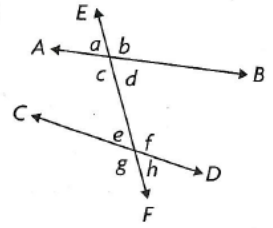
# Worksheet – Parallel Lines

1. Identify the transversal and corresponding angles in each diagram. Also identify the interior and exterior angles, if they exist.

a)




transversal: _____

corresponding angles:

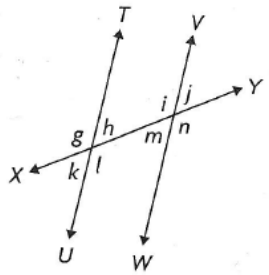
_____

_____

interior angles: _____

exterior angles: _____

b)




transversal: _____

corresponding angles:

_____

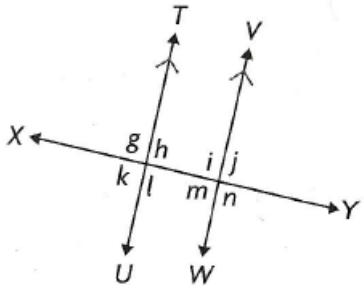
_____

interior angles: _____

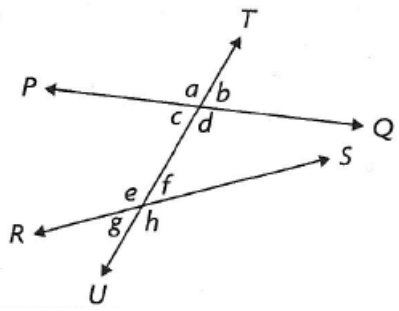
exterior angles: _____

2. In each diagram, are the corresponding angles equal? Explain how you know.

a)

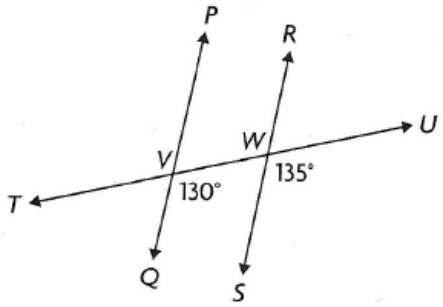



b)

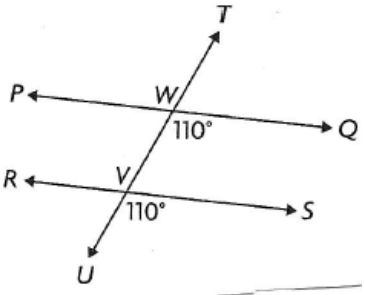



3. In each diagram, is $PQ$ parallel to $RS$? Explain how you know.

a)




b)




4. In which figure, or figures, are interior angles marked?

**A.** Figure I only

**B.** Figure II only

**C.** Figure I and Figure II

**D.** neither Figure I nor Figure II

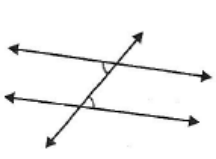


Figure I

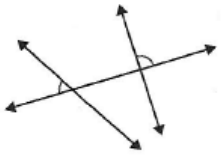
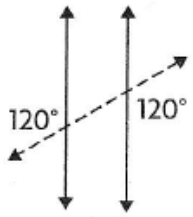


Figure II

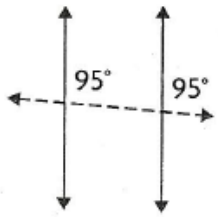
5. Joan made this conjecture: If a transversal intersects two or more lines, then those lines are parallel. Do you agree? Support your answer with a diagram and/or a counterexample.

6. How do you know that the solid lines in each diagram are parallel?

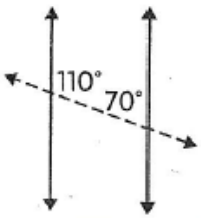
a)



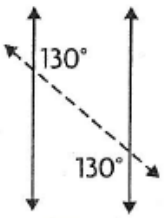

b)




c)

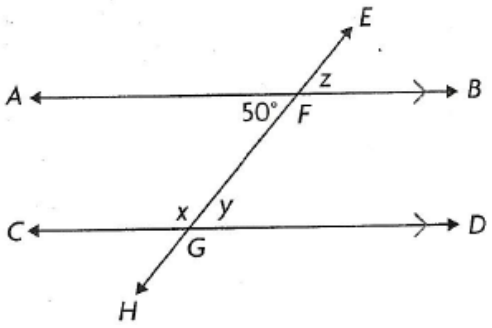



d)

