TASK№10

The root $x = 1$ has multiplicity 2 for the function $f(x) = x^3 - x^2 - x + 1$

A: True

B: False

SOLUTION

$$f(x) = x^3 - x^2 - x + 1 = \left(x^3 - x^2\right) - (x - 1) = x^2(x - 1) - (x - 1) =$$

$$= (x - 1) * \left(x^2 - 1\right) = (x - 1) * (x - 1) * (x + 1) = (x - 1)^2 * (x + 1)$$

ANSWER

$$f(x) = x^3 - x^2 - x + 1 = (x - 1)^2 * (x + 1)$$

A: True

The root $x = 1$ has multiplicity 2 for the function $f(x) = x^3 - x^2 - x + 1$

TASK№9

9: Which description means the same as this limit expression?

$$\lim_{x \to -\infty} f(x) = \infty?$$

A: The graph rises on the left side

B: The graph rises on the right side

C: The graph falls on the left side

D: The graph falls on the right side

SOLUTION

$$x \to -\infty$$

It means that on the coordinate plane, we are working with the second and third quadrant or the same on the left side

$$\lim_{x \to -\infty} f(x) = \infty \rightleftarrows \forall E > 0 \exists M(E) > 0 : \forall x < -M \ |f(x)| > E$$

ANSWER

A: The graph rises on the left side

TASK№7

The function $f(x) = -3x^3 + x^2 + 2x$ rises as x grows very small.
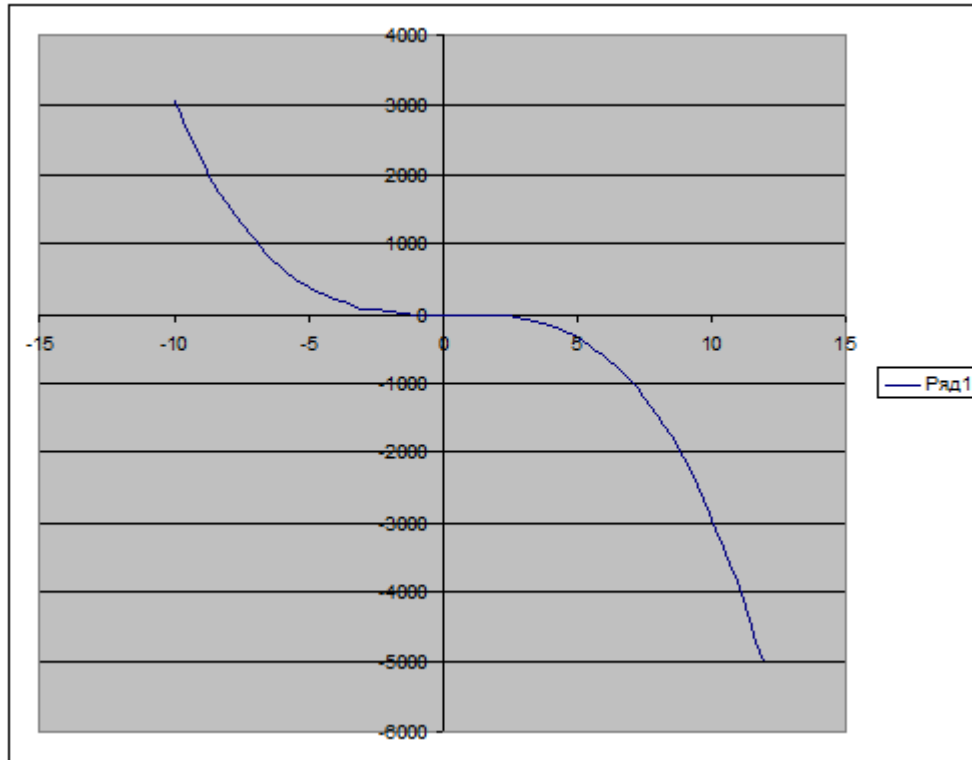
A: True

B: False

Рис. 1: The graph of the given function $f(x)$

SOLUTION

As can be seen from the figure function falls off with increasing value
of the variable x

ANSWER

B: False
Function falls off with increasing value of the variable x

TASK№6

The function $f(x) = x^3 - 3x^2 + 2x$ rises as x grows very large.
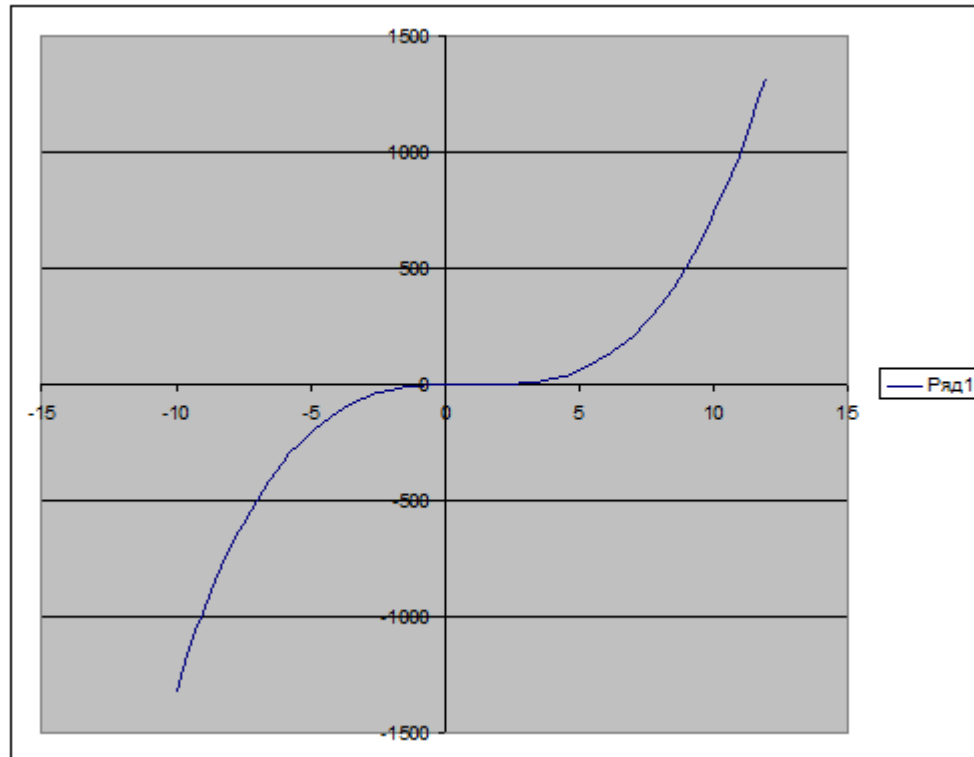
A: True

B: False

SOLUTION

Рис. 2: The graph of the given function $f(x)$

As seen from the figures the function increases with increasing values of the variable x

ANSWER

A: True

Function increases off with increasing value of the variable x