

Parallel line angle rules

Identify angle relationships and solve for unknowns using parallel line properties.



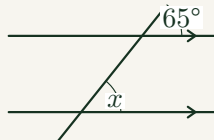
Name _____

Date _____

How to answer

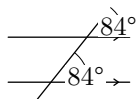
Read each diagram carefully. Identify which angle rule applies (corresponding, alternate, or co-interior). Show working for calculations. Explain your reasoning when asked.

Worked example Two parallel lines are cut by a transversal. One angle is 65° . Find the corresponding angle.

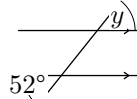


Corresponding angles are equal when lines are parallel. The marked 65° angle and x sit in the same position at each crossing, so they are corresponding angles. Therefore $x = 65^\circ$.

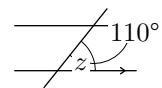
1. Name the angle relationship between the marked angles.



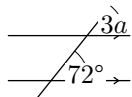
2. Name the angle relationship and find y .



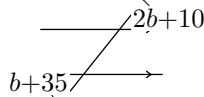
3. These angles are co-interior. Find z .



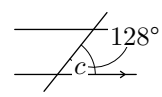
4. Find a . (Corresponding angles)



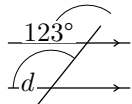
5. Find b . (Alternate angles)



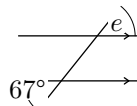
6. Find c . (Co-interior angles)



7. Name the rule. Then find d .



8. Find e . Explain which rule you used.



9. Two alternate angles are $(2f + 5)^\circ$ and $(3f - 30)^\circ$. Find f and both angles.

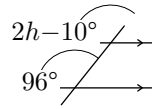
10. Complete: when lines are parallel, corresponding angles are _____.

11. Complete: when lines are parallel, alternate angles are _____.

12. Complete: when lines are parallel, co-interior angles _____ to 180° .

13. Two co-interior angles are $(4g + 8)^\circ$ and $(2g + 22)^\circ$. Find g and both angles.

14. Find h . Then name the angle relationship.



15. The acute angle is 41° . List all eight angle sizes at the two intersections.

16. One angle is $(5x - 20)^\circ$ and its corresponding angle is $(3x + 10)^\circ$. Find x .

17. Two alternate angles are $(6y + 5)^\circ$ and $(8y - 25)^\circ$. Find y and both angles.

18. Angles $(3z)^\circ$ and $(z + 60)^\circ$ are co-interior. Find z and explain why they must sum to 180° .

19. Given one angle is 38° , write three different facts about the other angles formed.

20. A pair of corresponding angles is 124° and 124° . What does this tell you about the lines? Explain.

21. A pair of co-interior angles is 97° and 83° . Are the lines parallel? Explain your reasoning.

22. A student says co-interior angles are equal. Correct this statement in one sentence.

23. Find m and both angles if they are alternate angles: $(7m - 13)^\circ$ and $(4m + 20)^\circ$.

24. Two angles on the same side of the transversal add to 180° . What is their relationship called?

25. Explain the difference between corresponding angles and alternate angles using the words *position* and *equal*.

26. One angle is 72° . Find all four acute angles and all four obtuse angles formed at the two intersections.

27. Write your own parallel line problem with one unknown and solve it.