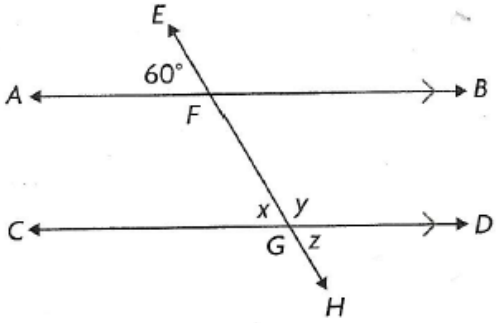



7. Determine the measures of angles $x$, $y$, and $z$. Give reasons.

a)

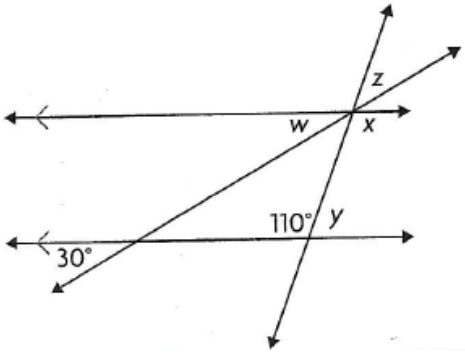



b)

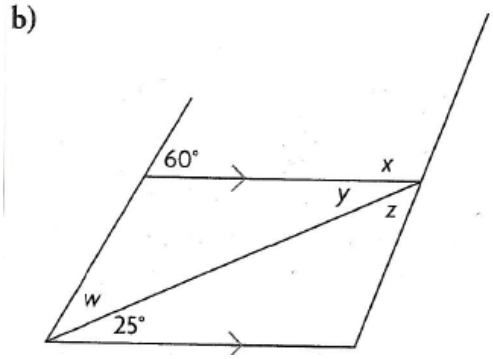



8. Determine the measures of angles $w$, $x$, $y$, and $z$.

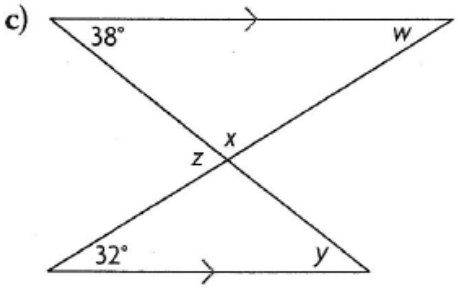
a)



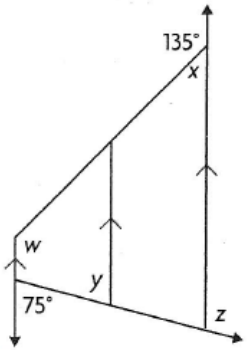

b)



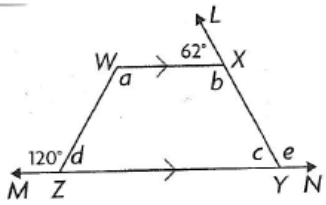

c)



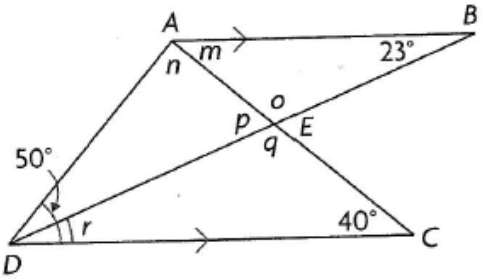

d)



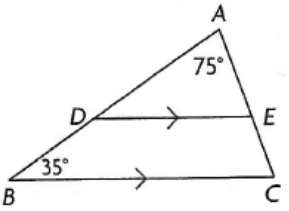

9. $WXYZ$ is a trapezoid. Determine the measures of angles $a$, $b$, $c$, $d$, and $e$.



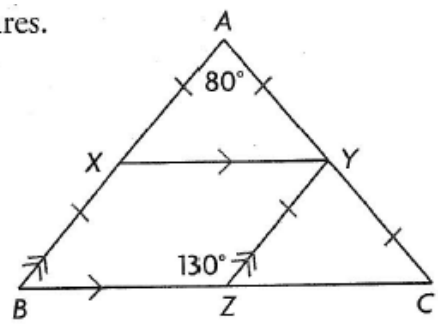
10. Determine the measures of all of the unknown angles in figure *ABCDE*.



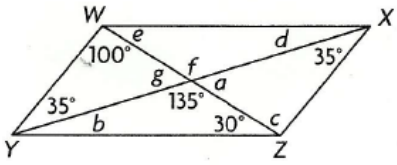

11. Lee made this design. He claims that triangles *ADE* and *ABC* are similar. Maria says they are not. Who is correct and why?




