



View hints



View feedback

Play All ▶

QUESTION 1



Factor

$$81x^4 - 24x$$

.

Enter your answers in the spaces provided.

$$81x^4 - 24x =$$

$3x($

3



$x -$

2



$)($

9



$x^2 +$

6



$x +$

4



$)$

.

QUESTION 2



What is the polynomial function of least degree with integral coefficients, the zeros of which include

-3

,

2

, and

$4 + i$

?

Choose the correct answer.



$$P(x) = x^4 - 7x^3 + 3x^2 + 65x - 102$$



$$P(x) = x^4 - 7x^3 + 3x^2 + 65x$$



$$P(x) = -7x^3 + 3x^2 + 65x - 102$$



$$P(x) = x^4 + 3x^2 + 65x - 102$$

QUESTION 3



The average number of people visiting a museum can be modeled by

$$f(x) = x^4 - 8x^3 + 33x^2 - 45x + 10$$

,

where x is the number of hours since the museum opens. What is the average number of people who visit the museum five hours after it opens? Use two methods.

Enter the correct answers into the spaces provided.



Synthetic substitution					
5	1	-8	a	-45	10
		5	-15	b	c
	1	-3	18	45	235
a =					
33 ✓					
b =					
90 ✓					
c =					
225 ✓					

The average number of people that visit the museum five hours after it opens is

235 ✓

QUESTION 4



Find the value of

a

if the remainder of the division of

$$f(x) = 2x^4 - 2x^3 + ax^2 - 3$$

by

$$(x - 2)$$

is

$$-3$$

.

Enter the correct answer into the space provided.

$a =$

-4



QUESTION 5



Find all the zeros of the polynomial function

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

.

Select the correct answer from the drop-down menu.

The zeros of the polynomial are

and



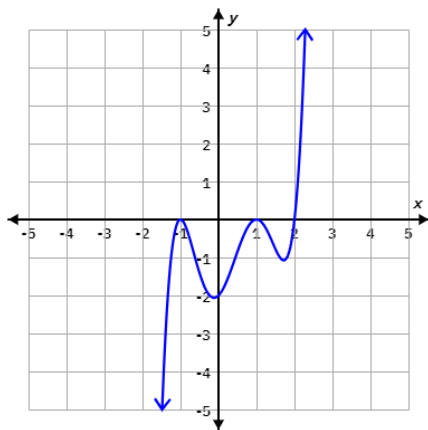
QUESTION 6



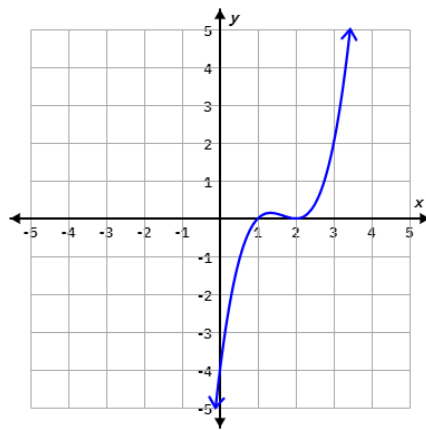
Find the zeros of the given function

$$f(x) = x^5 - 3x^4 + x^3 + x^2 + 4$$

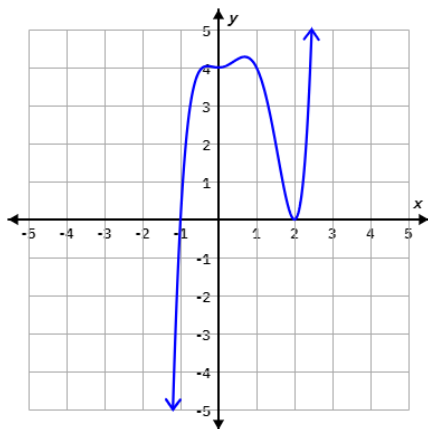
and its related graph.



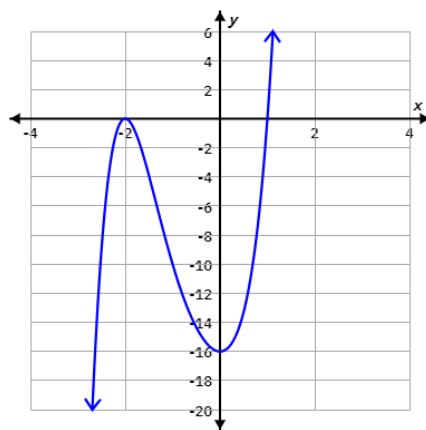
Graph A



Graph B



Graph C



Graph D

Drag and drop the correct answers to correctly complete the following sentence.

