Quadratic functions

0 00 0 0 7	0.0	hower	
LUILIASZ.			

3

Image: A matrix

We will discuss the important features of graphs of quadratic functions, ie functions that can be written in the form $f(x) = ax^2 + bx + c$.

3

(日) (同) (三) (三)

Graphs of quadratic functions

This is a graph of a generic quadratic function:



イロト イヨト イヨト イヨト

Graphs of quadratic functions

This graph has 4 important features:

- x-intercepts,
- y-intercept,
- vertex,
- axis of symmetry.

3

- 4 週 ト - 4 三 ト - 4 三 ト

Graphs of quadratic functions

The important features of the graph:



3

・ロト ・ 日 ・ ・ ヨ ・ ・ ヨ ・

The questions on the exam will test your understanding of these 4 features.

0 00 0 0 7		DOM NO	
LUILIASZ.			N 1
	_		

3

The quadratic function may be written in 3 forms:

- standard form $f(x) = ax^2 + bx + c$,
- vertex form $f(x) = a(x-h)^2 + k$,
- factored form f(x) = a(x-p)(x-q).

oossible to factored form doesn't always exist (ie it is not always) oossible to factorize a quadratic function). The quadratic function may be written in 3 forms:

- standard form $f(x) = ax^2 + bx + c$,
- vertex form $f(x) = a(x h)^2 + k$,
- factored form f(x) = a(x p)(x q).

Note that the factored form doesn't always exist (ie it is not always possible to factorize a quadratic function).

イロト 不得下 イヨト イヨト

Suppose we have a function in the vertex form $f(x) = (x - 2)^2 - 9$.

Can we change it to the other forms:

standard form:

$$(x-2)^2 - 9 = x^2 - 4x + 4 - 9 = x^2 - 4x - 5$$

so the function in the standard form is $f(x) = x^2 - 4x - 5$. • factored form:

 $(x-2)^2 - 9 = (x-2)^2 - 3^2 = (x-2-3)(x-2+3) = (x-5)(x+1)$

so the function in the factored form is f(x) = (x - 5)(x + 1). Note that we've used the following important formulae $(a - b)^2 = a^2 - 2ab + b^2$ (in the first case) and $a^2 - b^2 = (a - b)(a + b)$

イロト イポト イヨト イヨト

Suppose we have a function in the vertex form $f(x) = (x-2)^2 - 9$.

Can we change it to the other forms:

standard form:
(x-2)² - 9 = x² - 4x + 4 - 9 = x² - 4x - 5
so the function in the standard form is f(x) = x² - 4x - 5.
factored form:

 $(x-2)^2 - 9 = (x-2)^2 - 3^2 = (x-2-3)(x-2+3) = (x-5)(x+1)$

so the function in the factored form is f(x) = (x - 5)(x + 1). Note that we've used the following important formulae $(a - b)^2 = a^2 - 2ab + b^2$ (in the first case) and $a^2 - b^2 = (a - b)(a + b)$

(日) (同) (三) (三) (三)

Suppose we have a function in the vertex form $f(x) = (x - 2)^2 - 9$.

Can we change it to the other forms:

• standard form:

$(x-2)^2 - 9 = x^2 - 4x + 4 - 9 = x^2 - 4x - 5$

so the function in the standard form is $f(x) = x^2 - 4x - 5$. • factored form:

 $(x-2)^2 - 9 = (x-2)^2 - 3^2 = (x-2-3)(x-2+3) = (x-5)(x+1)$

so the function in the factored form is f(x) = (x - 5)(x + 1). Note that we've used the following important formulae $(a - b)^2 = a^2 - 2ab + b^2$ (in the first case) and $a^2 - b^2 = (a - b)(a + b)$

イロト 不得 トイヨト イヨト

Suppose we have a function in the vertex form $f(x) = (x - 2)^2 - 9$.

Can we change it to the other forms:

standard form:

$$(x-2)^2 - 9 = x^2 - 4x + 4 - 9 = x^2 - 4x - 5$$

so the function in the standard form is $f(x) = x^2 - 4x - 5$ \Rightarrow factored form:

 $(x-2)^2 - 9 = (x-2)^2 - 3^2 = (x-2-3)(x-2+3) = (x-5)(x+1)$

so the function in the factored form is f(x) = (x - 5)(x + 1). Note that we've used the following important formulae $(a - b)^2 = a^2 - 2ab + b^2$ (in the first case) and $a^2 - b^2 = (a - b)(a + b)$

イロト イポト イヨト イヨト

Suppose we have a function in the vertex form $f(x) = (x - 2)^2 - 9$.

Can we change it to the other forms:

standard form:

$$(x-2)^2 - 9 = x^2 - 4x + 4 - 9 = x^2 - 4x - 5$$

so the function in the standard form is $f(x) = x^2 - 4x - 5$.

 $(x-2)^2 - 9 = (x-2)^2 - 3^2 = (x-2-3)(x-2+3) = (x-5)(x+1)$

so the function in the factored form is f(x) = (x - 5)(x + 1). Note that we've used the following important formulae $(a - b)^2 = a^2 - 2ab + b^2$ (in the first case) and $a^2 - b^2 = (a - b)(a + b)$

イロト 不得下 イヨト イヨト 二日

Suppose we have a function in the vertex form $f(x) = (x - 2)^2 - 9$.

Can we change it to the other forms:

standard form:

$$(x-2)^2 - 9 = x^2 - 4x + 4 - 9 = x^2 - 4x - 5$$

so the function in the standard form is $f(x) = x^2 - 4x - 5$. • factored form:

 $(x-2)^2 - 9 = (x-2)^2 - 3^2 = (x-2-3)(x-2+3) = (x-5)(x+1)$ so the function in the factored form is f(x) = (x-5)(x+1). ote that we've used the following important formulae $(x-b)^2 = a^2 - 2ab + b^2$ (in the first case) and $a^2 - b^2 = (a-b)(a+b)$

イロト 不得下 イヨト イヨト 二日

Suppose we have a function in the vertex form $f(x) = (x - 2)^2 - 9$.

Can we change it to the other forms:

standard form:

$$(x-2)^2 - 9 = x^2 - 4x + 4 - 9 = x^2 - 4x - 5$$

so the function in the standard form is $f(x) = x^2 - 4x - 5$. • factored form:

$$(x-2)^2 - 9 = (x-2)^2 - 3^2 = (x-2-3)(x-2+3) = (x-5)(x+1)$$

so the function in the factored form is f(x) = (x - 5)(x + 1).

