Parallel Lines and Transversals

Name: _____	Date: _____	Score: _____ / 24

Quick Review

When a **transversal** (a line) crosses two **parallel lines**, it creates eight angles with neat relationships. **Corresponding angles** (same position at each crossing) are *equal*. **Alternate interior angles** (between the lines, opposite sides of the transversal) are *equal*. **Alternate exterior angles** (outside the lines, opposite sides) are *equal*. **Co-interior angles** (between the lines, same side) are *supplementary* — they add to $180°$. Once you know one angle, you can find all the others.

◇ **Example:** Two parallel lines are cut by a transversal. One angle measures $70°$. Find its co-interior (same-side interior) angle.

⇒ Co-interior angles sit between the two parallel lines, on the *same side* of the transversal. The rule is that they are *supplementary* — they add up to $180°$. So if one is $70°$, the other must be $180° - 70° = 110°$. Check: $70 + 110 = 180$. That's the straight line they form together.

Answer: $110°$

PRACTICE

Find the requested angle. Lines are parallel, cut by a transversal.

1. Corresponding angle to $50°$ _____
2. Corresponding angle to $125°$ _____
3. Alternate interior angle to $65°$ _____
4. Alternate interior angle to $140°$ _____
5. Alternate exterior angle to $38°$ _____
6. Alternate exterior angle to $152°$ _____
7. Co-interior angle to $80°$ _____
8. Co-interior angle to $110°$ _____
9. Co-interior angle to $90°$ _____
10. Vertical angle to $47°$ _____
11. Linear pair with $115°$ _____
12. Corresponding angle: $3x$ equals $75°$. Find x. _____
13. Alternate interior: $2x$ equals $100°$. Find x. _____
14. Co-interior: x and $4x$. Find x. _____
15. Co-interior: x and $x + 60$. Find x. _____
16. Corresponding: $x + 10$ equals $85°$. Find x. _____
17. Alternate exterior: $5x$ equals $145°$. Find x. _____
18. Two angles, one $130°$, on a line. Other? _____
19. Co-interior: $2x$ and $3x$. Find x. _____
20. Corresponding angles equal? (parallel lines) _____

♦ Word Problems

21. A straight crosswalk cuts across two parallel street curbs. It makes a $68°$ angle with the first curb. What is the corresponding angle it makes with the second curb? _____

22. Two parallel shelves are joined by a diagonal brace. The brace makes a $115°$ co-interior angle on the top shelf. What is the co-interior angle it makes on the bottom shelf? _____

23. A transversal crosses two parallel lines. One alternate interior angle is labeled $4x$ and the other is $96°$. Solve for x. _____

24. A road sign post crosses two parallel guide wires. The co-interior angles it forms are $2x$ and $7x$. Find x and both angle measures. _____

Answer Keys

1. 50°
2. 125°
3. 65°
4. 140°
5. 38°
6. 152°
7. 100°
8. 70°
9. 90°
10. 47°
11. 65°
12. 25°
13. 50°
14. 36°
15. 60°
16. 75°
17. 29°
18. 50°
19. 36°
20. yes
21. 68°
22. 65°
23. $x = 24^\circ$
24. $x = 20^\circ$; angles are 40° and 140°

Step-by-Step Explanations

1. Corresponding angles are equal.
2. Corresponding angles are equal.
3. Alternate interior angles are equal.
4. Alternate interior angles are equal.
5. Alternate exterior angles are equal.
6. Alternate exterior angles are equal.
7. Co-interior angles are supplementary: $180 - 80 = 100^\circ$.
8. $180 - 110 = 70^\circ$.
9. $180 - 90 = 90^\circ$.
10. Vertical angles are equal.
11. A linear pair is supplementary: $180 - 115 = 65^\circ$.
12. $3x = 75$, so $x = 25^\circ$.
13. $2x = 100$, so $x = 50^\circ$.
14. $x + 4x = 5x = 180$, so $x = 36^\circ$.
15. $x + x + 60 = 180$, so $2x = 120$ and $x = 60^\circ$.
16. $x + 10 = 85$, so $x = 75^\circ$.
17. $5x = 145$, so $x = 29^\circ$.
18. Angles on a line are supplementary: $180 - 130 = 50^\circ$.
19. $2x + 3x = 5x = 180$, so $x = 36^\circ$.
20. Yes — corresponding angles are always equal between parallel lines.
21. Corresponding angles between parallel lines are equal, so the angle is also 68°.
22. Co-interior angles are supplementary, so the angle is $180 - 115 = 65^\circ$.
23. Alternate interior angles are equal, so $4x = 96$, giving $x = 24^\circ$.
24. Co-interior angles add to 180°: $2x + 7x = 9x = 180$, so $x = 20^\circ$. The angles are $2(20) = 40^\circ$ and $7(20) = 140^\circ$.

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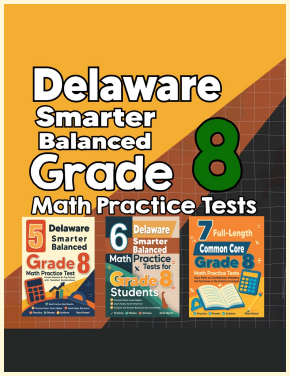

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