{3} = \frac{97^\circ}{2} \) \( \angle{5} = \frac{97^\circ}{2} = 48.5^\circ \)

\( \angle{2} \) \& \( \angle{10} \) are corresp.
\( \angle{3} \) \& \( \angle{10} \) are corresp.

\( \angle{9} = \frac{83^\circ}{2} \)

\( \angle{16} = \frac{97^\circ}{2} \)

Find the value of \( x \) given that \( s \parallel t \)

10. \( \angle{4} = 77^\circ \), \( \angle{8} = 4x + 57 \)

\( 77 = 4x + 57 \)

\( 20 = 4x \)

\( 5 = x \)

11. \( \angle{3} = 5x + 13 \), \( \angle{5} = 53^\circ \) Alternate interior angles

\( 5x + 13 = 53 \)

\( 5x = 40 \)

\( x = 8 \)

12. \( \angle{1} = 6x - 5 \), \( \angle{7} = 115^\circ \) Alternate exterior angles

\( 6x - 5 = 115 \)

\( 6x = 120 \)

\( x = 20 \)

Ex: \( \angle{15} \) \& \( \angle{14} \) are consecutive angles

\( \angle{9} \) \& \( \angle{14} \) are consecutive angles

\( \angle{10} \) \& \( \angle{13} \) are consecutive angles

Conclude on 10 \& 13 because they are not parallel lines.
Find the value of $x$ that makes $i \parallel k$.

13. Alternate interior

\[
\frac{3x + 10}{5x - 10} \quad j
\]

\[
3x + 10 = 5x - 10
\]

\[
20 = 2x
\]

\[
10 = x
\]

14. Vertical angles

\[
\frac{3x}{75} \quad k
\]

\[
3x = 75
\]

\[
x = 25
\]

Determine the missing angles.

15. Corresponding angles

\[
\frac{5x}{5x + 15} \quad l
\]

\[
5x + 15 = 6x
\]

\[
15 = x
\]

16. Alternate exterior

\[
\frac{6x}{4x - 20} \quad k
\]

\[
x + 10 = 4x - 20
\]

\[
30 = 3x
\]

\[
10 = x
\]

Determine the missing angles.

17. Adjacent

\[
\frac{55}{x}
\]

18. Complementary

\[
\frac{45}{y}
\]

19. Adjacent

\[
\frac{a}{67^\circ}
\]

20. Supplementary

\[
\frac{b}{122^\circ}
\]

\[
113^\circ
\]

\[
58^\circ
\]