Note that we've used the following important formulae

(日) (周) (三) (三)

Suppose we have a function in the vertex form $f(x) = (x - 2)^2 - 9$.

Can we change it to the other forms:

standard form:

$$(x-2)^2 - 9 = x^2 - 4x + 4 - 9 = x^2 - 4x - 5$$

so the function in the standard form is $f(x) = x^2 - 4x - 5$. • factored form:

$$(x-2)^2 - 9 = (x-2)^2 - 3^2 = (x-2-3)(x-2+3) = (x-5)(x+1)$$

so the function in the factored form is f(x) = (x - 5)(x + 1).

イロト イポト イヨト イヨト

Suppose we have a function in the vertex form $f(x) = (x - 2)^2 - 9$.

Can we change it to the other forms:

standard form:

$$(x-2)^2 - 9 = x^2 - 4x + 4 - 9 = x^2 - 4x - 5$$

so the function in the standard form is $f(x) = x^2 - 4x - 5$. • factored form:

$$(x-2)^2 - 9 = (x-2)^2 - 3^2 = (x-2-3)(x-2+3) = (x-5)(x+1)$$

so the function in the factored form is f(x) = (x - 5)(x + 1).

Note that we've used the following important formulae $(a - b)^2 = a^2 - 2ab + b^2$ (in the first case) and $a^2 - b^2 = (a - b)(a + b)$ in the second case.

Note that in general changing from factored or vertex form to the standard form is easy and you need to know this well.

form to the other two forms requires some practice. Fortunately you will almost certainly won't need to do it. Also you can use your GDC to help you with that.

Note that in general changing from factored or vertex form to the standard form is easy and you need to know this well. Changing from the standard form to the other two forms requires some practice.

almost certainly won't need to do it. Also you can use your GDC to help you with that.

Note that in general changing from factored or vertex form to the standard form is easy and you need to know this well. Changing from the standard form to the other two forms requires some practice. Fortunately you will almost certainly won't need to do it. Also you can use your GDC to help you with that.

イロト 不得下 イヨト イヨト

Why do we need 3 forms?

- standard form is good for the y-intercept,
- vertex form is good for the axis of symmetry and (surprise, surprise) the vertex,
- factored form is good for the x-intercepts.

(日) (同) (三) (三)

Why do we need 3 forms? Each of them is good for a particular thing.

- standard form is good for the y-intercept,
- vertex form is good for the axis of symmetry and (surprise, surprise) the vertex,
- factored form is good for the x-intercepts.

(日) (同) (三) (三)

Why do we need 3 forms? Each of them is good for a particular thing. Remember there were 4 important features of the graph of a quadratic functions.

- standard form is good for the y-intercept,
- vertex form is good for the axis of symmetry and (surprise, surprise) the vertex,
- factored form is good for the x-intercepts.

(日) (周) (三) (三)

Why do we need 3 forms? Each of them is good for a particular thing. Remember there were 4 important features of the graph of a quadratic functions.

- standard form is good for the y-intercept,
- vertex form is good for the axis of symmetry and (surprise, surprise) the vertex,
- factored form is good for the x-intercepts.

(日) (周) (三) (三)

Why do we need 3 forms? Each of them is good for a particular thing. Remember there were 4 important features of the graph of a quadratic functions.

- standard form is good for the y-intercept,
- vertex form is good for the axis of symmetry and (surprise, surprise) the vertex,
- factored form is good for the x-intercepts.

イロト 不得下 イヨト イヨト

Why do we need 3 forms? Each of them is good for a particular thing. Remember there were 4 important features of the graph of a quadratic functions.

- standard form is good for the y-intercept,
- vertex form is good for the axis of symmetry and (surprise, surprise) the vertex,
- factored form is good for the *x*-intercepts.

Why do we need 3 forms? Each of them is good for a particular thing. Remember there were 4 important features of the graph of a quadratic functions.

- standard form is good for the y-intercept,
- vertex form is good for the axis of symmetry and (surprise, surprise) the vertex,
- factored form is good for the *x*-intercepts.

y-intercept of any function is calculated by substituting 0 for x.

Suppose our function is $f(x) = x^2 + 3x - 2$. What is its y-intercept? We substitute 0 for x and get:

$y = 0^2 + 3 \times 0 - 2 = -2$

so y = -2. The graphs intersects the y-axis at (0, -2).

(日) (同) (三) (三)



Suppose our function is $f(x) = x^2 + 3x - 2$. What is its y-intercept? We substitute 0 for x and get:

 $y = 0^2 + 3 \times 0 - 2 = -2$

so y = -2. The graphs intersects the y-axis at (0, -2).

Tomasz Lechowski

October 19, 2019 11 / 21

(日) (周) (三) (三)

Suppose our function is $f(x) = x^2 + 3x - 2$.

 $y = 0^2 + 3 \times 0 - 2 = -2$

so y = -2. The graphs intersects the y-axis at (0, -2).

イロト 不得下 イヨト イヨト 二日

Suppose our function is $f(x) = x^2 + 3x - 2$. What is its y-intercept?

 $y = 0^2 + 3 \times 0 - 2 = -2$

so y = -2. The graphs intersects the y-axis at (0, -2).

イロト 不得下 イヨト イヨト 二日

Suppose our function is $f(x) = x^2 + 3x - 2$. What is its *y*-intercept? We substitute 0 for x and get:

$$y = 0^2 + 3 \times 0 - 2 = -2$$

so y = -2. The graphs intersects the v-axis at (0, -2).

Suppose our function is $f(x) = x^2 + 3x - 2$. What is its *y*-intercept? We substitute 0 for x and get:

$$y = 0^2 + 3 \times 0 - 2 = -2$$

so y = -2. The graphs intersects the y-axis at (0, -2).

▲□▶ ▲□▶ ▲□▶ ▲□▶ = ののの

Now suppose that our function is $f(x) = ax^2 + bx + c$, what is its *y*-intercept?

We substitute 0 for x and we get:

 $y = a \times 0^2 + b \times 0 + c = c$

so *y* = *c* and the coordinates of the point where the graph intersects the *y*-axis are (0, *c*).

3

・ロン ・四 ・ ・ ヨン ・ ヨン

Now suppose that our function is $f(x) = ax^2 + bx + c$, what is its *y*-intercept?

