Warm Up

plug in $(-x)$

Algebraically determine whether the function $j(x) = x^4 - 3x^2 - 4$ is odd, even, or neither.

$j(-x) = (-x)^4 - 3(-x)^2 - 4$

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

Even

Which function is even?

1) ~~$f(x) = \sin x$~~ (Same)

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

3) $f(x) = |x - 2| + 5$

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

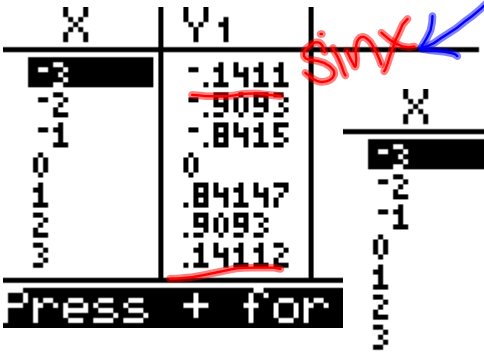
Which equation represents an odd function? (negated)

1) $y = \sin x$

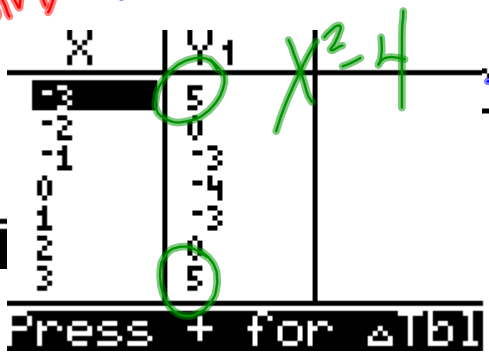
2) $y = \cos x$

3) $y = (x+1)^3$

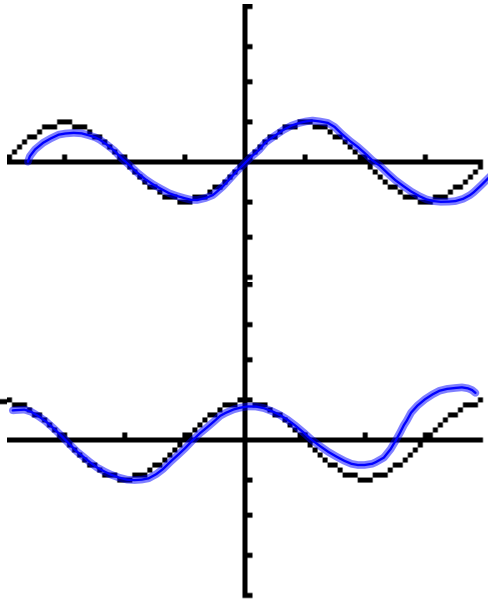
4) $y = e^{5x}$



Sinx



$x^2 - 4$



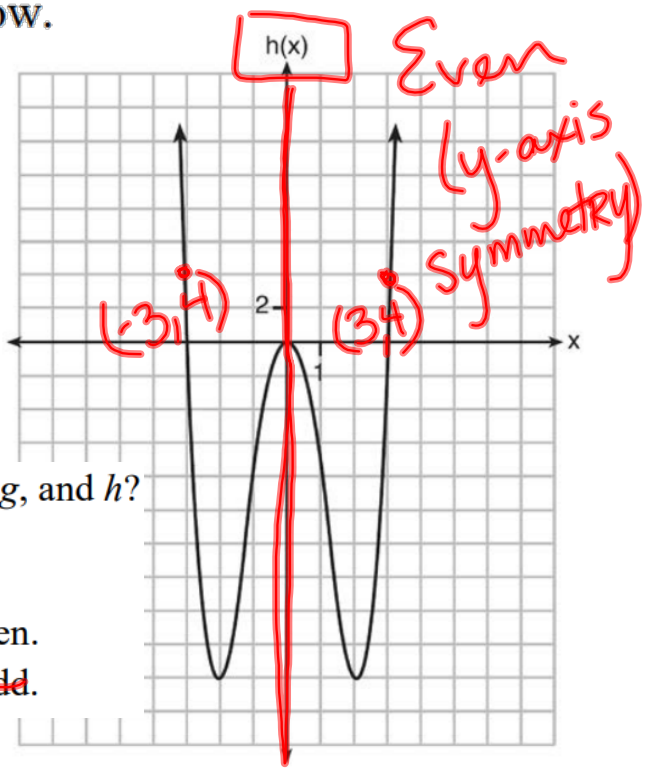
Functions f, g, and h are given below.

$f(x) = \sin(2x)$

$g(x) = f(x) + 1$

X	Y1
-3	1.2794
-2	1.7568
-1	.0907
0	1
1	1.9093
2	2432
3	.72058

Press + for ΔTbl



Which statement is true about functions f, g, and h?

1) $f(x)$ and $g(x)$ are odd, $h(x)$ is even.
2) $f(x)$ and $g(x)$ are even, $h(x)$ is odd.
3) $f(x)$ is odd, $g(x)$ is neither, $h(x)$ is even.
4) $f(x)$ is even, $g(x)$ is neither, $h(x)$ is odd.

Function Sense & Function Properties

Remember AROC? (average rate of change)

$\frac{y_2-y_1}{x_2-x_1}$

Slope between two points on a non-linear function

The distance needed to stop a car after applying the brakes varies directly with the square of the car's speed. The table below shows stopping distances for various speeds.

x

Speed (mph)	10	20	30	40	50	60	70
Distance (ft)	6.25	25	56.25	100	156.25	225	306.25

y

Slope

Determine the average rate of change in braking distance, in ft/mph, between one car traveling at 50 mph and one traveling at 70 mph. Explain what this rate of change means as it relates to braking distance.

