

Geometry - Coordinate Geometry and Proofs - Answer Key

Common Core G-GPE.B.4, G-GPE.B.5, G-GPE.B.6, G-GPE.B.7 · maths-pdf.fr/en/

Use this answer key to check the 20 problems on coordinate geometry. Every solution shows the formula or theorem used, each step of the work, and the final answer in bold. If an answer differs from yours, compare the steps line by line to find where the work changed.

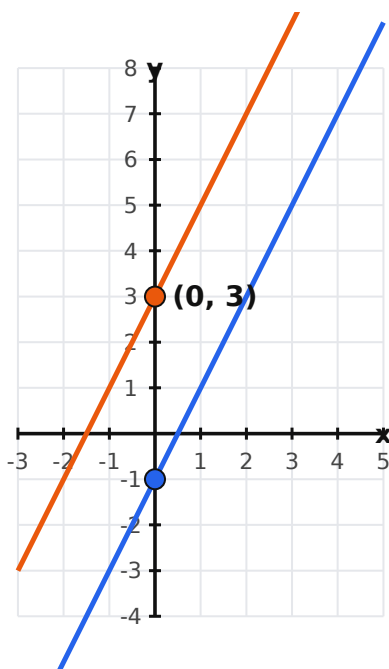
Geometry · Common Core State Standards: **G-GPE.B.4, G-GPE.B.5, G-GPE.B.6, G-GPE.B.7**

Exercise 1 - Find a slope

$$\frac{10-2}{5-1} = \frac{8}{4} = 2$$

2

Exercise 2 - Parallel line



Parallel lines have the same slope.

Parallel lines have the same slope, 2.

The y-intercept is 3.

$$y = 2x + 3$$

Exercise 3 - Are they parallel?

Slope 1: $\frac{4-1}{4+2} = \frac{1}{2}$. Slope 2: $\frac{3}{6} = \frac{1}{2}$.

The slopes are equal and the lines are different, so they are parallel.

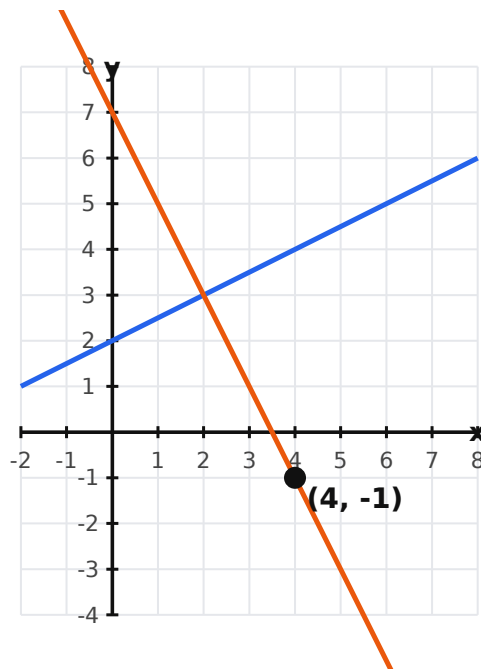
Yes

Exercise 4 - Perpendicular slope

Take the opposite reciprocal.

-4/3

Exercise 5 - Perpendicular line



Perpendicular slopes are opposite reciprocals.

The perpendicular slope is -2 .

$$y+1 = -2(x-4)$$

$$y = -2x + 7$$

$$y = -2x + 7$$

Exercise 6 - Are they perpendicular?

$$\frac{2}{3} \cdot \left(-\frac{3}{2}\right) = -1.$$

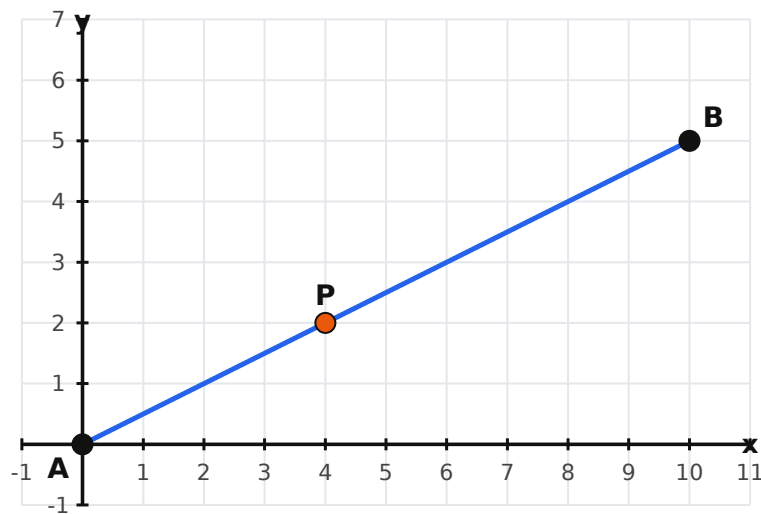
Yes

Exercise 7 - Distance

$$\sqrt{(5+3)^2 + (8-2)^2} = \sqrt{64+36} = 10$$

10

Exercise 8 - Partition 2 : 3



P splits AB in the ratio 2 : 3 from A.

P is $\frac{2}{5}$ of the way from A to B.

$$\left(\frac{2}{5} \cdot 10, \frac{2}{5} \cdot 5\right) = (4, 2)$$

P(4, 2)

Exercise 9 - Partition 1 : 2

$\frac{1}{3}$ of the way: $x = -2 + \frac{1}{3}(9) = 1$, $y = 4 + \frac{1}{3}(-9) = 1$.