We substitute 0 for x and we get:

$$y = a \times 0^2 + b \times 0 + c = c$$

so y = c and the coordinates of the point where the graph intersects the y-axis are (0, c).

3

(日) (周) (三) (三)

Now suppose that our function is $f(x) = ax^2 + bx + c$, what is its *y*-intercept?

We substitute 0 for x and we get:

$$y = a \times 0^2 + b \times 0 + c = c$$

so y = c and the coordinates of the point where the graph intersects the y-axis are (0, c).

イロト 不得 トイヨト イヨト 二日
x-intercept of any function is calculated by substituting 0 for y.

Suppose our functions is f(x) = 2(x - 1)(x + 3). What are its x-intercepts?

To find x-intercepts we set y = 0 and solve for x. So we need to solve:

$$2(x-1)(x+3)=0$$

which is very simple, x = 1 or x = -3. The function will cross the x-axis at two points (1,0) and (-3,0).

-			
Lomosz	00	DOWE	
TOHIASZ		10005	ο.

(日) (同) (三) (三)

x-intercept of any function is calculated by substituting 0 for y. This is because the *u*-coordinate of the point on the *x*-axis is 0.

Suppose our functions is f(x) = 2(x - 1)(x + 3). What are its *x*-intercepts?

To find x-intercepts we set y = 0 and solve for x. So we need to solve:

$$2(x-1)(x+3)=0$$

which is very simple, x = 1 or x = -3. The function will cross the x-axis at two points (1, 0) and (-3, 0).

	22	20	-	<u></u>	•	•••	 -		
		<i>.</i>	~ /	_		- 14	-	P2.	
		-							

(日) (同) (三) (三)

x-intercept of any function is calculated by substituting 0 for y. This is because the *u*-coordinate of the point on the *x*-axis is 0.

Suppose our functions is f(x) = 2(x-1)(x+3).

To find x-intercepts we set y = 0 and solve for x. So we need to solve:

$$2(x-1)(x+3) = 0$$

which is very simple, x = 1 or x = -3. The function will cross the x-axis at two points (1,0) and (-3,0).

-			
1000	007		
тош	dSZ	IUWS	n.

(日) (周) (三) (三)

x-intercept of any function is calculated by substituting 0 for y. This is because the *u*-coordinate of the point on the *x*-axis is 0.

Suppose our functions is f(x) = 2(x - 1)(x + 3). What are its *x*-intercepts?

To find x-intercepts we set y = 0 and solve for x. So we need to solve:

2(x-1)(x+3) = 0

which is very simple, x = 1 or x = -3. The function will cross the x-axis at two points (1,0) and (-3,0).

イロト 不得下 イヨト イヨト 二日

x-intercept of any function is calculated by substituting 0 for y. This is because the *u*-coordinate of the point on the *x*-axis is 0.

Suppose our functions is f(x) = 2(x - 1)(x + 3). What are its *x*-intercepts?

To find x-intercepts we set y = 0 and solve for x.

2(x-1)(x+3) = 0

which is very simple, x = 1 or x = -3. The function will cross the x-axis at two points (1,0) and (-3,0).

x-intercept of any function is calculated by substituting 0 for y. This is because the *u*-coordinate of the point on the *x*-axis is 0.

Suppose our functions is f(x) = 2(x - 1)(x + 3). What are its *x*-intercepts?

To find x-intercepts we set y = 0 and solve for x. So we need to solve:

$$2(x-1)(x+3)=0$$

which is very simple,

simple,

イロト 不得 トイヨト イヨト 二日

x-intercept of any function is calculated by substituting 0 for y. This is because the *u*-coordinate of the point on the *x*-axis is 0.

Suppose our functions is f(x) = 2(x - 1)(x + 3). What are its *x*-intercepts?

To find x-intercepts we set y = 0 and solve for x. So we need to solve:

$$2(x-1)(x+3)=0$$

which is very simple, x = 1 or x = -3.

x-intercept of any function is calculated by substituting 0 for y. This is because the *u*-coordinate of the point on the *x*-axis is 0.

Suppose our functions is f(x) = 2(x - 1)(x + 3). What are its *x*-intercepts?

To find x-intercepts we set y = 0 and solve for x. So we need to solve:

$$2(x-1)(x+3)=0$$

which is very simple, x = 1 or x = -3. The function will cross the x-axis at two points (1,0) and (-3,0).

Now suppose our functions is f(x) = a(x - p)(x - q).

Again we set *y* = 0 and solve for *x*. We need to solve:

a(x-p)(x-q)=0

this of course gives x = p or x = q. The function will cross the x-axis at two points (p, 0) and (q, 0).

3

・ロン ・四 ・ ・ ヨン ・ ヨン

Now suppose our functions is f(x) = a(x - p)(x - q). What are its *x*-intercepts?

Again we set y = 0 and solve for x. We need to solve:

a(x-p)(x-q)=0

this of course gives x = p or x = q. The function will cross the x-axis at two points (p, 0) and (q, 0).

3

・ロン ・四 ・ ・ ヨン ・ ヨン

Now suppose our functions is f(x) = a(x - p)(x - q). What are its *x*-intercepts?

Again we set y = 0 and solve for x.

(x-p)(x-q)=0

this of course gives x = p or x = q. The function will cross the x-axis at two points (p, 0) and (q, 0).

イロト 不得下 イヨト イヨト 二日

Now suppose our functions is f(x) = a(x - p)(x - q). What are its *x*-intercepts?

Again we set y = 0 and solve for x. We need to solve:

$$a(x-p)(x-q)=0$$

this of course gives

< ロ > < 同 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ >

Now suppose our functions is f(x) = a(x - p)(x - q). What are its *x*-intercepts?

Again we set y = 0 and solve for x. We need to solve:

$$a(x-p)(x-q)=0$$

this of course gives x = p or x = q.

< ロ > < 同 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < 回 > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ > < □ >

Now suppose our functions is f(x) = a(x - p)(x - q). What are its *x*-intercepts?

Again we set y = 0 and solve for x. We need to solve:

$$a(x-p)(x-q)=0$$

this of course gives x = p or x = q. The function will cross the x-axis at two points (p, 0) and (q, 0).

vertex

Now let's suppose that we have a function $f(x) = 2(x - 3)^2 + 5$.

We have $f(x) = 2(x - 3)^2 + 5$, now the first part $2(x - 3)^2$, because it's squared, can never be less than 0, so the least it can be is 0. We add 5, so the least value y of our function is 5. For what x do we get this value? We get the least value of y, when the part $2(x - 3)^2$ is 0, so when x = 3.