The function has real zeros at

2



—
1 ✓ and the complex roots at i ✓,
-1 ✓ i. The related graph is C ✓.

2i

D

4

3

-2

-
4

B

A

-2i

QUESTION 7

Simplify

$$\frac{21xy^3 - 49x^2y + 14xy^2}{7xy}$$

Enter your answers in the spaces provided.

$$\frac{21xy^3 - 49x^2y + 14xy^2}{7xy}$$

=

3y² ✓

—

7x ✓

+

2y ✓

QUESTION 8



Factor the polynomial

$$2xa - 3y - 3ya + 2x + 10xb - 15yb$$

.

Drag and drop your answers to correctly complete the following factorization.

$$2xa - 3y - 3ya + 2x + 10xb - 15yb$$

=

$$(2xa + 10xb) \quad \checkmark$$

+ 2x

$$+ (-3ya - 15yb - 3y) \quad \checkmark$$

=

$$2x(a + 5b + 1) \quad \checkmark$$

- 3y

$$(a + 5b + 1) \quad \checkmark$$

= (2x

$$- 3y) \quad \checkmark$$

)

(a +

$$5b + 1) \quad \checkmark$$

)

.

$5y + 1$

$(2a + 10b)$

$3y$

$(-3ya - 15yb)$

$2x$

$(2xa + 10xb + 2x)$

QUESTION 9



What is the error done in this product?

$$\begin{aligned}(5x - 1)(-2x^2 - 3x) \\&= 5x(-2x^2) + 5x(-3x) - 1(-2x^2) - 1(-3x) \\&= 3x^3 - 2x^2 - 3x^2 - 4x \\&= 3x^3 - 5x^2 - 4x\end{aligned}$$

.

Choose the correct answer.

☐ The error is in using the Distributive Property.

☐ The error is in combining like terms.

☒ The error is in multiplying the monomials.



☐ The error is in adding like terms.

QUESTION 10



Find a polynomial

$$p(x)$$

of degree 3 such that

$$p(3) = 0$$

,

$$(x - 2)$$

is a factor,

$$p(1) = 2$$

and

$$p(-1) = -12$$

.

Enter the correct answer into the space provided.

$$p(x) =$$

$$x(x - 2)(x - 3)$$



QUESTION 11



Sami bought for his store 20 electronic devices, computers that costs AED 1500 each and tablets that cost AED 700 each.

Write and simplify a polynomial that models his total cost. Let x represent the number of computers.

Enter the correct answer into the space provided.

The polynomial that models Sami's total cost is

$$800x + 14000$$





QUESTION 12



Complete the table that shows the synthetic division used to determine the quotient and remainder of

$$\begin{array}{r} x^3 - 3x^2 + x - 4 \\ x - 3 \end{array}$$

Drag and drop the correct answers to correctly fill in the following spaces.

3	1
	1

The quotient is $x^2 + 1$ ✓ and the remainder is

-1 ✓

-3

4

x^2

$$\frac{-1}{x-3}$$

$x+1$

x^2-3

-4

QUESTION 13



The height of a tissue box is

$2x + 4$

centimeters and its volume is

$6x^3 - 1$

cubic centimeters.

What is true about the area of the bottom of the tissue box?

Choose the correct answer.



The area of the bottom of the tissue box is a polynomial because dividing the volume to the height leads to a quotient which is a polynomial with a zero remainder.



The area of the bottom of the tissue box is not a polynomial because dividing the volume to the height leads to a quotient which is a polynomial with a zero remainder.



The area of the bottom of the tissue box is not a polynomial because dividing the volume to the height leads to a quotient which is a polynomial with a non-zero remainder.



The area of the bottom of the tissue box is a polynomial because dividing the volume to the height leads to a quotient which is a polynomial with a zero remainder.

QUESTION 14



What is true about the polynomial

$$f(x) = x^4 - 4x^3 + 2x^2 + 1$$

?

Choose the correct answers.



The number of positive real roots is either zero or two.



$(x + 1)$
is a factor



$(x - 1)$
is a factor



The polynomial has one negative real root.



The polynomial has one positive real root.

☐

The number of negative real roots is either zero or two.

