

## Function notation

1.  $f(x) = 2x + 1$

(a) Find  $f(3)$

(b) Find  $f(-2)$

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2.  $f(x) = 3x^2 + 10$

(a) Find  $f(2)$

(b) Find  $f(-1)$

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## Inverse functions $f^{-1}(x)$

### Reflect the function in the line $y = x$ Interchange $x$ and $y$

#### Two step

1. Swop  $x, y$

2. Make  $y$  subject

1.  $f(x) = 3x + 2$

(a) Find the inverse function  $f^{-1}(x)$ .

(b) Sketch the graph of  $f(x)$  and  $f^{-1}(x)$  on the same axes.

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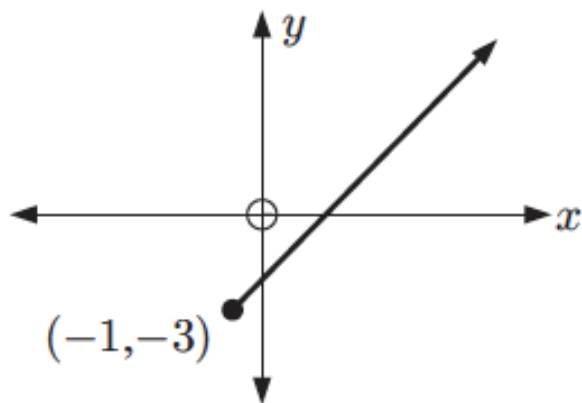
## Domain

Set of  $x$  values in the relation

## Range

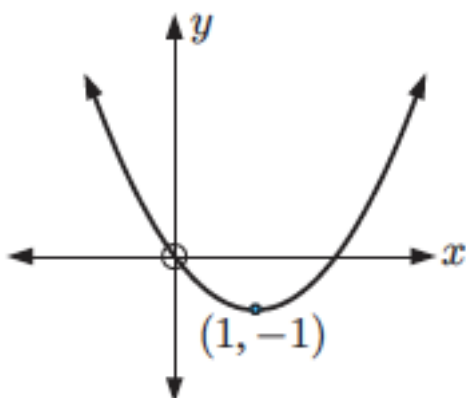
Set of  $y$  values in the relation

## Example



Domain  $\{x|x \geq -1\}$

Range is  $\{y|y \geq -3\}$

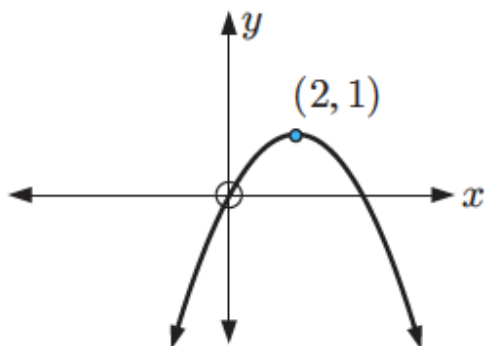


Domain  $\{x|x \in \mathbb{R}\}$

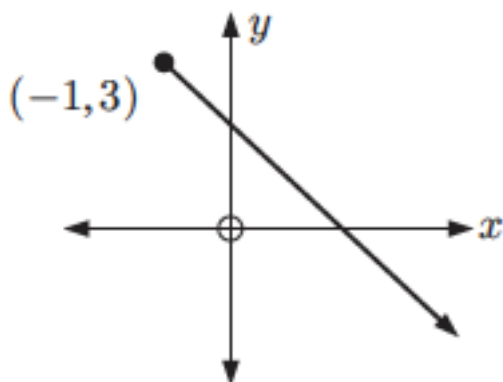
Range is  $\{y|y \geq -1\}$

For each of the following graphs state the domain and range.

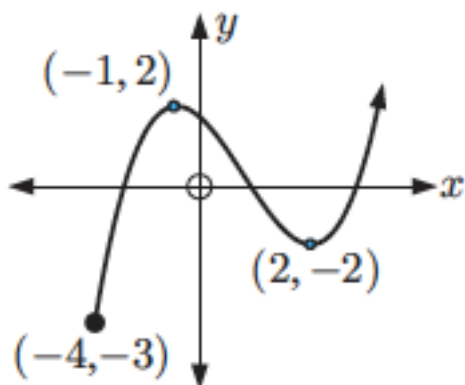
1.



2.



3.



## Axis of symmetry

The equation of the axis of symmetry is  $x = C$ .

Axis of symmetry is the vertical line splitting the graph into half.

Quadratic form:  $y = ax^2 + bx + c$

Axis of symmetry is  $x = \frac{-b}{2a}$

1. The x-intercepts of a quadratic function are 1 and 9.  
Find the equation of axis of symmetry.

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2. The x-intercepts of a quadratic function are  $-2$  and  $6$ .  
Find the equation of axis of symmetry.

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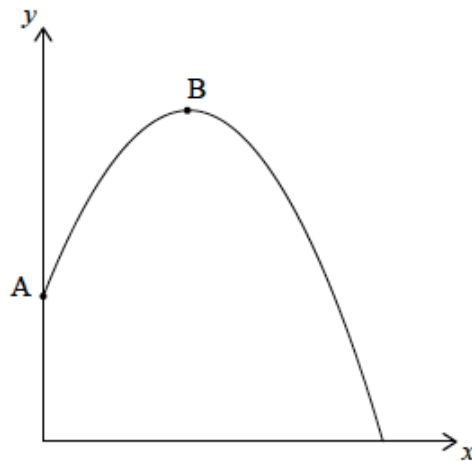
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### Exercise

1. Bella throws a ball from the top of a wall onto flat horizontal ground.

The path of the ball is modelled by the quadratic curve  $y = 2 + 4x - x^2$ , where  $x$  represents the horizontal distance the ball is thrown and  $y$  represents the height of the ball above the ground. All distances are measured in metres.

The wall lies along the  $y$ -axis. The curve intersects the  $y$ -axis at point A and has its vertex at point B.



- (a) Write down the height in metres from which the ball was thrown.
- (b) Calculate the maximum height, above the ground, reached by the ball.
- (c) Find the horizontal distance from the base of the wall to the point at which the ball hits the ground.

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2. Consider the quadratic function  $f(x) = ax^2 + bx + 22$ .

The equation of the line of symmetry of the graph  $y = f(x)$  is  $x = 1.75$ .

(a) Using only this information, write down an equation in terms of  $a$  and  $b$ .

The graph intersects the  $x$ -axis at the point  $(-2, 0)$ .

(b) Using this information, write down a second equation in terms of  $a$  and  $b$ .

(c) Hence find the value of  $a$  and of  $b$ .

The graph intersects the  $x$ -axis at a second point, P.

(d) Find the  $x$ -coordinate of P.

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