This means that the vertex has coordinates (3, 5), because the minimum value y of our function is 5 and it occurs when x = 3.

(日) (同) (三) (三)

Now let's suppose that we have a function $f(x) = 2(x-3)^2 + 5$. We want to find the vertex of the graph of this function.

minimum/maximum value of the function. What is the minimum value of the given function.

We have $f(x) = 2(x - 3)^2 + 5$, now the first part $2(x - 3)^2$, because it's squared, can never be less than 0, so the least it can be is 0. We add 5, so the least value y of our function is 5. For what x do we get this value? We get the least value of y, when the part $2(x - 3)^2$ is 0, so when x = 3.

This means that the vertex has coordinates (3,5), because the minimum value y of our function is 5 and it occurs when x = 3.

Now let's suppose that we have a function $f(x) = 2(x-3)^2 + 5$. We want to find the vertex of the graph of this function. The vertex gives the minimum/maximum value of the function.

We have $f(x) = 2(x - 3)^2 + 5$, now the first part $2(x - 3)^2$, because it's squared, can never be less than 0, so the least it can be is 0. We add 5, so the least value y of our function is 5. For what x do we get this value? We get the least value of y, when the part $2(x - 3)^2$ is 0, so when x = 3.

This means that the vertex has coordinates (3, 5), because the minimum value y of our function is 5 and it occurs when x = 3.

We have $f(x) = 2(x - 3)^2 + 5$, now the first part $2(x - 3)^2$, because it's squared, can never be less than 0, so the least it can be is 0. We add 5, so the least value y of our function is 5. For what x do we get this value? We get the least value of y, when the part $2(x - 3)^2$ is 0, so when x = 3.

This means that the vertex has coordinates (3,5), because the minimum value y of our function is 5 and it occurs when x = 3.

We have $f(x) = 2(x - 3)^2 + 5$, now the first part $2(x - 3)^2$, because it's squared, can never be less than 0, so the least it can be is 0. We add 5, so the least value y of our function is 5. For what x do we get this value? We get the least value of y, when the part $2(x - 3)^2$ is 0, so when x = 3.

This means that the vertex has coordinates (3,5), because the minimum value y of our function is 5 and it occurs when x = 3.

We have $f(x) = 2(x-3)^2 + 5$, now the first part $2(x-3)^2$, because it's squared, can never be less than 0, so the least it can be is 0.

This means that the vertex has coordinates (3,5), because the minimum value y of our function is 5 and it occurs when x = 3.

We have $f(x) = 2(x-3)^2 + 5$, now the first part $2(x-3)^2$, because it's squared, can never be less than 0, so the least it can be is 0. We add 5, so the least value y of our function is 5.

This means that the vertex has coordinates (3,5), because the minimum value y of our function is 5 and it occurs when x = 3.

We have $f(x) = 2(x-3)^2 + 5$, now the first part $2(x-3)^2$, because it's squared, can never be less than 0, so the least it can be is 0. We add 5, so the least value y of our function is 5. For what x do we get this value?

This means that the vertex has coordinates (3,5), because the minimum value y of our function is 5 and it occurs when x = 3.

We have $f(x) = 2(x-3)^2 + 5$, now the first part $2(x-3)^2$, because it's squared, can never be less than 0, so the least it can be is 0. We add 5, so the least value y of our function is 5. For what x do we get this value? We get the least value of y, when the part $2(x-3)^2$ is 0, so when x = 3.

This means that the vertex has coordinates (3, 5), because the minimum value y of our function is 5 and it occurs when x = 3.

イロト 不得下 イヨト イヨト 二日

We have $f(x) = 2(x-3)^2 + 5$, now the first part $2(x-3)^2$, because it's squared, can never be less than 0, so the least it can be is 0. We add 5, so the least value y of our function is 5. For what x do we get this value? We get the least value of y, when the part $2(x-3)^2$ is 0, so when x = 3.

This means that the vertex has coordinates (3, 5), because the minimum value y of our function is 5 and it occurs when x = 3.

15 / 21

The part $3(x + 2)^2$ can never get below 0, so the minimum value y is 1. It occurs when $3(x + 2)^2$ is 0, so when x = -2.

The vertex has coordinates (-2,1).

・ロン ・四 ・ ・ ヨン ・ ヨン

The part $3(x+2)^2$ can never get below 0, so the minimum value y is 1.

The vertex has coordinates (-2, 1).

・ロン ・四 ・ ・ ヨン ・ ヨン

The part $3(x+2)^2$ can never get below 0, so the minimum value y is 1. It occurs when $3(x+2)^2$ is 0, so when x = -2.

The vertex has coordinates (-2, 1).

(日) (周) (三) (三)

The part $3(x+2)^2$ can never get below 0, so the minimum value y is 1. It occurs when $3(x+2)^2$ is 0, so when x = -2.

The vertex has coordinates (-2, 1).

イロト 不得下 イヨト イヨト

The part $a(x - h)^2$ has minimum/maximum (depending on whether a is positive or negative) value 0, so the minimum/maximum value of y is k. It occurs when $a(x - h)^2$ is 0, so when x = h.

The vertex has coordinates (h, k).

◆□▶ ◆圖▶ ◆圖▶ ◆圖▶ ─ 圖

The part $a(x - h)^2$ has minimum/maximum (depending on whether *a* is positive or negative) value 0, so the minimum/maximum value of *y* is k.

The vertex has coordinates (h, k).

イロト 不得下 イヨト イヨト

The part $a(x - h)^2$ has minimum/maximum (depending on whether *a* is positive or negative) value 0, so the minimum/maximum value of *y* is k. It occurs when $a(x - h)^2$ is 0, so when x = h.

The vertex has coordinates (*h*, *k*).

イロト 不得下 イヨト イヨト 二日

The part $a(x - h)^2$ has minimum/maximum (depending on whether *a* is positive or negative) value 0, so the minimum/maximum value of *y* is k. It occurs when $a(x - h)^2$ is 0, so when x = h.

The vertex has coordinates (h, k).