$\frac{156.25-306.25}{50-70}$

$\frac{306.25-156.25}{70-50}$

7.5

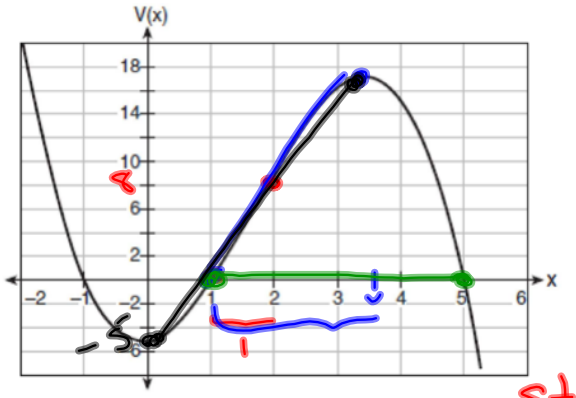
7.5

$\frac{156.25-306.25}{50-70}$

7.5 ft/mph

Every 7.5 ft it slows down by 1 mph.

A cardboard box manufacturing company is building boxes with length represented by $x+1$, width by $5-x$, and height by $x-1$. The volume of the box is modeled by the function below.



Over which interval is the volume of the box changing at the fastest average rate?

1) [1,2]
2) [1,3.5]
3) [1,5]
4) [0,3.5]

steepest slope

$\frac{8}{1}=8$

$\frac{0}{4}=0$

$\frac{18}{2.5}\approx 7.2$

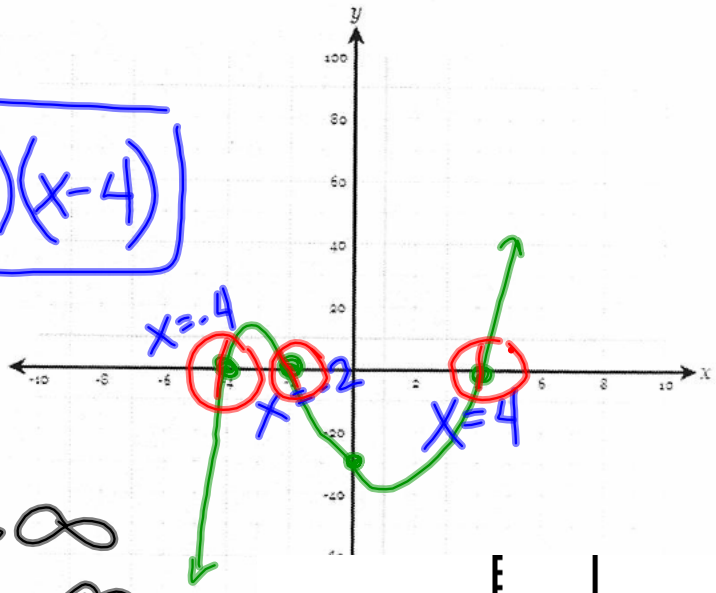
$\frac{23}{3.5}\approx 6.57$

Given $f(x) = x^3 + 2x^2 - 16x - 32$

a. Express $f(x)$ as a product of its factors.

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

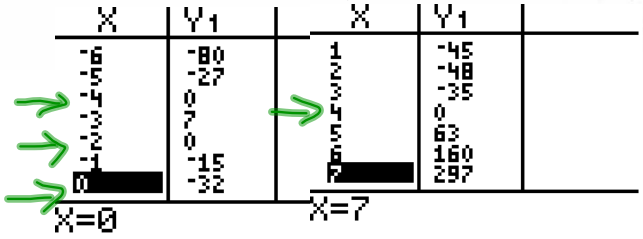
b. Graph $f(x)$ on the graph below. Be sure to include all intercepts (both x and y). A scale has been provided.

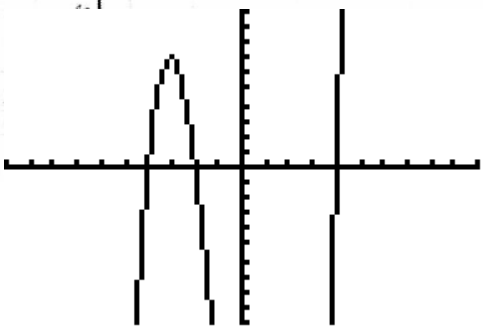


c. Describe the end behaviors of $f(x)$.

$x \to \infty, f(x) \to \infty$

$x \to -\infty, f(x) \to -\infty$

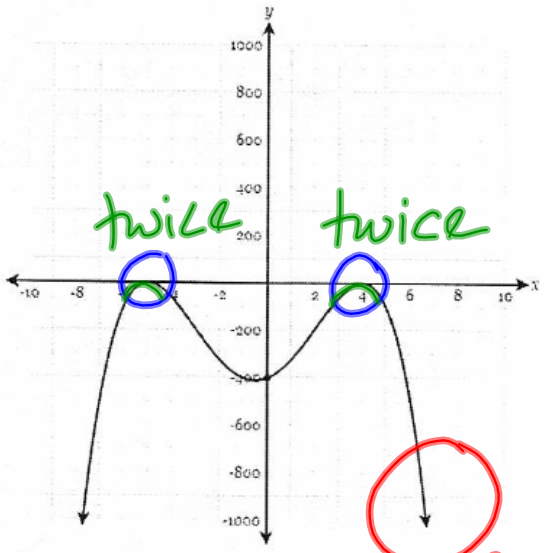




Write an equation for the function ~~shown in standard form.~~

Roots: -5, 4

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



negative leading coefficient

Which equation would represent the function shown?

A. $f(x) = (x+3)^2(x-6)^2$

B. $f(x) = (x+3)^2(x-6)$

C. $f(x) = (x-3)^2(x+6)^2$

D. $f(x) = (x-3)^2(x+6)$

Roots are negations of factor