

# Grade 7 - Angle Relationships and Equations - Answer Key

Common Core 7.G.B.5 · [maths-pdf.fr/en/](https://maths-pdf.fr/en/)

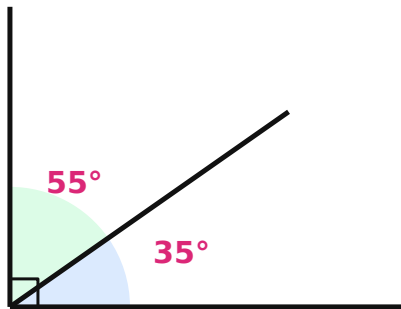
Use this answer key to check your work on the angle relationships worksheet. Every solution shows the steps, and the final answer appears in bold. If your answer is different, compare each step and look for the first place where the work changes.

**Grade 7** · Common Core State Standards: **7.G.B.5**

## Exercise 1 - Complement

$$90 - 35 = 55$$

$$55^\circ$$

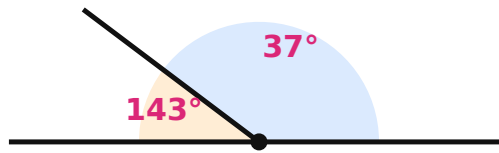


$$35^\circ + 55^\circ = 90^\circ.$$

## Exercise 2 - Supplement

A linear pair is supplementary:  $180 - 143 = 37$ .

$$37^\circ$$



$$37^\circ + 143^\circ = 180^\circ.$$

### Exercise 3 - Complement of a decimal

$$90 - 72.5 = 17.5$$

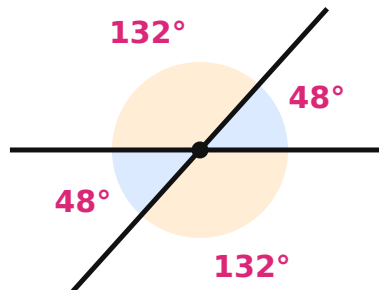
$$17.5^\circ$$

### Exercise 4 - Vertical and adjacent

Vertical angles are equal:  $48^\circ$ .

Adjacent angles form a linear pair:  $180 - 48 = 132$ .

**vertical**  $48^\circ$ ; **adjacent**  $132^\circ$



All four angles.

### Exercise 5 - Complementary equation

$$x + 65 = 90, \text{ so } x = 25.$$

$$25^\circ$$

### Exercise 6 - Supplementary equation

$$x+118=180, \text{ so } x=62.$$

$$62^\circ$$

### Exercise 7 - Two-step complement

$$2x+30=90.$$

$$2x=60, \text{ so } x=30.$$

The first angle is  $2(30)=60^\circ$ .

$$x = 30; 60^\circ$$

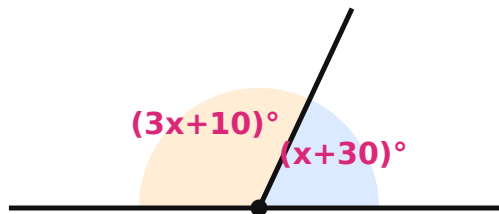
### Exercise 8 - Supplementary expressions

$$3x+10+x+30=180, \text{ so } 4x+40=180.$$

$$4x=140, x=35.$$

Angles:  $3(35)+10=115$  and  $35+30=65$ .

$$x = 35; 115^\circ \text{ and } 65^\circ$$



The angles are  $65^\circ$  and  $115^\circ$ .

### Exercise 9 - Vertical angle equation

Vertical angles are equal:  $4x+5=65$ .

$$4x=60, \text{ so } x=15.$$

**$x = 15$**

### Exercise 10 - Ratio of complementary angles

Let the angles be  $2k$  and  $3k$ . Then  $5k = 90$ , so  $k = 18$ .

$$2(18) = 36 \text{ and } 3(18) = 54.$$

**$36^\circ$  and  $54^\circ$**

### Exercise 11 - Three times as large

$$x + 3x = 180, \text{ so } 4x = 180 \text{ and } x = 45.$$

The other angle is  $3(45) = 135$ .

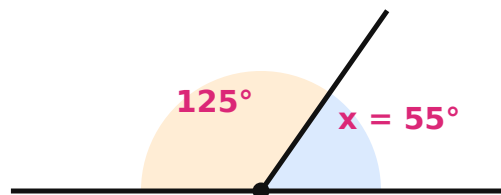
**$45^\circ$  and  $135^\circ$**

### Exercise 12 - Linear pair

$$x + 2x + 15 = 180, \text{ so } 3x = 165 \text{ and } x = 55.$$

The other angle is  $2(55) + 15 = 125$ .

**$x = 55$ ;  $55^\circ$  and  $125^\circ$**



The linear pair:  $55^\circ$  and  $125^\circ$ .

### Exercise 13 - Angles on a line

$$40 + 75 + x = 180, \text{ so } 115 + x = 180 \text{ and } x = 65.$$

$65^\circ$

### Exercise 14 - Angles around a point

$90+120+85+x=360$ , so  $295+x=360$  and  $x=65$ .

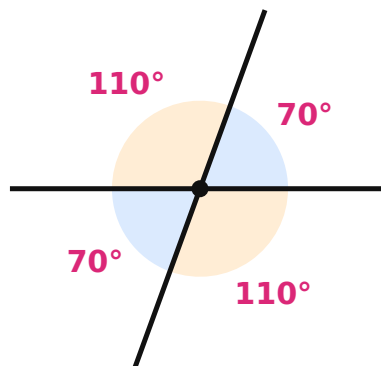
$65^\circ$

### Exercise 15 - All four angles

Vertical:  $70^\circ$ .

The other two:  $180-70=110^\circ$  each.

$70^\circ, 110^\circ, 110^\circ$



All four angles.

### Exercise 16 - Ladder

The ladder, wall, and ground form a right triangle, and the angles of a triangle add up to  $180^\circ$ .

$90+72+x=180$ , so  $x=18$ .

$18^\circ$

### Exercise 17 - Ramp

$180-15=165$

$165^\circ$

### Exercise 18 - Scissors

Vertical:  $38^\circ$ . Adjacent:  $180 - 38 = 142^\circ$ .

$38^\circ$  and  $142^\circ$

### Exercise 19 - Complementary expressions

$2x - 5 + x + 20 = 90$ , so  $3x + 15 = 90$ .

$3x = 75$ ,  $x = 25$ .

Angles:  $2(25) - 5 = 45$  and  $25 + 20 = 45$ .

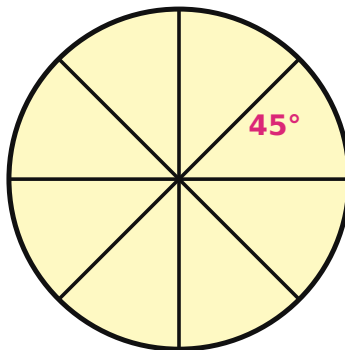
**$x = 25$ ;  $45^\circ$  and  $45^\circ$**

### Exercise 20 - Pizza slices

The full turn is  $360^\circ$ :  $360 \div 8 = 45$ .

Supplement:  $180 - 45 = 135$

$45^\circ$ ;  $135^\circ$



Eight slices of  $45^\circ$  each.