Find the coordinates of the point, where the function intersects the y-axis:

f(x) = 2x² + 3x + 5,
 point of intersection with *y*-axis: (0,5),

f(x) = -x² + 2x + 3,
 point of intersection with y-axis: (0, 3)

f(x) = 4x² + 1,
 point of intersection with y-axis: (0, 1)

• $f(x) = \frac{1}{3}x^2 + 3x - 7$, point of intersection with y-axis: (0, -7),

f(x) = 3x² + 2x,
 point of intersection with y-axis: (0,

Find the coordinates of the point, where the function intersects the y-axis:

•
$$f(x) = 2x^2 + 3x + 5$$
,

point of intersection with y-axis: (0,5),

f(*x*) = −*x*² + 2*x* + 3,
 point of intersection with *y*-axis: (0, 3)

• $f(x) = 4x^2 + 1$, point of intersection with y-axis: (0, 1)

• $f(x) = \frac{1}{3}x^2 + 3x - 7$, point of intersection with y-axis: (0, -7),

• $f(x) = 3x^2 + 2x$,

point of intersection with y-axis: (0,0)

(日) (周) (三) (三)

Find the coordinates of the point, where the function intersects the *y*-axis:

- $f(x) = 2x^2 + 3x + 5$, point of intersection with *y*-axis:
- f(x) = −x² + 2x + 3, point of intersection with *y*-axis: (0,3)
- f(x) = 4x² + 1,
 point of intersection with y-axis: (0, 1)
- $f(x) = \frac{1}{3}x^2 + 3x 7$, point of intersection with y-axis: (0, -7),
- $f(x) = 3x^2 + 2x$,

point of intersection with y-axis: (0,0)

(日) (周) (三) (三)

Find the coordinates of the point, where the function intersects the *y*-axis:

- f(x) = 2x² + 3x + 5, point of intersection with *y*-axis: (0,5),
- f(x) = -x² + 2x + 3,
 point of intersection with y-axis: (0,3)
- f(x) = 4x² + 1,
 point of intersection with y-axis: (0, 1)
- $f(x) = \frac{1}{3}x^2 + 3x 7$, point of intersection with y-axis: (0, -7),
- $f(x) = 3x^2 + 2x$,

point of intersection with y-axis: (0,0)

イロト 不得下 イヨト イヨト
Find the coordinates of the point, where the function intersects the y-axis:

•
$$f(x) = 2x^2 + 3x + 5$$
,
point of intersection with y-axis: (0,5),

•
$$f(x) = -x^2 + 2x + 3$$
,

point of intersection with y-axis: (0,3),

 $f(x) = 4x^2 + 1$, point of intersection with y-axis: (0, 1)

 $f(x) = \frac{1}{3}x^2 + 3x - 7,$ point of intersection with y-axis: (0, -7),

• $f(x) = 3x^2 + 2x$,

point of intersection with y-axis: (0,0)

(日) (周) (三) (三)

Find the coordinates of the point, where the function intersects the y-axis:

- f(x) = 2x² + 3x + 5,
 point of intersection with y-axis: (0,5),
- $f(x) = -x^2 + 2x + 3$, point of intersection with *y*-axis:

 $f(x) = 4x^2 + 1$, point of intersection with y-axis: (0,1)

- $f(x) = \frac{1}{3}x^2 + 3x 7,$ point of intersection with y-axis: (0, -7),
- $f(x) = 3x^2 + 2x$,

point of intersection with y-axis: (0,0)

Find the coordinates of the point, where the function intersects the y-axis:

- f(x) = 2x² + 3x + 5,
 point of intersection with y-axis: (0,5),
- f(x) = -x² + 2x + 3,
 point of intersection with *y*-axis: (0,3),

 $f(x) = 4x^2 + 1$, point of intersection with y-axis: (0, 1)

- $f(x) = \frac{1}{3}x^2 + 3x 7,$ point of intersection with y-axis: (0, -7),
- $f(x) = 3x^2 + 2x$,

point of intersection with y-axis: (0,0)

Find the coordinates of the point, where the function intersects the y-axis:

•
$$f(x) = 2x^2 + 3x + 5$$
,
point of intersection with y-axis: (0,5),

•
$$f(x) = -x^2 + 2x + 3$$
,
point of intersection with y-axis: (0,3),

•
$$f(x) = 4x^2 + 1$$
,

point of intersection with y-axis: (0,1)

 $f(x) = \frac{1}{3}x^2 + 3x - 7,$
point of intersection with y-axis: (0, -7),

• $f(x) = 3x^2 + 2x$,

point of intersection with y-axis: (0,

3

(日) (周) (三) (三)

Find the coordinates of the point, where the function intersects the y-axis:

- f(x) = 2x² + 3x + 5,
 point of intersection with y-axis: (0,5),
- f(x) = -x² + 2x + 3,
 point of intersection with y-axis: (0,3),
- $f(x) = 4x^2 + 1$, point of intersection with *y*-axis:
 - $f(x) = \frac{1}{3}x^2 + 3x t$; point of intersection with *y*-axis: (0, -7),
 - $f(x) = 3x^2 + 2x$,

Find the coordinates of the point, where the function intersects the y-axis:

- f(x) = 2x² + 3x + 5,
 point of intersection with y-axis: (0,5),
- f(x) = -x² + 2x + 3,
 point of intersection with y-axis: (0,3),
- f(x) = 4x² + 1,
 point of intersection with *y*-axis: (0,1),
 - point of intersection with y-axis: (0, -7),
 - $f(x) = 3x^2 + 2x$,

Find the coordinates of the point, where the function intersects the y-axis:

- f(x) = 2x² + 3x + 5,
 point of intersection with y-axis: (0,5),
- f(x) = -x² + 2x + 3,
 point of intersection with y-axis: (0,3),
- f(x) = 4x² + 1,
 point of intersection with *y*-axis: (0,1),

•
$$f(x) = \frac{1}{3}x^2 + 3x - 7$$
,

point of intersection with y-axis: (0, -7),

Find the coordinates of the point, where the function intersects the y-axis:

- f(x) = 2x² + 3x + 5,
 point of intersection with y-axis: (0,5),
- f(x) = -x² + 2x + 3,
 point of intersection with *y*-axis: (0,3),
- f(x) = 4x² + 1,
 point of intersection with *y*-axis: (0,1),
- $f(x) = \frac{1}{3}x^2 + 3x 7$, point of intersection with *y*-axis:

イロト イポト イヨト イヨト 二日

Find the coordinates of the point, where the function intersects the y-axis:

- f(x) = 2x² + 3x + 5,
 point of intersection with y-axis: (0,5),
- f(x) = -x² + 2x + 3,
 point of intersection with *y*-axis: (0,3),
- f(x) = 4x² + 1,
 point of intersection with *y*-axis: (0,1),
- $f(x) = \frac{1}{3}x^2 + 3x 7$, point of intersection with y-axis: (0, -7),

