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Exploring; "Deepening your understanding of quadratics and cubics"

page 4 all panels

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Answer Question 6 - SAS4

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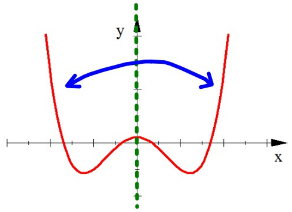
Answers to Question #6

Even Functions:

Graphically:

Graph has y-axis symmetry

example: $y = 3x^4 - 9x^2 + 1$



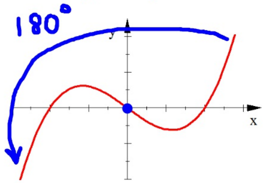
Since this graph appears to y-axis symmetry this function is EVEN

Odd Functions:

Graphically:

Graph has symmetry about the origin.

example: $y = x^3 - 4x$



Since this graph appears to symmetry about the origin this function is ODD

Even Functions:

Numerically: f(-x) = f(x)

When you replace x with its opposite you get the same y-value in return.

example: $y = 3x^4 - 9x^2 + 1$

X	Y
1	$3(1)^4 - 9(1)^2 + 1 = 3(1) - 9(1) + 1 = 3 - 9 + 1 = -5$
-1	$3(-1)^4 - 9(-1)^2 + 1 = 3(1) - 9(1) + 1 = 3 - 9 + 1 = -5$

when we substituted an x-value and its opposite value and got the same y-value both times this function appears to be EVEN

Odd Functions:

Numerically: f(-x) = -f(x)

When you replace x with its opposite you get the opposite y-value in return.

example: $y = x^3 - 4x$

X	Y
5	$(5)^3 - 4(5) = 125 - 20 = 105$
-5	$(-5)^3 - 4(-5) = -125 + 20 = -105$

when we substituted opposite values and got opposite values of y this function appears to be ODD

Even Functions:

Algebraically: f(-x) = f(x)

When you rewrite the original function using -x instead of x it will simplify back into the original equation.

example: $y = 3x^4 - 9x^2 + 1$

$f(x) = 3x^4 - 9x^2 + 1$

$f(-x) = 3(-x)^4 - 9(-x)^2 + 1$

$= \underbrace{3x^4 - 9x^2 + 1}_{f(x)}$

$f(-x) = f(x)$

When we replaced x with its opposite and simplified the result was the same function as the original f(x). Therefore, this function must be EVEN

Odd Functions:

Algebraically: f(-x) = -f(x)

When you rewrite the original function using -x instead of x it will simplify into an equation that is the opposite of the original equation (all signs will change).

example: $y = x^3 - 4x$

$f(x) = x^3 - 4x$

$f(-x) = (-x)^3 - 4(-x)$

$= -x^3 + 4x$

factor out a negative

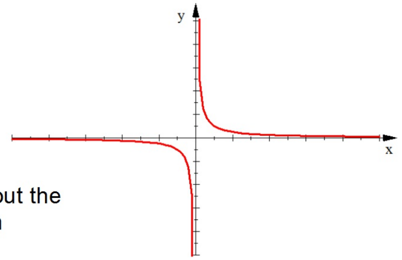
$= -(\underbrace{x^3 - 4x}_{f(x)})$

$f(-x) = -f(x)$

We replaced x with its opposite and simplified. After simplifiying we factored out a negative. After factoring out a negative we were left with the original function. This result shows that we end up with the opposite of the original function. Therefore, this function must be ODD

Graphically, does this function appear to be ODD, EVEN, or Neither?

$$y = \frac{1}{x}$$



This appears to symmetry about the origin. Therefore, the function appears to be ODD.

Numerically, does this function appear to be ODD, EVEN, or Neither?

$$y = |x^3| - 2$$

X	Y
1	-1
-1	-1

When we substituted opposite x-values +1 & -1 into the function we got the same y-value in return. Therefore, this function appears to be EVEN.

Algebraically, does this function appear to be ODD, EVEN, or Neither?

$$y = x^4 - 2x + 6$$

$$f(-x) = (-x)^4 - 2(-x) + 6$$

$$= x^4 + 2x + 6$$ → this isn't the original f(x)

$$f(-x) = -(-x^4 - 2x - 6)$$ → this isn't the opposite of f(x)

Therefore, this function is NEITHER odd nor even.

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page 6 panel 1

Introduces the conecpt of Average Rate of Change over an interval of a function.

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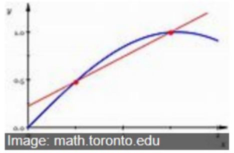
page 6 show panel 2

introduces the term Secant Line. See next page for an example/definition of this term.

Secant line In geometry, a secant of a curve is a **line that intersects the curve in at least two (distinct) points**. The word secant comes from the Latin word secare, meaning to cut.



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Answer Question 7 - SAS4

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page 6 play animation on panel 2

Answers Question #7

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page 6 panel 3

Gives practice finding rate of change over an interval

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Answer Question 8 - SAS4

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page 6 panel 4

Answers question #8 and gives more practice finding avg rate of change on a cubic.

If an interval for rate of change includes a max or min then it's not a good indicator of the graphs behavior.

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page 7

introduces a scenario for average rate of change.

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Answer Question 9 - SAS4

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Answer Question 10 - SAS4

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Answers Questions 9 and 10

Hwk #20

1. Agilemind website - Topic 4 - Introduction to Polynomials

   More Practice #'s 11-15

2. Agilemind - Topic 4 - Introduction to Polynomials

   SAS4 - questions 17, 18