

HW 5 - 9

1. $Q(x) = x^2 + 2$

$R(x) = 2$

$P(-3) = 2 \checkmark$

2. $Q(x) = x^2 + 3x + 4$

$R(x) = 4$

$P(-2) = 4 \checkmark$

3. $P(2) = 0$

yes

4. $P(-2) = 16$

no

5. $a = -7$

6. Graph see next page

increasing: $(-2, 0), (2, \infty)$ decreasing: $(-\infty, -2), (0, 2)$ rel min: $(-2, 0), (2, 0)$ rel max: $(0, 16)$

7. Graph see next page

increasing: $(-\infty, .21), (3.12, \infty)$ decreasing: $(.21, 3.12)$ rel min: $(3.12, -4.06)$ rel max: $(.21, 8.21)$

Test is Wednesday.

Use Castle Learning Unit 5 Review as extra practice.

Review in class tomorrow.

Tonight's HW: Omit domain & range parts only in #1 & 2.

Nov 1-8:35 PM

For 1 & 2:

a. Use long division to find the quotient $Q(x)$ and remainder $R(x)$.

b. Verify your remainder with the remainder theorem.

space

$$\begin{array}{r} x^3 + 3x^2 + 2x + 8 \\ x+3 \overline{) } \\ \underline{-(x^3 + 3x^2)} \\ 2x + 8 \\ \underline{-(2x + 6)} \\ 2 \end{array}$$

$Q(x) = x^2 + 2$

$R(x) = 2$

$P(-3) = (-3)^3 + 3(-3)^2 + 2(-3) + 8$

$P(-3) = 2 \checkmark$

space

$$\begin{array}{r} x^3 + 5x^2 + 10x + 12 \\ x+2 \overline{) } \\ \underline{-(x^3 + 2x^2)} \\ 3x^2 + 10x \\ \underline{-(3x^2 + 6x)} \\ 4x + 12 \\ \underline{-(4x + 8)} \\ 4 \end{array}$$

remainder

$Q(x) = x^2 + 3x + 4$

$R(x) = 4$

$P(-2) = (-2)^3 + 5(-2)^2 + 10(-2) + 12$

$P(-2) = -8 + 20 - 20 + 12$

$P(-2) = 4 \checkmark$

In 3 & 4, using the binomial theorem, determine if the given binomial is a factor of the given polynomial.

3. $(x^4 - 8x^3 + 10x^2 + 2x + 4) \div (x - 2)$

$P(2) = 2^4 - 8(2)^3 + 10(2)^2 + 2(2) + 4$

$P(2) = 16 - 64 + 40 + 8$

$P(2) = 0$

 $\therefore$ yes

4. $(x^4 + 10x^3 + 21x^2 + 6x + 8) \div (x + 2)$

$P(-2) = (-2)^4 + 10(-2)^3 + 21(-2)^2 + 6(-2) + 8$

$P(-2) = 16 - 80 + 84 - 12 - 8$

$P(-2) = 16$

 $\therefore$ no

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5. Find the value of a if $x^3 + 8x^2 + ax - 2$ is divisible by $(x - 1)$

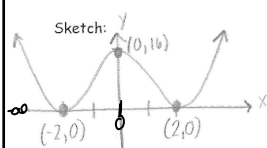
$$\begin{aligned} P(1) &= 0 \\ 1^3 + 8(1)^2 + 1(a) - 2 &= 0 \\ 1 + 8 + a - 2 &= 0 \\ 7 + a &= 0 \\ a &= -7 \end{aligned}$$

In 6 & 7, state the degree of the polynomial, find the zeros of each polynomial, state the multiplicity of each. Sketch. Using your calculator, determine relative min/max and where it's increasing/decreasing.

6. $P(x) = (x + 2)^2(x - 2)^2$

Degree: 4

Z	M	T/C
-2	2	T
2	2	T

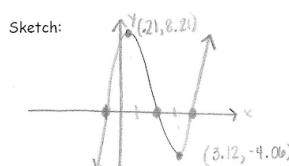


Increasing: $(-2, 0), (2, \infty)$
 Decreasing: $(-\infty, -2), (0, 2)$
 Rel Min: $(-2, 0), (2, 0)$
 Rel Max: $(0, 16)$

7. $Q(x) = (x + 1)(x - 2)(x - 4)$

Degree: 3

Z	M	T/C
-1	1	C
2	1	C
4	1	C



Increasing: $(-\infty, 2), (3.12, \infty)$
 Decreasing: $(2, 3.12)$
 Rel Min: $(3.12, -4.06)$
 Rel Max: $(2, 8.21)$

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Even & Odd

Functions

**YOU WILL NEED YOUR PHONE FOR
NOTES TODAY!**

Jan 16-1:11 PM

Even Function → A function is even if $f(-x) = f(x)$ for every x in the domain of $f(x)$.

Odd Function → A function is odd if $f(-x) = -f(x)$ for every x in the domain of $f(x)$.