P(1, 1)

Exercise 10 - Partition 3 : 1

$\frac{3}{4}$ of the way: $x = 1 + \frac{3}{4}(8) = 7$, $y = 2 + \frac{3}{4}(8) = 8$.

P(7, 8)

Exercise 11 - Perimeter of a triangle

$AB = 4$, $BC = 3$, $AC = \sqrt{4^2 + 3^2} = 5$.

$$4 + 3 + 5 = 12$$

12 units

Exercise 12 - Area of a rectangle

Width $7 - 1 = 6$, height $5 - 1 = 4$.

$$A = 6 \cdot 4 = 24 \text{ and } P = 2(6 + 4) = 20.$$

Area 24; perimeter 20

Exercise 13 - Area of a triangle

Base $AB = 8$ (horizontal). Height = the y-coordinate of $C = 6$.

$$\frac{1}{2} \cdot 8 \cdot 6 = 24$$

24 square units

Exercise 14 - Area of a trapezoid

The parallel sides are the bottom (length 6) and the top (length 4), and the height is 4.

$$\frac{1}{2}(6+4) \cdot 4 = 20$$

20 square units

Exercise 15 - Isosceles triangle

$$AC = \sqrt{2^2 + 5^2} = \sqrt{29} \text{ and } BC = \sqrt{(-2)^2 + 5^2} = \sqrt{29}.$$

Two sides are equal, so the triangle is isosceles ($AB = 4$ is the base).

$$AC = BC = \sqrt{29}$$

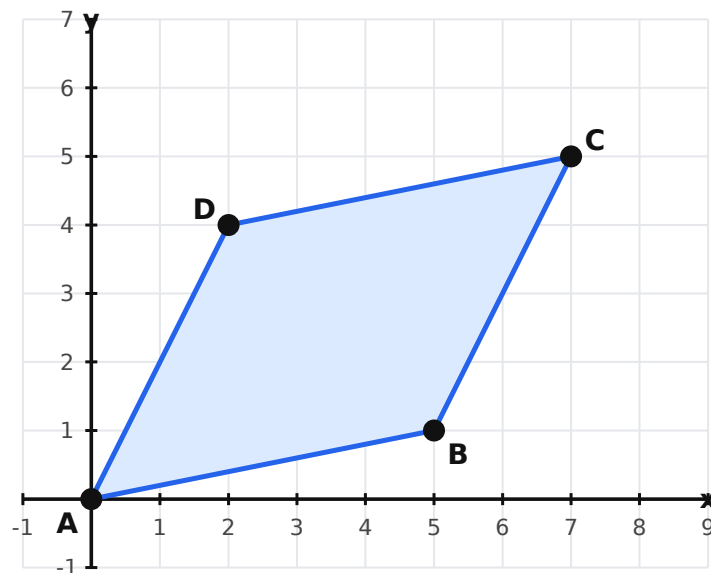
Exercise 16 - Right angle test

Slope of AB: $\frac{2}{6} = \frac{1}{3}$. Slope of AC: $\frac{3}{-1} = -3$.

$\frac{1}{3} \cdot (-3) = -1$, so AB is perpendicular to AC.

The angle at A is a right angle

Exercise 17 - Parallelogram proof



Opposite sides have slopes $1/5$ and 2 .

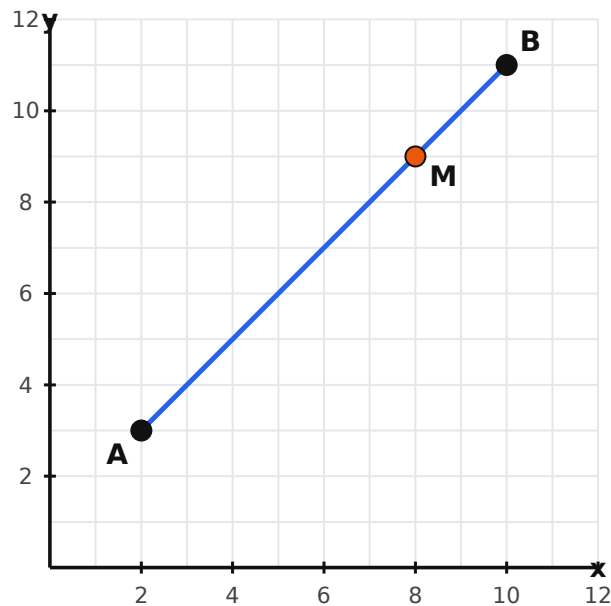
Slope of AB: $\frac{1}{5}$. Slope of DC: $\frac{5-4}{7-2} = \frac{1}{5}$.

Slope of BC: $\frac{5-1}{7-5} = 2$. Slope of AD: $\frac{4}{2} = 2$.

Both pairs of opposite sides are parallel, so ABCD is a parallelogram.

Parallelogram

Exercise 18 - Meeting point on a map



Meeting point M(8, 9).

$$(2 + \frac{3}{4} \cdot 8, 3 + \frac{3}{4} \cdot 8) = (8, 9).$$

Distance AB: $\sqrt{8^2 + 8^2} = 8\sqrt{2} = 11.3$. Three quarters of that is $0.75 \cdot 11.31 = 8.5$.

(8, 9); about 8.5 miles

Exercise 19 - New road

Slope of the existing road: $\frac{2-4}{5-0} = -\frac{2}{5}$.

The perpendicular slope is the opposite reciprocal.

5/2

Exercise 20 - Fence cost

Sides: 12, 9 and $\sqrt{12^2+9^2}=15$.

Perimeter: $12+9+15=36$ feet.

Cost: $36 \cdot \$3.50 = \$126$.

36 feet; \$126