QUESTION 15



Find the real zeros of the polynomial

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

.

Enter the correct answers into the spaces provided.

	1	
-3	1 ✓	
-2	1	
-1	1	
1	1	3

The real zeros of

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

from smallest to greatest are

-2



-1



1



QUESTION 16



Jana claims that the only polynomial that has the real zeros 1, 2 and -3

is

$$p(x) = x^3 - 7x + 6$$

. Is her claim correct? Why?

Choose the correct answer.

Jana's claim is correct because

$$p(x) = (x - 1)(x - 2)(x + 3) = x^3 - 7x + 6$$

is the only polynomial having the factors

$$(x - 1)$$

,

☐ $(x - 2)$

and

$$(x + 3)$$

thus the real zero are 1, 2 and

$$-3$$

.

Jana's claim is not correct because

$$p(x) = x^3 - 7x + 6$$



is the only polynomial of least degree having the real zero 1, 2 and

$$-3$$



Jana's claim is correct because the rational zeros of

$$p(x) = x^3 - 7x + 6$$

are

- ☐ $\pm 1, \pm 2, \pm 3, \pm 6$

, thus the real zero roots are 1, 2 and

$$-3$$

Jana's claim is not correct because

$$p(x) = x^3 - 7x + 6$$

- ☐ is a polynomial having the real zero 1, 2 and

$$-3$$

in addition to complex roots.

QUESTION 17



Use synthetic division to find the remainder when

$$x^4 - 5x^3 + 3x - 2$$

is divided by

$$x - 1$$

.

$$\begin{array}{r|rrrr} 1 & 1 & a & 3 & -2 \\ & & 1 & c & -1 \\ \hline & b & -4 & -1 & -3 \end{array}$$

Enter the correct answers into the spaces provided.

$a =$

✓

$b =$

✓

$c =$

✓

and the remainder is

✓

QUESTION 18



What is true about the polynomial function

$$f(x) = 4x^4 + 3x^2 - 1$$

?

Choose the correct answers.

☐

If

$$\frac{p}{q}$$

is a rational zero then

p

is a factor of 4 and

q

is a factor of 1.

The rational zeros are:

$p \in \{ \dots, -1, 1, \dots \}$



$$\frac{p}{q} = \left\{ \pm 1, \pm \frac{1}{2}, \pm \frac{1}{4} \right\}$$



If

$$\frac{p}{q}$$

is a rational zero then

$$p$$

is a factor of 1 and

$$q$$

is a factor of 4.



If

$$\frac{p}{q}$$

is a rational zero then

$$p$$

is a factor of 1 and

$$q$$

is a factor of 3.



The rational zeros are:

$$\frac{p}{q} = \left\{ \pm 1, \pm \frac{1}{3} \right\}$$

.



The rational zeros are:

$$\frac{p}{q} = \left\{ \pm 1, \pm 2, \pm 4 \right\}$$

.

QUESTION 19



Enter the correct answers into the spaces provided.

Use the division algorithm to simplify the following expression:

$$(x^3 - 2x^2 + x - 3)(x - 1)^{-1} =$$

$$x^2 - x$$



—

$$\frac{3}{x - 1}$$



QUESTION 20



Given the polynomial function

$$f(x) = 3x^3 - 4x^2 - 5x + 4$$

Fill in the blanks to estimate the x -coordinates of the relative maxima and relative minima.

