Year 7 angles on parallel lines worksheet

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Name: _____ Date: _____

Question 1

Two parallel lines are crossed by a transversal. One co-interior angle is 74°. Find the other co-interior angle, giving a reason.

Answer: _____

Question 2

Two horizontal lines AB and CD are parallel, with AB above CD, and A and C on the left. A transversal EF crosses AB at G and CD at H, with E above line AB and F below line CD. angle AGH = 72°. Find angle DHF, giving reasons.

Answer: _____

Question 3

Two parallel lines are cut by a transversal. One co-interior angle is 63°. Find the other co-interior angle, in degrees.

Answer: _____

Question 4

Two horizontal lines AB and CD are parallel, with AB above CD, and A and C on the left. A transversal EF crosses AB at G and CD at H, with E above line AB and F below line CD. angle EGB = 115°. Find angle CHG, giving reasons.

Answer: _____

Question 5

Two parallel lines are crossed by a transversal. One corresponding angle is (3x + 15)° and the other corresponding angle is 60°. Find the value of x.

Answer: _____

Question 6

Two horizontal lines are parallel. Point B is on the upper line and point A is on the upper line to the right of B. Point D is on the lower line and point C is on the lower line to the right of D. Point P lies between the two lines, to the right of both B and D. Intervals BP and DP are drawn. If angle ABP = 40° and angle CDP = 55°, find angle BPD.

Answer: _____

Question 7

Two parallel lines are crossed by a transversal. Fill in the gaps.

(a) Corresponding angles are _____.

(b) Alternate angles are _____.

(c) Co-interior angles add up to _____.

Answer: _____

Question 8

Two horizontal lines AB and CD are parallel, with AB above CD, A to the left of B and C to the left of D. Point P is on AB. Points Q and R are on CD, with Q to the left of R. Intervals PQ and PR are drawn, forming triangle PQR. angle APQ = 58° and angle BPR = 47°.

(a) Find angle PQR, giving a reason.

(b) Find angle PRQ, giving a reason.

(c) Find angle QPR, giving a reason.

Answer: _____

Question 9

Two parallel lines are crossed by a transversal. One of a pair of co-interior angles is 70°. Find the other angle.

Answer: _____

Question 10

Lines AB and CD are parallel, with AB above CD. Both run from left to right (A and C on the left). Point P is on AB and point Q is on CD. Point X lies between the two lines, to the right of P and Q. Intervals PX and XQ are drawn.

angle BPX = 35° and angle DQX = 50°. Find angle PXQ. (Hint: draw a line through X parallel to AB.)

Answer: _____

Year 7 angles on parallel lines: answers and worked solutions

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Question 1

Key idea: Co-interior angles (also called C-angles) are between the parallel lines on the same side of the transversal, and they add to 180°.

1. Write the co-interior angle relationship: 74° + x = 180° 2. Solve for x: x = 180° - 74° = 106° 3. State the reason: co-interior angles on parallel lines are supplementary.

Answer: The other co-interior angle is 106°.

Question 2

Key idea: Co-interior angles on parallel lines add to 180°, and vertically opposite angles are equal.

1. angle AGH and angle GHC are co-interior (both between the parallel lines, on the left of the transversal), so angle GHC = 180° - 72° = 108° 2. angle DHF is vertically opposite angle GHC, so angle DHF = 108°

Answer: angle DHF = 108°

Question 3

Key idea: Co-interior angles (C-shape) between parallel lines are supplementary, meaning they add to 180°.

1. Write the co-interior angle relationship: $\text{angle}_1 + \text{angle}_2 = 180°$ 2. Substitute the known angle: $63° + \text{angle}_2 = 180°$ 3. Solve for the unknown angle: $\text{angle}_2 = 180° - 63°$ 4. Calculate: $\text{angle}_2 = 117°$ 5. Check: $63° + 117° = 180°$ ✓

Answer: 117°

Question 4

Key idea: Corresponding angles on parallel lines are equal, and angles on a straight line add to 180°.

1. angle EGB is above line AB on the right of the transversal; angle GHD is above line CD on the right. They are corresponding, so angle GHD = 115° 2. angle CHG and angle GHD are adjacent angles on the straight line CD, so angle CHG = 180° - 115° = 65°

Answer: angle CHG = 65°

Question 5

Key idea: Corresponding angles on parallel lines are equal.

1. Set the two expressions equal: 3x + 15 = 60 2. Subtract 15 from both sides: 3x = 45 3. Divide both sides by 3: x = 15 4. Check: 3(15) + 15 = 45 + 15 = 60° ✓

Question 6

Key idea: Draw an extra line through P parallel to the two given lines; this splits angle BPD into two alternate angles.

1. Draw a line through P parallel to both lines, with point Q on it to the right of P 2. angle BPQ = angle ABP = 40° (alternate angles, upper line parallel to PQ) 3. angle DPQ = angle CDP = 55° (alternate angles, lower line parallel to PQ) 4. angle BPD = 40° + 55° = 95°

Answer: angle BPD = 95°

Question 7

Answer: (a) equal (b) equal (c) 180°

Question 8

Key idea: Alternate angles on parallel lines are equal, and angles on a straight line add to 180°.

1. (a) angle PQR and angle APQ are alternate angles on parallel lines (transversal PQ), so angle PQR = 58° 2. (b) angle PRQ and angle BPR are alternate angles on parallel lines (transversal PR), so angle PRQ = 47° 3. (c) angle APQ, angle QPR and angle BPR together form the straight angle at P on line AB 4. (c) angle QPR = 180° - 58° - 47° = 75° 5. Check: the triangle's angles are 58° + 47° + 75° = 180° ✓

Answer: (a) 58° (b) 47° (c) 75°

Question 9

Answer: 110°

Question 10

Key idea: A line through X parallel to AB splits angle PXQ into two parts, each equal to an alternate angle.

1. The top part of angle PXQ is alternate to angle BPX, so it is 35°. 2. The bottom part is alternate to angle DQX, so it is 50°. 3. angle PXQ = 35° + 50° = 85°

Answer: 85°