

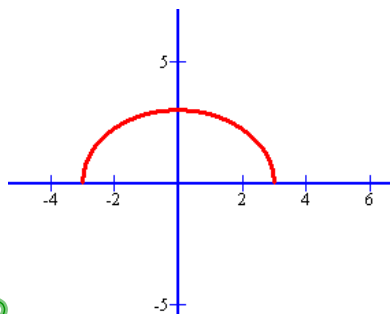
Homework Questions

15.

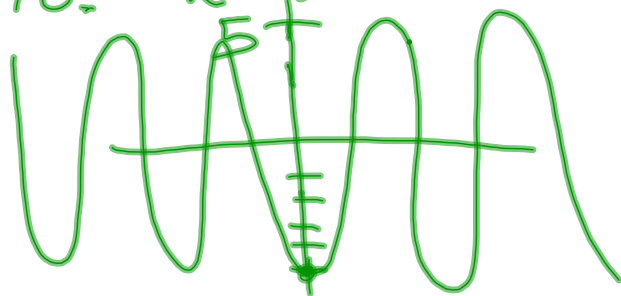
$$\sqrt{9-x^2}$$

$$D: -3 \leq x \leq 3$$

$$R: 0 \leq y \leq 3$$



18.
$$h(\theta) = -5 \cos\left(\frac{\theta}{2}\right)$$

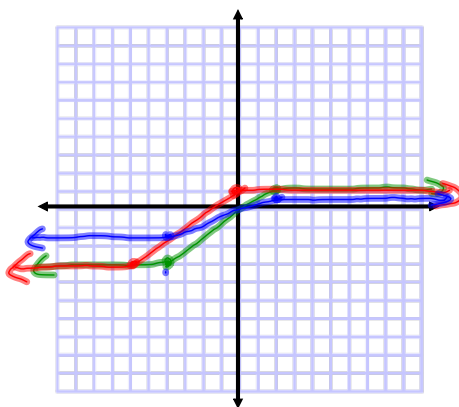


$$D: \mathbb{R}$$

$$R: -5 \leq y \leq 5$$

b)
$$f(x+2)$$

f)
$$\frac{1}{2}f(x)$$



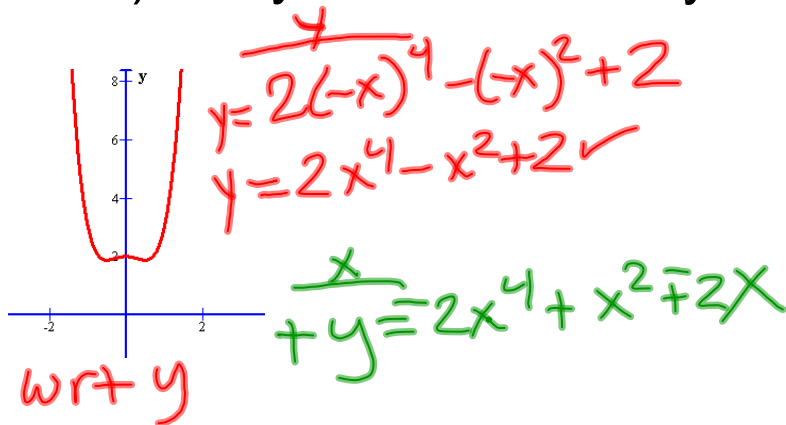
Symmetry

Symmetric wrt x-axis: replacing y with $-y$ yields an equivalent equation.

Symmetric wrt y-axis: replacing x with $-x$ yields an equivalent equation.