x	-3	-2
$f(x)$	-98	-26



The relative maximum is closest to the integer

$x =$

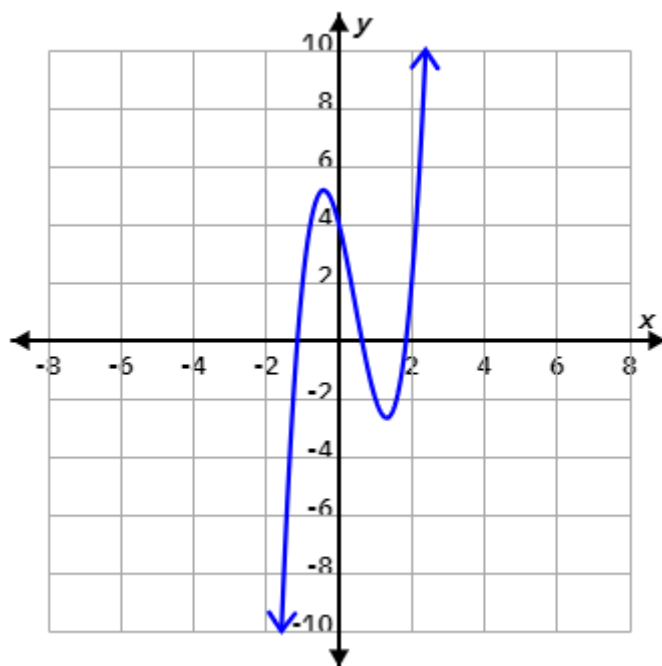
0



The relative minimum is closest to the integer

$x =$

1



QUESTION 21



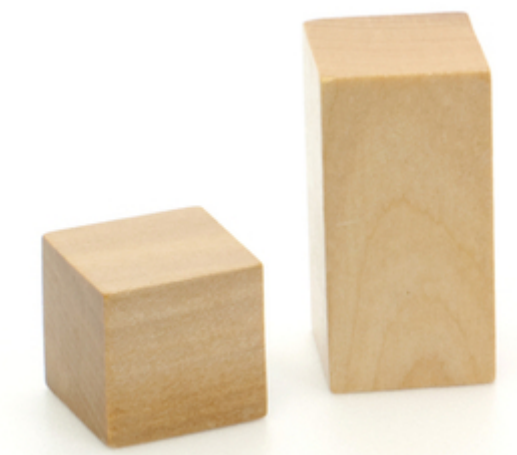
Given a cube of side x and a rectangular prism whose base area is

$$(x - 1)^2$$

unit square and height

$$2x + 1$$

Estimate the possible values for x so that both have the same volume. Give your answer to the nearest whole number.



Choose the correct answer.



$$x = -1$$

or

$$x = 3$$



$$x = 1$$

or

$$x = 2$$

^

⌵

☒

$x = 1$
or
 $x = 3$

✓

☐

$x = 2$
or
 $x = 3$

QUESTION 22

▶

The annual revenue of selling household machines is modeled by the cubic function

$$f(x) = -0.3x^3 + 2.8x^2 - 4.7x + 3$$

. where

x

is the number of years after 2000 and

$f(x)$

is the annual revenue in thousands of dirhams.

Select the correct answer from the drop-down menu.

The value of

$f(x)$

changes sign between

$x =$

7 ✓ ▼

and

$x =$

8

indicating a zero of the function.

There is a relative minimum near 2000 and 2002 ✓ ▼ and a relative maximum

near 2004 and 2006 ✓ ▼.

$f(x) \rightarrow \infty$ as

$x \rightarrow -\infty$ ✓ ▼ and

$f(x) \rightarrow -\infty$ ✓ ▼

as $x \rightarrow \infty$

Household machines sold declined at 2001 and peaked at around 2005 ✓ ▼.

QUESTION 23



Solve

$$x^4 - 3x^2 + 2 = 0$$

Enter the correct answers into the spaces provided.

The solutions of the equation, from smallest to greatest, are

$-\sqrt{2}$ ✓

-1 ✓

1 ✓

$\sqrt{2}$ ✓

QUESTION 24



Select the correct answer from the drop-down menu.

When a polynomial

$$p(x)$$

of degree

$$n \geq 2$$

is divided by

$$(x - a)$$

then

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

where

$$(x - a)$$

is called the divisor ✓ ▼,

$$q(x)$$

is the quotient ✓ ▼,

$$p(a)$$

is the remainder ✓ ▼ and

$$p(x)$$

is the dividend ✓ ▼.

QUESTION 25



Select the correct answer from the drop-down menu.

