

Grade 8 · Angles, Parallel Lines and Triangles · Worksheet Answer Key

Common Core 8.G.A.5 · mathovore.fr

Every problem has a full worked solution that names the angle relationship, writes the equation and checks the result, with the final answer in bold. Compare each step with your own work and redraw any figure you missed.

Grade 8 Common Core: 8.G.A.5

Problem 1: Find the third angle

The angles sum to 180° : $180 - 48 - 67 = 65$.

65°

Problem 2: Right triangle angles

The right angle is 90° , so $180 - 90 - 35 = 55$.

55°

Problem 3: Isosceles triangle

The base angles are equal and share $180 - 40 = 140$ degrees, so each is $140 \div 2 = 70$.

Each base angle is 70° .

Problem 4: Angles in a ratio

Add and set equal to 180: $x + 2x + 3x = 6x = 180$, so $x = 30$.

$30^\circ, 60^\circ, 90^\circ$

Problem 5: Exterior angle

An exterior angle equals the sum of the two remote interior angles: $x = 50 + 65 = 115$.

Check: the interior angle at B is $180 - 50 - 65 = 65$, and $65 + 115 = 180$.

$x = 115^\circ$

Problem 6: Missing remote angle

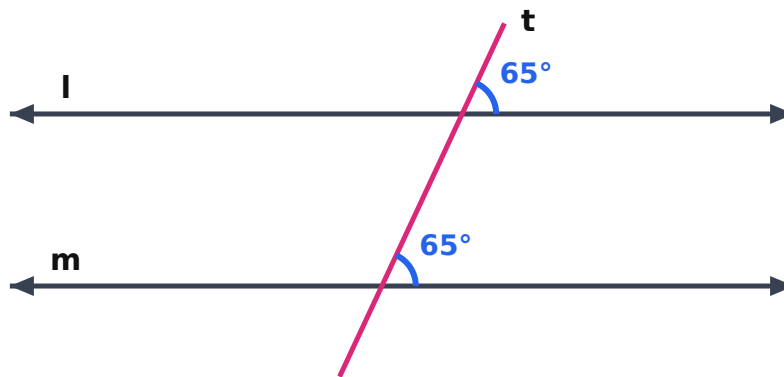
The exterior angle is the sum of the remote angles: $130 = 80 + y$, so $y = 50$.

$$50^\circ$$

Problem 7: Corresponding angles

The marked angles are in the same position at each intersection, so they are corresponding angles. Parallel lines make them equal.

$$x = 65^\circ$$

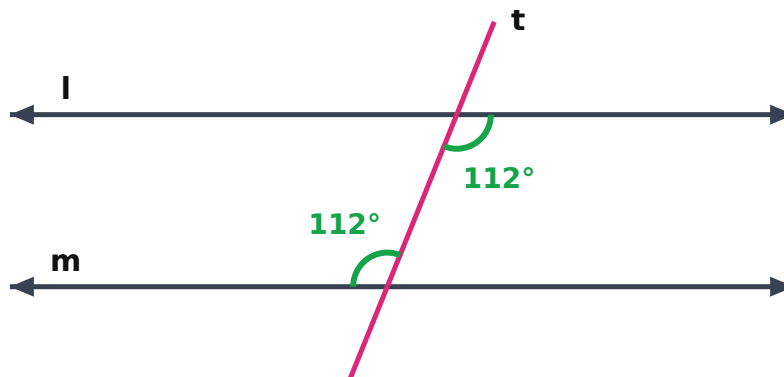


Corresponding angles are equal.

Problem 8: Alternate interior angles

The marked angles lie between the lines on opposite sides of the transversal: alternate interior angles. They are equal.

$$x = 112^\circ$$



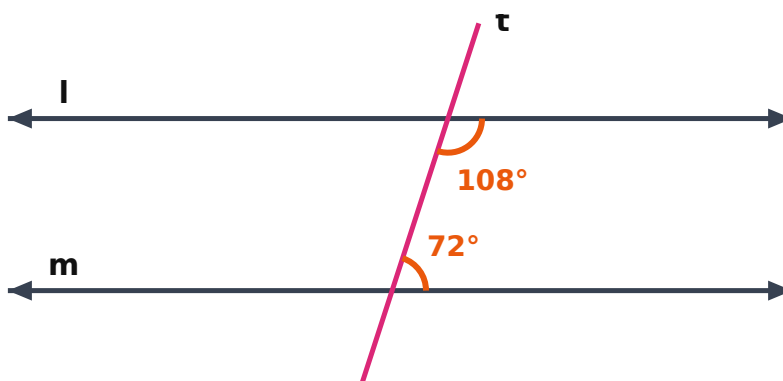
Alternate interior angles are equal.

Problem 9: Same-side interior angles

The marked angles are between the lines on the same side of the transversal, so they add to

$$180^\circ: x = 180 - 108 = 72.$$

$$x = 72^\circ$$



Same-side interior angles add to 180 degrees.

Problem 10: Linear pair and vertical angles

x and the 55° angle form a linear pair, so $x = 180 - 55 = 125$. y and the 55° angle are vertical angles, so $y = 55$.

$$x = 125^\circ \text{ and } y = 55^\circ$$

Problem 11: Alternate exterior angles

The marked angles lie outside the lines on opposite sides of the transversal: alternate exterior angles. They are equal.

$$x = 118^\circ$$

Problem 12: Corresponding angles with x

Corresponding angles are equal: $3x + 10 = 70$. Subtract 10: $3x = 60$. Divide by 3: $x = 20$.

$$\text{Check: } 3(20) + 10 = 70.$$

$$x = 20$$

Problem 13: Same-side interior with x

They add to 180: $(2x + 20) + (x + 40) = 180$, so $3x + 60 = 180$ and $3x = 120$, giving $x = 40$.

$$\text{Angles: } 2(40) + 20 = 100 \text{ and } 40 + 40 = 80; 100 + 80 = 180.$$

$$x = 40; \text{ the angles are } 100^\circ \text{ and } 80^\circ.$$

Problem 14: Triangle with x

$(x+10)+2x+(3x+20)=180$ gives $6x+30=180$, so $6x=150$ and $x=25$.