What does this mean? Given $x \rightarrow y$, even $-x \rightarrow y$, odd $-x \rightarrow -y$

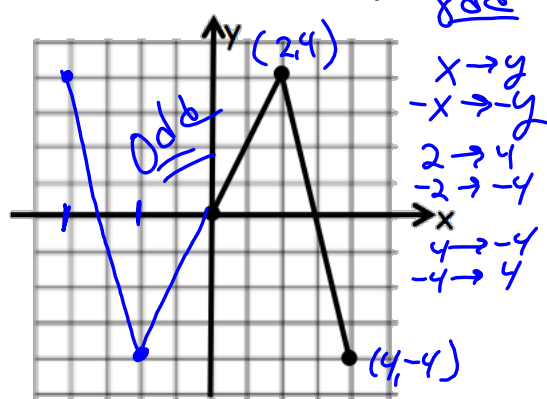
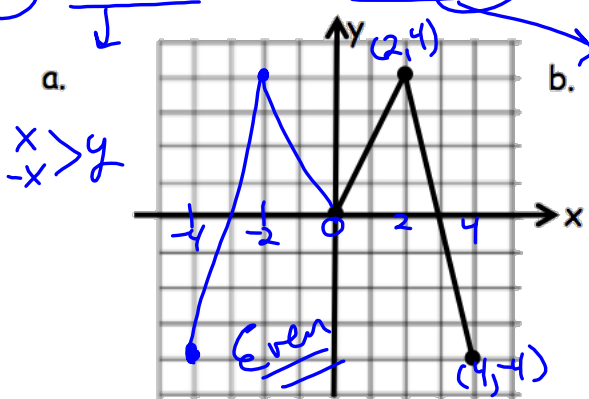
Even → When you plug in $-x$ for x , you get the same answer

Odd → When you plug in $-x$ for x , you get the opposite answer

Jan 16-1:13 PM

Given the partial graph of function f shown below. Sketch the other half of the function in

a) if $f(x)$ is even and in b) if $f(x)$ is odd. Find $f(-x)$ for each of the indicated points.



What can you say about each of the functions graphically (think symmetry)

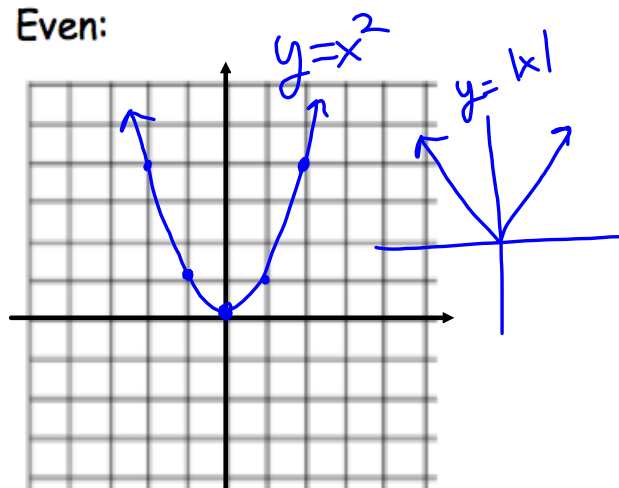
Even → Symmetrical with respect to y-axis ($r_{y\text{-axis}}$)

Odd → Symmetrical with respect to the origin ($r_{o,o}$ or R_{180})

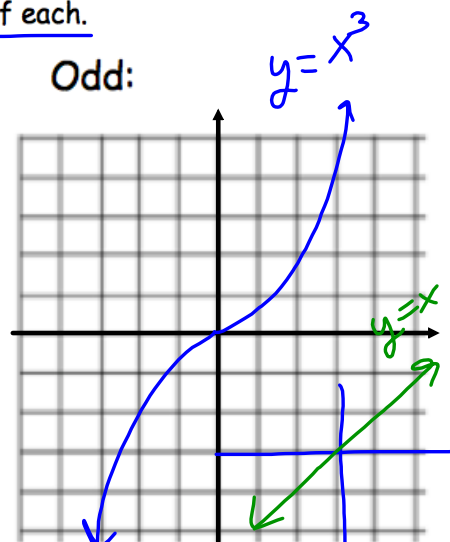
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Think about all of the functions we have studied so far this year. Sketch a graph of an even function and an odd function and state the equation of each.

Even:



Odd:



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<https://kahoot.com/>

A2 Even & Odd Functions 'Shared..'

Determine Graphically whether a function is odd or even - Quick 5 Question Kahoot

$f(-x)$
 → same → even
 → opposite → odd
 → otherwise neither

Nov 1-2:14 PM

Determine algebraically whether each of the following functions is even, odd, or neither.

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

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

$$= 3x^2 - x - 1$$

Neither

$\frac{1}{2} \rightarrow -\frac{1}{2} = \frac{-1}{2} = \frac{1}{-2}$

2. $f(x) = \frac{x}{x^2 - 1}$

$$f(-x) = \frac{-x}{(-x)^2 - 1}$$

$$= \frac{-x}{x^2 - 1}$$

Opposite $\rightarrow$ odd

$x \rightarrow y$
 $-x \rightarrow y$
 even
 $-x \rightarrow -y$
 odd

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

$$f(-x) = |-x| + 2$$

$$= x + 2$$

Same $\rightarrow$ even

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

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

$$= -x^3 + x$$

Opposite $\rightarrow$ odd

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Given the partially filled out table below for $f(x)$, fill in the rest of the table based on the function type.

5. Even

$$x \rightarrow y$$

$$-x \rightarrow -y$$

x	-3	-2	-1	0	1	2	3
y	-15	-5	1	3	1	-5	-15

6. Odd

$$x \rightarrow y$$

$$-x \rightarrow -y$$

x	-3	-2	-1	0	1	2	3
y	-21	-4	1	0	-1	4	21

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7. If $f(x)$ is an even function and $f(3) = 5$ then what is the value of $4f(3) + 2f(-3)$?

a. 30

b. 10

c. 60

d. 6

$$f(-3) = 5$$

$$4(5) + 2(5)$$

$$20 + 10$$

$$= 30$$

HOMEWORK: 5-10

Jan 16-1:21 PM

**Group Work Question: Groups of 4. 5-7 minutes.
Staple together with paper to grade on top. Turn in.**

Nov 14-6:13 PM