For the given polynomial function

$$f(x) = 2x^3 - x^2 - 8x + 4$$

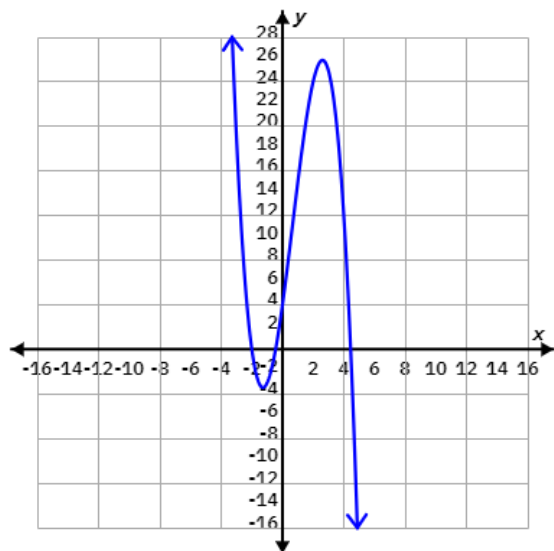
$$f(0) =$$

4 ✓ ▼ and

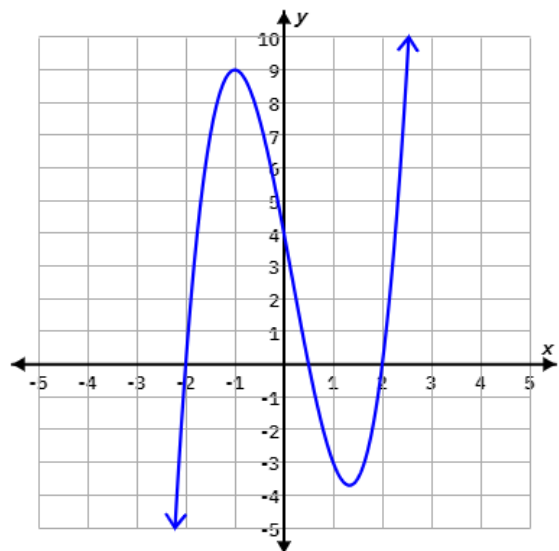
$$f(-2) =$$

0 ✓ ▼ .

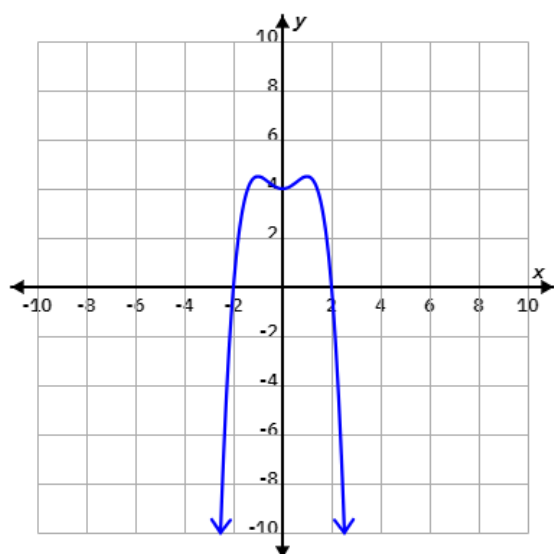
The curve that represents the function f is Graph B ✓ ▼.



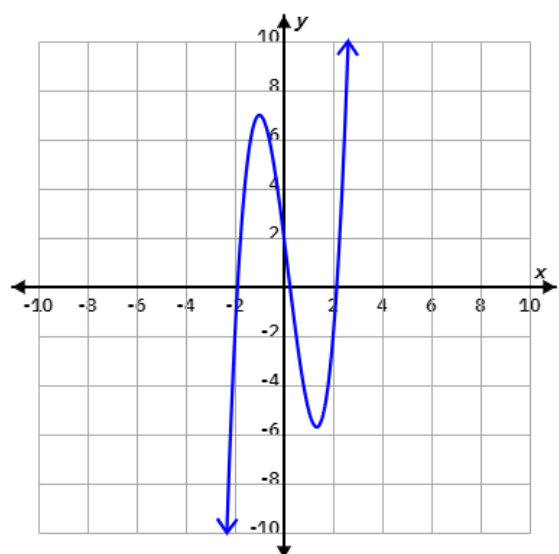
Graph A



Graph B



Graph C



Graph D

QUESTION 26



What is true about the expression

$$-3x^4 + xy^4 - 3x^2y^5 - 3$$

?

Choose the correct answers.

☐

$$-3x^4 + xy^4 - 3x^2y^5 - 3$$

is not a polynomial.

☐

$$-3x^4 + xy^4 - 3x^2y^5 - 3$$

is a polynomial of the same degree as

$$-3x^4 + xy^4$$

.

☒

$$-3x^4 + xy^4 - 3x^2y^5 - 3$$

is a polynomial of the same degree as

$$3x^4y^3 - 3$$

.


☒

$$-3x^4 + xy^4 - 3x^2y^5 - 3$$

is a polynomial of degree 7.



☐

$-5x^3 + xy^3 - 5x^2y^2 - 3$
is a polynomial of degree 4.