Angles: 35, 50 and 95; sum = 180.

$x=25$; **angles** 35° , 50° , 95°

Problem 15: Exterior angle with x

The exterior angle equals the sum of the remote angles: $5x-10=(2x+15)+(x+25)=3x+40$.

Subtract $3x$ and add 10: $2x=50$, so $x=25$. The exterior angle is $5(25)-10=115$.

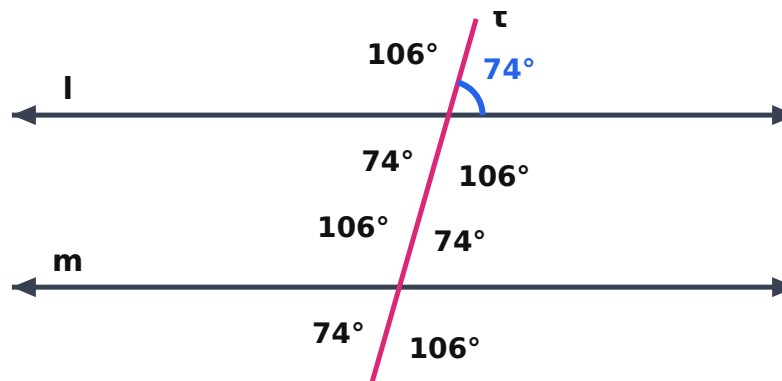
$x=25$; **exterior angle** 115°

Problem 16: All eight angles

a forms a linear pair with the 74° angle: $a=180-74=106$. c is vertical to a , so $c=106$. d is vertical to 74° , so $d=74$.

The angles at the bottom line match the top by corresponding angles: $e=106$, $f=74$, $g=106$, $h=74$.

$a=c=e=g=106^\circ$ and $d=f=h=74^\circ$



All eight angles: four of 74° and four of 106° .

Problem 17: Same angles?

Third angle of triangle 1: $180-50-60=70$. Third angle of triangle 2: $180-60-70=50$.

Both triangles have angles 50° , 60° and 70° .

Yes, they are similar by the AA criterion.

Problem 18: Not similar

Third angle of triangle 1: $180 - 45 - 65 = 70$. Third angle of triangle 2: $180 - 45 - 75 = 60$.

The angle sets 45,65,70 and 45,75,60 differ, even though one angle matches.

No, the triangles are not similar.

Problem 19: Missing side by AA

Angles $A = D = 60^\circ$ and $B = E = 70^\circ$, so $\triangle ABC \sim \triangle DEF$ by AA.

Scale factor: $DE \div AB = 9 \div 6 = \frac{3}{2}$. Then $EF = 8 \cdot \frac{3}{2} = 12$.

$$EF = 12$$

Problem 20: Roof truss

The three angles sum to 180° : $100 + x + x = 180$, so $2x = 80$ and $x = 40$.

Each base angle is 40° .

Problem 21: City streets

East side: the two angles are same-side interior angles, so they add to 180° : $180 - 52 = 128$.

West side: this angle is an alternate interior angle to the 52° angle, so it equals 52° . Check: $128 + 52 = 180$, a linear pair.

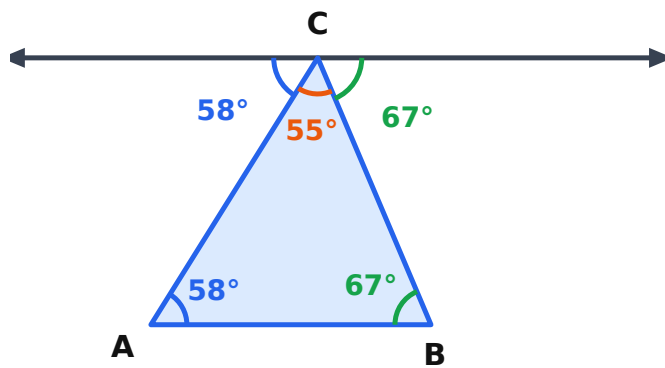
East side 128° ; west side 52° .

Problem 22: Parallel line through a vertex

x and $\angle A$ are alternate interior angles, so $x = 58$. z and $\angle B$ are alternate interior angles, so $z = 67$.

$\angle C = 180 - 58 - 67 = 55$. Along the straight line: $58 + 55 + 67 = 180$.

$$x = 58^\circ, z = 67^\circ, \angle C = 55^\circ$$



Along the line: $58^\circ + 55^\circ + 67^\circ = 180^\circ$.

Problem 23: Ramp brace

The interior angle next to the exterior angle: $180 - 125 = 55$.

The exterior angle equals the sum of the two remote angles: $125 = 35 + C$, so $C = 90$.

Check: $55 + 35 + 90 = 180$.

$55^\circ, 35^\circ, 90^\circ$

Problem 24: Quilt seam

Alternate interior angles are equal: $4x + 8 = 6x - 32$. Subtract $4x$: $8 = 2x - 32$. Add 32: $40 = 2x$, so $x = 20$.

Each angle: $4(20) + 8 = 88$ and $6(20) - 32 = 88$.

$x = 20$; **each angle measures 88° .**