Find the coordinates of the point, where the function intersects the *y*-axis:

- f(x) = 2x² + 3x + 5,
 point of intersection with y-axis: (0,5),
- f(x) = -x² + 2x + 3,
 point of intersection with y-axis: (0,3),
- f(x) = 4x² + 1,
 point of intersection with *y*-axis: (0,1),
- $f(x) = \frac{1}{3}x^2 + 3x 7$, point of intersection with y-axis: (0, -7),
- $f(x) = 3x^2 + 2x$,

イロト イポト イヨト イヨト 二日

Find the coordinates of the point, where the function intersects the *y*-axis:

- $f(x) = 2x^2 + 3x + 5$, point of intersection with y-axis: (0,5),
- f(x) = -x² + 2x + 3,
 point of intersection with y-axis: (0,3),
- f(x) = 4x² + 1,
 point of intersection with *y*-axis: (0,1),
- $f(x) = \frac{1}{3}x^2 + 3x 7$, point of intersection with y-axis: (0, -7),
- $f(x) = 3x^2 + 2x$, point of intersection with *y*-axis:

Find the coordinates of the point, where the function intersects the *y*-axis:

- f(x) = 2x² + 3x + 5,
 point of intersection with y-axis: (0,5),
- f(x) = -x² + 2x + 3,
 point of intersection with y-axis: (0,3),
- f(x) = 4x² + 1,
 point of intersection with *y*-axis: (0,1),
- $f(x) = \frac{1}{3}x^2 + 3x 7$, point of intersection with y-axis: (0, -7),
- $f(x) = 3x^2 + 2x$, point of intersection with *y*-axis: (0,0).

Find the coordinates of the points, where the function intersects the x-axis:

- f(x) = (x 2)(x 7),points of intersection with x-axis: (2,0) and (7,0)
- f(x) = (x + 1)(x − 3), points of intersection with x-axis: (−1,0) and (3,0),
- f(x) = 3(x + 4)(x + 2), points of intersection with x-axis: (-4, 0) and (-2, 0)
- $f(x) = 3(x + 4)^2$, point of intersection with x-axis: (-4,0),
- f(x) = 2x(x-5)

Find the coordinates of the points, where the function intersects the x-axis:

•
$$f(x) = (x-2)(x-7)$$
,

points of intersection with x-axis: (2,0) and (7,0),

- f(x) = (x + 1)(x 3),
 points of intersection with x-axis: (-1,0) and (3,0),
- f(x) = 3(x + 4)(x + 2), points of intersection with x-axis: (-4, 0) and (-2, 0)
- $f(x) = 3(x + 4)^2$, point of intersection with x-axis: (-4,0),
- f(x) = 2x(x-5)

points of intersection with x-axis: (0,0) and (5,0).

Find the coordinates of the points, where the function intersects the x-axis:

- f(x) = (x 2)(x 7), points of intersection with x-axis:
- f(x) = (x + 1)(x 3),
 points of intersection with x-axis: (-1,0) and (3,0),
- f(x) = 3(x + 4)(x + 2),
 points of intersection with x-axis: (-4,0) and (-2,0).
- $f(x) = 3(x + 4)^2$, point of intersection with x-axis: (-4, 0),
- f(x) = 2x(x-5)

Find the coordinates of the points, where the function intersects the x-axis:

- f(x) = (x 2)(x 7),
 points of intersection with x-axis: (2,0) and (7,0),
- f(x) = (x + 1)(x 3),
 points of intersection with x-axis: (-1,0) and (3,0),
- f(x) = 3(x + 4)(x + 2), points of intersection with x-axis: (-4,0) and (-2,0).
- $f(x) = 3(x + 4)^2$, point of intersection with x-axis: (-4,0),
- f(x) = 2x(x-5)

Find the coordinates of the points, where the function intersects the x-axis:

f(x) = (x - 2)(x - 7),
 points of intersection with x-axis: (2,0) and (7,0),

•
$$f(x) = (x+1)(x-3)$$
,

points of intersection with x-axis: (-1,0) and (3,0),

- f(x) = 3(x + 4)(x + 2), points of intersection with x-axis: (-4,0) and (-2,0).
- $f(x) = 3(x + 4)^2$, point of intersection with x-axis: (-4,0),

f(x) = 2x(x-5)

points of intersection with x-axis: (0,0) and (5,0).

Find the coordinates of the points, where the function intersects the x-axis:

- f(x) = (x 2)(x 7), points of intersection with x-axis: (2,0) and (7,0),
- f(x) = (x + 1)(x 3),
 points of intersection with x-axis:
 - $f(\mathbf{x}) = 3(\mathbf{x} + 4)(\mathbf{x} + 2),$ points of intersection with x-axis: (-4,0) and (-2,0),
 - $f(x) = 3(x+4)^2$, point of intersection with x-axis: (-4,0),
 - f(x) = 2x(x-5)

Find the coordinates of the points, where the function intersects the x-axis:

- f(x) = (x 2)(x 7), points of intersection with x-axis: (2,0) and (7,0),
- f(x) = (x + 1)(x − 3), points of intersection with x-axis: (−1,0) and (3,0),
 - f(x) = 3(x + 4)(x + 2),points of intersection with x-axis: (-4,0) and (-2,0),
 - $f(x) = 3(x + 4)^2$, point of intersection with x-axis: (-4,0),
- f(x) = 2x(x-5)

Find the coordinates of the points, where the function intersects the x-axis:

- f(x) = (x 2)(x 7), points of intersection with x-axis: (2,0) and (7,0),
- f(x) = (x + 1)(x − 3), points of intersection with x-axis: (−1,0) and (3,0),

•
$$f(x) = 3(x+4)(x+2)$$
,

points of intersection with x-axis: (-4,0) and (-2,0),

 $f(x) = 3(x + 4)^2$, point of intersection with x-axis: (-4, 0),

f(x) = 2x(x-5)

Find the coordinates of the points, where the function intersects the x-axis:

- f(x) = (x 2)(x 7), points of intersection with x-axis: (2,0) and (7,0),
- f(x) = (x + 1)(x − 3), points of intersection with x-axis: (−1,0) and (3,0),
- f(x) = 3(x+4)(x+2), points of intersection with x-axis:

 $f(x) = S(x + 4)^{-}$; point of intersection with x-axis: (-4, 0).

f(x) = 2x(x-5)

Find the coordinates of the points, where the function intersects the x-axis:

- f(x) = (x 2)(x 7),
 points of intersection with x-axis: (2,0) and (7,0),
- f(x) = (x + 1)(x 3), points of intersection with x-axis: (-1, 0) and (3, 0),
- f(x) = 3(x + 4)(x + 2), points of intersection with x-axis: (-4,0) and (-2,0),

point of intersection with x-axis: (-4, 0),

f(x) = 2x(x-5)

Find the coordinates of the points, where the function intersects the x-axis:

- f(x) = (x 2)(x 7),
 points of intersection with x-axis: (2,0) and (7,0),
- f(x) = (x + 1)(x 3), points of intersection with x-axis: (-1, 0) and (3, 0),
- f(x) = 3(x + 4)(x + 2), points of intersection with x-axis: (-4,0) and (-2,0),
- $f(x) = 3(x+4)^2$,

point of intersection with x-axis: (-4, 0),

▲白 ▶ ▲母 ▶ ▲目 ▶ ▲目 ▶ ● ● ●

Find the coordinates of the points, where the function intersects the x-axis:

- f(x) = (x 2)(x 7),
 points of intersection with x-axis: (2,0) and (7,0),
- f(x) = (x + 1)(x 3), points of intersection with x-axis: (-1, 0) and (3, 0),
- f(x) = 3(x + 4)(x + 2), points of intersection with x-axis: (-4,0) and (-2,0),
- $f(x) = 3(x+4)^2$, point of intersection with *x*-axis:

白 ト (同 ト (日 ト (日 ト) 日) の (の

Find the coordinates of the points, where the function intersects the x-axis:

- f(x) = (x 2)(x 7),
 points of intersection with x-axis: (2,0) and (7,0),
- f(x) = (x + 1)(x 3), points of intersection with x-axis: (-1, 0) and (3, 0),
- f(x) = 3(x + 4)(x + 2), points of intersection with x-axis: (-4,0) and (-2,0),
- f(x) = 3(x + 4)²,
 point of intersection with x-axis: (-4,0),

▲白 ▶ ▲母 ▶ ▲目 ▶ ▲目 ▶ ● ● ●

Find the coordinates of the points, where the function intersects the x-axis:

- f(x) = (x 2)(x 7),
 points of intersection with x-axis: (2,0) and (7,0),
- f(x) = (x + 1)(x 3), points of intersection with x-axis: (-1, 0) and (3, 0),
- f(x) = 3(x + 4)(x + 2), points of intersection with x-axis: (-4,0) and (-2,0),
- f(x) = 3(x + 4)²,
 point of intersection with x-axis: (-4,0),
- f(x) = 2x(x-5),

Find the coordinates of the points, where the function intersects the x-axis:

- f(x) = (x 2)(x 7),
 points of intersection with x-axis: (2,0) and (7,0),
- f(x) = (x + 1)(x 3), points of intersection with x-axis: (-1, 0) and (3, 0),
- f(x) = 3(x + 4)(x + 2), points of intersection with x-axis: (-4,0) and (-2,0),
- f(x) = 3(x + 4)²,
 point of intersection with x-axis: (-4,0),
- f(x) = 2x(x 5),
 points of intersection with x-axis:

Find the coordinates of the points, where the function intersects the x-axis:

- f(x) = (x 2)(x 7),
 points of intersection with x-axis: (2,0) and (7,0),
- f(x) = (x + 1)(x 3), points of intersection with x-axis: (-1, 0) and (3, 0),
- f(x) = 3(x + 4)(x + 2), points of intersection with x-axis: (-4,0) and (-2,0),
- f(x) = 3(x + 4)²,
 point of intersection with x-axis: (-4,0),
- f(x) = 2x(x-5), points of intersection with x-axis: (0,0) and (5,0).

Find the coordinates of the vertex of the graphs of the following functions

- coordinates of the vertex: (1, 6),
- f(x) = (x + 3)² + 2, coordinates of the vertex: (−3, 2).
- f(x) = 4(x + 7)² − 1,
 coordinates of the vertex: (−7, −1),
- *f*(*x*) = −5(*x* − 6)² + 1,
 coordinates of the vertex: (6, −1),
- f(x) = −¹/₂(x + 8)² − 2, coordinates of the vertex: (−8, −2)

3

・ロト ・聞ト ・ヨト ・ヨト

Find the coordinates of the vertex of the graphs of the following functions
f(x) = (x - 1)² + 6,

coordinates of the vertex: (1, 6),

• $f(x) = (x + 3)^2 + 2$, coordinates of the vertex: (-3, 2)

 $f(x) = 4(x + 7)^2 - 1,$ coordinates of the vertex: (-7, -1),

f(*x*) = −5(*x* − 6)² + 1,
 coordinates of the vertex: (6, −1),

 f(x) = -¹/₂(x + 8)² − 2, coordinates of the vertex: (-8, -2)

◆□▶ ◆圖▶ ◆圖▶ ◆圖▶ ─ 圖

Find the coordinates of the vertex of the graphs of the following functions

• $f(x) = (x - 1)^2 + 6$, coordinates of the vertex:

 $f(x) = (x + 3)^2 + 2,$ coordinates of the vertex: (-3,2).

• $f(x) = 4(x + 7)^2 - 1$, coordinates of the vertex: (-7, -1),

f(*x*) = −5(*x* − 6)² + 1,
 coordinates of the vertex: (6, −1),

 f(x) = −¹/₂(x + 8)² − 2, coordinates of the vertex: (−8, −2)

Find the coordinates of the vertex of the graphs of the following functions

 $f(\mathbf{x}) = (\mathbf{x} + 3)^2 + 2,$ coordinates of the vertex: (-3, 2)

• $f(x) = 4(x + 7)^2 - 1$, coordinates of the vertex: (-7, -1),

f(*x*) = −5(*x* − 6)² + 1,
 coordinates of the vertex: (6, −1),

 f(x) = −¹/₂(x + 8)² − 2, coordinates of the vertex: (−8, −2)