☐

$-3x^4 + xy^4 - 3x^2y^5 - 3$
is a polynomial of degree 16.

QUESTION 27



Fill in the blanks with either *T* for true statements, *F* for false statements, and *CNT* for other statements.

Statement	T/F
If $f(x)$ is a polynomial function, a and b are two real numbers and $f(a) \cdot f(b) > 0$ then the function has at least one real zero between a and b .	F
A point B is a relative minimum	T

if there are no other nearby points having lesser y -coordinates.	
The function with a relative maximum has a real zero.	CNT
If the value of x changes the sign from one value of y to the next then there is a zero between these two values.	F
If $f(x)$ is a polynomial function, a and b are two real numbers and $f(a) \cdot f(b) > 0$ then the function has no real zero.	CNT

QUESTION 28



Describe the characteristics of the function

$f(x)$

whose graph is shown.

Select the correct answer from the drop-down menu.

The domain of f is

all real numbers ✓ ▼

The end behavior: As

$x \rightarrow -\infty$.

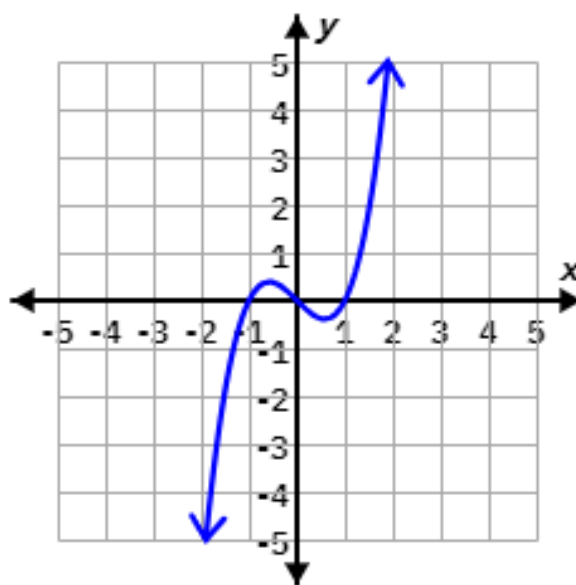
$f(x) \rightarrow -\infty$ ✓ ▼; As

$x \rightarrow \infty$.

$f(x) \rightarrow \infty$ ✓ ▼.

The function has an odd-degree and a positive ✓ ▼ leading coefficient.

It has three ✓ ▼ real zeros.



QUESTION 29



Drag and drop each equation or property to correctly complete the following table.

$x^7 \cdot x^6 = x^{11}$ ✓	Product of Powers Property
$(xy)^3 = x^3 y^3$	Power of a Product Property ✓
	Quotient of Powers Property

$$\frac{x^5}{x^3} = x^2, x \neq 0 \quad \checkmark$$

$$x^{-5} = \frac{1}{x^5}$$

,

$$x \neq 0$$

Negative Exponent Property 

$$x^7 \cdot x^6 = \frac{1}{x^{-11}}$$

Power of a Power Property

Zero Power Property

$$\left(\frac{x}{y}\right)^2 = \frac{x^2}{y^2}, y \neq 0$$

$$x^0 = 1, x \neq 0$$

Powers of Quotient Property

QUESTION 30



What is true about the function

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

?

Select all that apply.

☐

The number of real zeros of $f(x)$

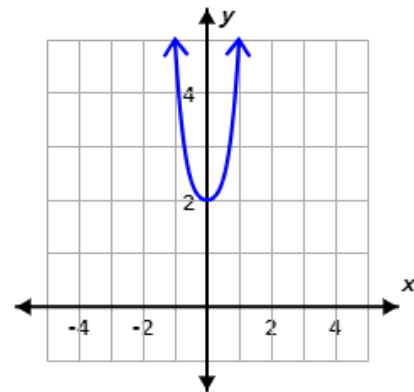
is 2.



$$f(-t) = 2t^3 + t^2 - 1$$



The function has the following graph:



$$f(x) \rightarrow \infty \text{ as } x \rightarrow -\infty$$

and

$$f(x) \rightarrow \infty \text{ as } x \rightarrow \infty$$



$$f(x)$$

is a polynomial function of degree 5.



$$f(x) \rightarrow \infty \text{ as } x \rightarrow -\infty$$

and

$$f(x) \rightarrow -\infty \text{ as } x \rightarrow \infty$$

