Year 8 angles on parallel lines worksheet

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Name: _____ Date: _____

Question 1

Two parallel lines are cut by a transversal, forming eight angles. One of the angles is 72°. Find the sizes of all eight angles.

Answer: _____

Question 2

Two angles are co-interior angles between a pair of parallel lines. One of them is 64°. Find the other.

Answer: _____

Question 3

A transversal crosses two parallel lines. Two alternate angles measure (3x + 10)° and (5x - 30)°. Find x and the size of each angle.

Answer: _____

Question 4

A transversal crosses two lines. Two corresponding angles measure 85° and 87°. Are the two lines parallel? Explain.

Answer: _____

Question 5

Lines AB and CD are parallel. A transversal crosses AB at P and CD at Q. Angles BPQ and PQD both lie between the parallel lines, on the same side of the transversal. angle BPQ = (2x + 15)° and angle PQD = (x + 30)°.

(a) What type of angle pair are angle BPQ and angle PQD?

(b) Find x.

(c) Find the size of each angle.

Answer: _____

Question 6

Two parallel lines are cut by a transversal. A pair of corresponding angles measure (2x + 14)° and 76°. Find x.

Answer: _____

Question 7

Two parallel lines are cut by a transversal. A pair of co-interior angles measure 3x° and (x + 40)°. Find x.

Answer: _____

Question 8

Two angles are co-interior angles between a pair of parallel lines. One of them is 47°. Find the other angle.

Answer: _____

Question 9

A transversal crosses two parallel lines. A pair of alternate angles measure (5x - 20)° and (3x + 16)°. Find x.

Answer: _____

Question 10

A straight road crosses two parallel railway lines. One of the angles between the road and the first railway line is 112°.

(a) Find the size of the angle that is co-interior with the 112° angle.

(b) Find the size of the angle that corresponds to the 112° angle at the second railway line.

(c) Find the size of the angle that is alternate to the co-interior angle in (a).

Answer: _____

Year 8 angles on parallel lines: answers and worked solutions

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Question 1

Key idea: With parallel lines, corresponding, alternate and vertically opposite angles are equal, and angles on a straight line add to 180°.

1. At each crossing point, the angle vertically opposite the 72° angle is 72° and the other two angles are 180° - 72° = 108° 2. The lines are parallel, so the corresponding angles at the other crossing point are the same: two of 72° and two of 108° 3. Altogether four angles are 72° and four are 108°

Answer: Four angles are 72° and four angles are 108°

Question 2

Key idea: Co-interior angles between parallel lines are supplementary (add to 180°).

1. 180° - 64° = 116°

Answer: 116°

Question 3

Key idea: Alternate angles between parallel lines are equal.

1. 5x - 30 = 3x + 10 2. 2x = 40, so x = 20 3. 3 × 20 + 10 = 70 and 5 × 20 - 30 = 70

Answer: x = 20; each angle is 70°

Question 4

Key idea: Two lines cut by a transversal are parallel exactly when corresponding angles are equal.

1. For parallel lines, corresponding angles must be equal 2. 85° ≠ 87°, so the lines are not parallel

Answer: No, the lines are not parallel, because the corresponding angles are not equal

Question 5

Key idea: Co-interior angles lie between the parallel lines on the same side of the transversal and add to 180°.

1. (a) They are between the parallel lines and on the same side of the transversal, so they are co-interior 2. (b) $(2x + 15) + (x + 30) = 180$ 3. (b) $3x + 45 = 180$, so $3x = 135$ and $x = 45$ 4. (c) angle BPQ $= 2 \times 45 + 15 = 105°$ and angle PQD $= 45 + 30 = 75°$ 5. Check: $105 + 75 = 180$ ✓

Answer: (a) Co-interior angles (b) $x = 45$ (c) angle BPQ $= 105°$, angle PQD $= 75°$

Question 6

Key idea: Corresponding angles on parallel lines are equal.

1. $2x + 14 = 76$ 2. $2x = 62$ 3. $x = 31$

Answer: $x = 31$

Question 7

Key idea: Co-interior angles on parallel lines add to 180°.

1. $3x + x + 40 = 180$ 2. $4x = 140$ 3. $x = 35$

Answer: $x = 35$

Question 8

Key idea: Co-interior angles on parallel lines add to 180°.

1. $180° - 47° = 133°$

Answer: 133°

Question 9

Key idea: Alternate angles on parallel lines are equal.

1. $5x - 20 = 3x + 16$ 2. $2x = 36$ 3. $x = 18$

Answer: $x = 18$

Question 10

Key idea: Use the angle relationships for parallel lines: co-interior angles add to 180°, corresponding and alternate angles are equal.

1. Co-interior: $180° - 112° = 68°$ 2. Corresponding angles are equal: 112° 3. Alternate angles are equal, so the angle alternate to the 68° angle is also 68°

Answer: (a) 68° (b) 112° (c) 68°