3

イロト 不得 トイヨト イヨト

Find the coordinates of the vertex of the graphs of the following functions

f(*x*) = (*x* − 1)² + 6, coordinates of the vertex: (1, 6),

•
$$f(x) = (x+3)^2 + 2$$
,

(-3, 2),

$$f(x) = 4(x + 7)^2 - 1$$
,
coordinates of the vertex: $(-7, -1)$,

f(x) = −5(x − 6)² + 1,
 coordinates of the vertex: (6, −1),

 f(x) = -¹/₂(x + 8)² − 2, coordinates of the vertex: (-8, -2)

◆□▶ ◆圖▶ ◆圖▶ ◆圖▶ ─ 圖

Find the coordinates of the vertex of the graphs of the following functions

- *f*(*x*) = (*x* − 1)² + 6, coordinates of the vertex: (1, 6),
- $f(x) = (x + 3)^2 + 2$, coordinates of the vertex:
 - $f(x) = 4(x + 7)^2 1$, coordinates of the vertex: (-7, -1),
- $f(x) = -5(x-6)^2 + 1$, coordinates of the vertex: (6, -1),
- $f(x) = -\frac{1}{2}(x+8)^2 2,$ coordinates of the vertex: (-8, -2)

Find the coordinates of the vertex of the graphs of the following functions

- *f*(*x*) = (*x* − 1)² + 6, coordinates of the vertex: (1, 6),
- f(x) = (x + 3)² + 2, coordinates of the vertex: (-3, 2),
 - $f(x) = 4(x + 7)^2 1$, coordinates of the vertex: (-7, -1),
- f(x) = −5(x − 6)² + 1,
 coordinates of the vertex: (6, −1),
- $f(x) = -\frac{1}{2}(x+8)^2 2,$ coordinates of the vertex: (-8, -2)

Find the coordinates of the vertex of the graphs of the following functions

- *f*(*x*) = (*x* − 1)² + 6, coordinates of the vertex: (1, 6),
- f(x) = (x + 3)² + 2, coordinates of the vertex: (-3, 2),

•
$$f(x) = 4(x+7)^2 - 1$$
,

coordinates of the vertex: (-7, -1),

• $f(x) = -5(x-6)^2 + 1$, coordinates of the vertex: (6, -1),

 $f(x) = -\frac{1}{2}(x+8)^2 - 2,$ coordinates of the vertex: (-8, -2)
Find the coordinates of the vertex of the graphs of the following functions

- *f*(*x*) = (*x* − 1)² + 6, coordinates of the vertex: (1, 6),
- f(x) = (x + 3)² + 2, coordinates of the vertex: (-3, 2),
- $f(x) = 4(x+7)^2 1$, coordinates of the vertex:
- $f(x) = -5(x-6)^2 + 1$, coordinates of the vertex: (6, -1),
- $f(x) = -\frac{1}{2}(x+8)^2 2,$ coordinates of the vertex: (-8, -2)

イロト 不得 トイヨト イヨト 二日

Find the coordinates of the vertex of the graphs of the following functions

- *f*(*x*) = (*x* − 1)² + 6, coordinates of the vertex: (1, 6),
- f(x) = (x + 3)² + 2, coordinates of the vertex: (-3, 2),
- f(x) = 4(x + 7)² − 1, coordinates of the vertex: (−7, −1),
 - $f(x) = -5(x-6)^2 + 1,$ coordinates of the vertex: (6, -1),
 - $f(x) = -\frac{1}{2}(x+8)^2 2,$ coordinates of the vertex: (-8, -2)

Find the coordinates of the vertex of the graphs of the following functions

- *f*(*x*) = (*x* − 1)² + 6, coordinates of the vertex: (1, 6),
- f(x) = (x + 3)² + 2, coordinates of the vertex: (-3, 2),

•
$$f(x) = 4(x+7)^2 - 1$$
,
coordinates of the vertex: $(-7, -1)$,

•
$$f(x) = -5(x-6)^2 + 1$$
,

coordinates of the vertex: (-8, -2)

イロト 不得下 イヨト イヨト 二日

Find the coordinates of the vertex of the graphs of the following functions

- *f*(*x*) = (*x* − 1)² + 6, coordinates of the vertex: (1, 6),
- f(x) = (x + 3)² + 2, coordinates of the vertex: (-3, 2),
- f(x) = 4(x + 7)² − 1, coordinates of the vertex: (−7, −1),
- $f(x) = -5(x-6)^2 + 1$, coordinates of the vertex:

▲□▶ ▲□▶ ▲□▶ ▲□▶ = ののの

Find the coordinates of the vertex of the graphs of the following functions

- *f*(*x*) = (*x* − 1)² + 6, coordinates of the vertex: (1, 6),
- f(x) = (x + 3)² + 2, coordinates of the vertex: (-3, 2),

•
$$f(x) = 4(x+7)^2 - 1$$
,
coordinates of the vertex: $(-7, -1)$,

 f(x) = −5(x − 6)² + 1, coordinates of the vertex: (6, −1),

coordinates of the vertex: (-8, -2)

Find the coordinates of the vertex of the graphs of the following functions

- *f*(*x*) = (*x* − 1)² + 6, coordinates of the vertex: (1, 6),
- f(x) = (x + 3)² + 2, coordinates of the vertex: (-3, 2),

•
$$f(x) = 4(x+7)^2 - 1$$
,
coordinates of the vertex: $(-7, -1)$,

•
$$f(x) = -\frac{1}{2}(x+8)^2 - 2$$
,

イロト 不得下 イヨト イヨト 二日

Find the coordinates of the vertex of the graphs of the following functions

- *f*(*x*) = (*x* − 1)² + 6, coordinates of the vertex: (1, 6),
- f(x) = (x + 3)² + 2, coordinates of the vertex: (-3, 2),

•
$$f(x) = 4(x+7)^2 - 1$$
,
coordinates of the vertex: $(-7, -1)$,

• $f(x) = -\frac{1}{2}(x+8)^2 - 2$, coordinates of the vertex:

Find the coordinates of the vertex of the graphs of the following functions

- *f*(*x*) = (*x* − 1)² + 6, coordinates of the vertex: (1, 6),
- f(x) = (x + 3)² + 2, coordinates of the vertex: (-3, 2),

•
$$f(x) = 4(x+7)^2 - 1$$
,
coordinates of the vertex: $(-7, -1)$,

•
$$f(x) = -\frac{1}{2}(x+8)^2 - 2$$
,
coordinates of the vertex: $(-8, -2)$

イロト 不得下 イヨト イヨト 二日

The lesson from this presentation should be to be able to figure out which form is suitable for which purpose and to use this form for that purpose.

< ロ > < 同 > < 三 > < 三