12. Label the diagram with the missing angle measures.



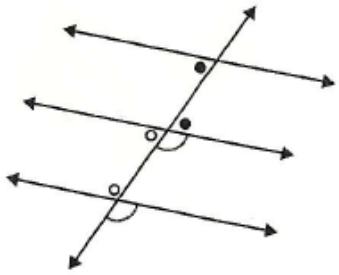

13. Terence is creating a stained-glass panel. He will use coloured triangles to form the panel. He assembled this quadrilateral. Is it a parallelogram? Explain how you know.



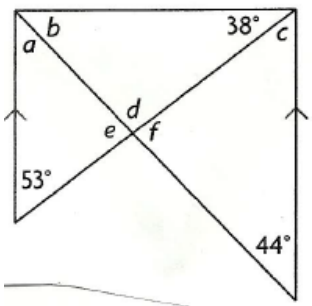

Note: There is a mistake in the "proof" that this is a parallelogram (see answer section). Can you find the mistake?

14. Which angles does the diagram show? Choose the best answer.

**A.** alternate interior angles
**C.** interior angles
**B.** corresponding angles
**D.** all of these choices



15. Determine the measure of $\angle d$.



## Answers:

1. a) transversal: $EF$; corresponding angles: $b$ and $f$, $d$ and $h$, $a$ and $e$, $c$ and $g$
interior angles: $c, d, e, f$
exterior angles: $a, b, g, h$

b) transversal: $XY$
corresponding angles: $g$ and $i$, $h$ and $j$, $k$ and $m$, $l$ and $n$
interior angles: $h, i, l, m$
exterior angles: g, k, j, n

2. a) Yes; $TU$ and $VW$ are parallel. b) No; $PQ$ is not parallel to $RS$.
3. a) No; $\angle QVW \neq \angle SWU$ (corresponding angles)
b) Yes; $\angle$UWQ $= \angle$UVS (corresponding angles)
4. A.
5. e.g., No; a transversal can intersect two non-parallel lines.

6. a) alternate exterior angles equal

b) corresponding angles are equal

c) supplementary interior angles
d) alternate interior angles equal

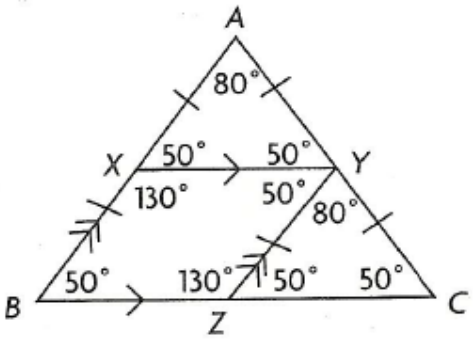
7. a) $\angle x = 130°$; interior angles supplementary between parallel lines
$\angle y = 50°$; alternate interior angles equal between parallel lines
$\angle z = 50°$; vertically opposite angles equal
b) $\angle x = 60°$; corresponding angles equal between parallel lines
$\angle y = 120°$; supplementary angles
$\angle z = 60°$; alternate exterior angles equal between parallel lines

8. a) $\angle w = 30°, \angle x = 110°, \angle y = 70°, \angle z = 40°$

b) $\angle$ w = 35°, $\angle$ y = 25°, not enough information to determine $\angle$ x and $\angle$ z

c) $\angle w = 32°, \angle x = 110°, \angle y = 38°, \angle z = 70°$
d) $\angle w = 135°, \angle x = 45°, \angle y = 75°, \angle z = 105°$

9. $\angle a = 120°, \angle b = 118°, \angle c = 62°, \angle d = 60°, \angle e = 118°$
10. $\angle m = 40°, \angle n = 90°, \angle o = 117°, \angle p = 63°, \angle q = 117°, \angle r = 23°$
11. $\triangle ADE$ is similar to $\triangle ABC$. Lee is correct. e.g., Corresponding angles a equal.
12.




13. Yes.
$\angle f = 135°$ Vertically opposite angles are equal.
$\angle g = 45°$ $\angle g$ and $\angle f$ are supplementary.
$\angle a = 45°$ angle vertically opposite $\angle g$
$\angle c = 100°$ The sum of interior angles in a triangle is 180°.
$\angle b = 15°$ The sum of interior angles in a triangle is 180°.
$\angle d = 15°$ $\angle b$ and $\angle d$ are alternate interior angles.
$30° + \angle c + 35° + \angle d = 30° + 100° + 35° + 15° = 180°$
Therefore, $WY \parallel XZ$.
$35° + \angle b + 30° + \angle c = 35° + 15° + 30° + 100° = 180°$
Therefore, $WX \parallel YZ$.
14. D.
15.
$\angle a = 44°$ alternate interior angles
$\angle a + \angle e + 53° = 180°$ sum of interior angles in a triangle
$\angle e = 83°$
$\angle e + \angle d = 180°$ supplementary angles
$\angle d = 97°$