Symmetric wrt origin: replacing x with $-x$ and replacing y with $-y$ yields an equivalent equation

E4) test $y=2x^4-x^2+2$ for symmetry

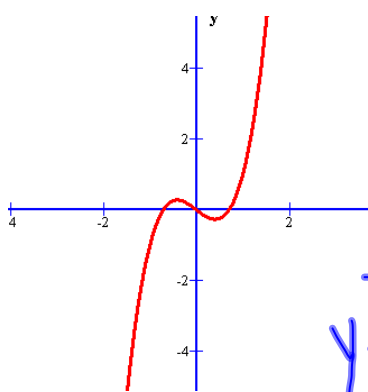


origin

$$-y = 2(-x)^4 - (-x)^2 + 2$$

$$+y = 2x^4 + x^2 + 2 \quad X$$

E5) test $f(x)=2x^3-x$ for symmetry



$$+y = 2x^3 + x \quad \text{NO}$$

$$y = 2(-x)^3 - (-x) \quad \text{NO}$$

origin

$$-y = 2(-x)^3 - (-x)$$

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

$$y = 2x^2 - x$$

YES!

y-axis

x-axis

origin

Even and Odd functions

A function is **even** if $f(-x) = f(x)$

A function is **odd** if $f(-x) = -f(x)$

Which one of these is a law for symmetry?

What type of symmetry is it?

Even functions are symmetric
wrt y .

determine if the functions are odd, even, or neither

even

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

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

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

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

ODD

$$g(x) = -4x^2$$

$$g(-x) = -4(-x)^2$$

$$g(-x) = -4x^2$$

EVEN

$$h(x) = x^2 + x + 3$$

$$h(-x) =$$

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

$$x^2 - x + 3$$

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

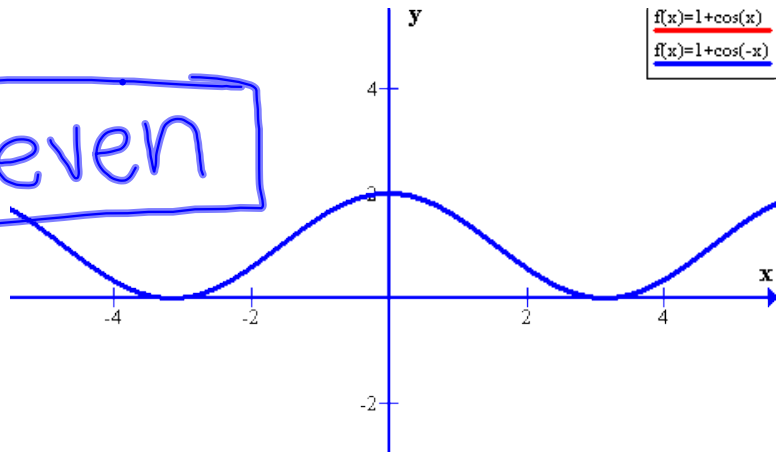
NEITHER

odd

$$g(x) = 1 + \cos x$$

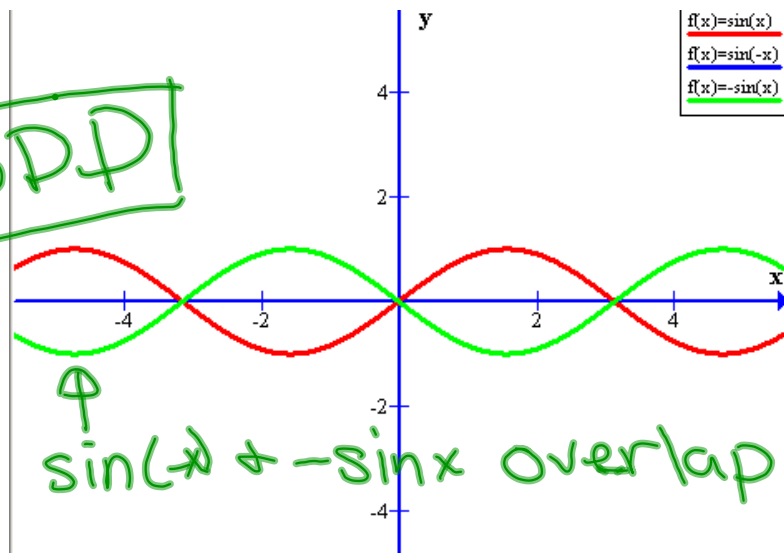
$$g(-x) = 1 + \cos(-x)$$

Cosine is even



$$f(\theta) = \sin \theta$$

Sine is ODD



$$\sin(-x) = -\sin x$$

$$\cos(-x) = \cos x$$

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p. 29 # 47, 48