Review Exercise Set 2

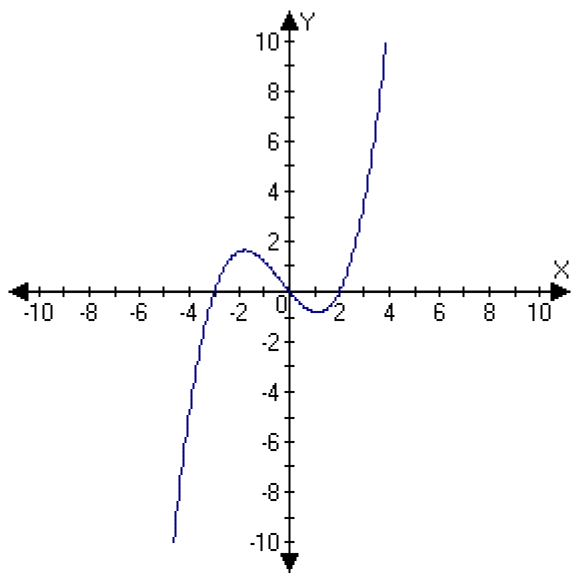
Exercise 1: Determine the difference quotient of the given function.

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

Exercise 2: Evaluate the given piecewise function at the indicated value.

$$h(x) = \begin{cases} 3x+7 & \text{if } x < -1 \\ \sqrt{x+5} & \text{if } x \geq -1 \end{cases} \quad ; \quad \text{where } x = -3$$

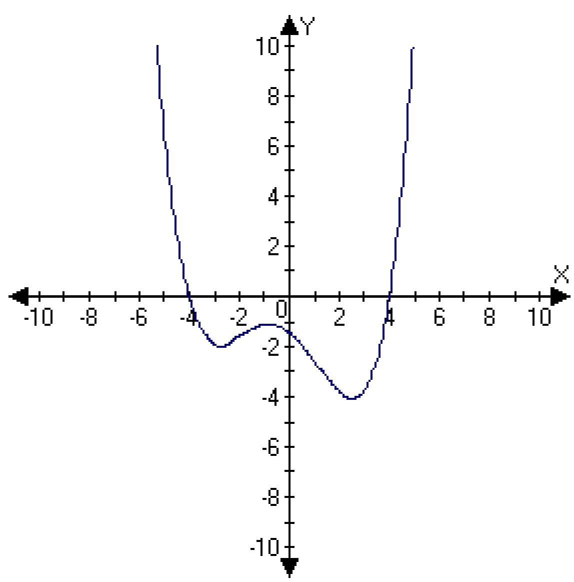
Exercise 3: Use the given graph to determine the intervals where the function is increasing and decreasing.



Exercise 4: Determine whether the given function is even, odd, or neither.

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

Exercise 5: Use the given graph of the function g(x) to determine each of the following.



a) Domain:
b) Range:
c) x-intercept(s):
d) y-intercept:
e) Intervals where g(x) is increasing:
f) Intervals where g(x) is decreasing:
g) Intervals where g(x) is constant:
h) Relative Maximum:
i) Relative Minimum:
j) Is g(x) even, odd or neither?

Review Exercise Set 2 Answer Key

Exercise 1: Determine the difference quotient of the given function.

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

Find f(x + h)

$f(x + h) = (x + h)^2 - 2(x + h) + 1$
$f(x + h) = x^2 + 2hx + h^2 - 2x - 2h + 1$

Find f(x + h) - f(x)

$f(x + h) - f(x) = x^2 + 2hx + h^2 - 2x - 2h + 1 - (x^2 - 2x + 1)$
$f(x + h) - f(x) = x^2 + 2hx + h^2 - 2x - 2h + 1 - x^2 + 2x - 1$
$f(x + h) - f(x) = 2hx + h^2 - 2h$

Find $\dfrac{f(x+h)-f(x)}{h}$

$$\begin{aligned}\frac{f(x+h)-f(x)}{h} &= \frac{2hx+h^2-2h}{h}\\ &= \frac{h(2x+h-2)}{h}\\ &= 2x+h-2\end{aligned}$$

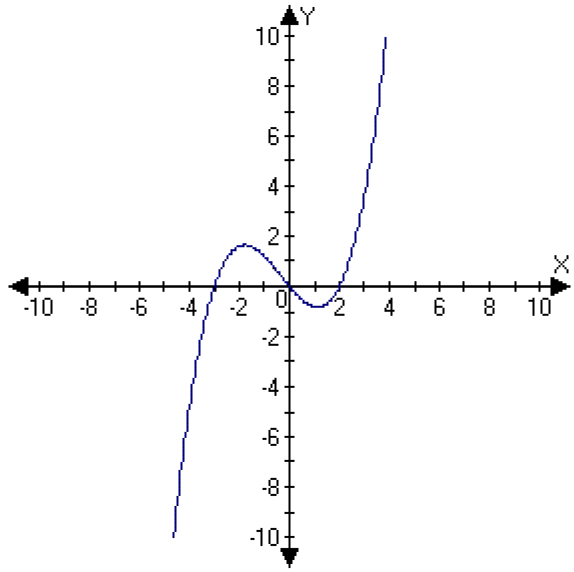
Exercise 2: Evaluate the given piecewise function at the indicated value.

$$h(x)=\begin{cases}3x+7 & if\ \ x<-1\\ \sqrt{x+5} & if\ \ x\geq -1\end{cases} \quad ; \quad where\ \ x=-3$$

Since -3 < -1, we would use the top function of h(x) = 3x + 7

h(x) = 3x + 7
h(-3) = 3(-3) + 7
h(-3) = -9 + 7
h(-3) = -2

Exercise 3: Use the given graph to determine the intervals where the function is increasing and decreasing.



Increasing intervals: $(-\infty,-2)\cup(1,\infty)$

Decreasing interval: $(-2,1)$

Exercise 4: Determine whether the given function is even, odd, or neither.

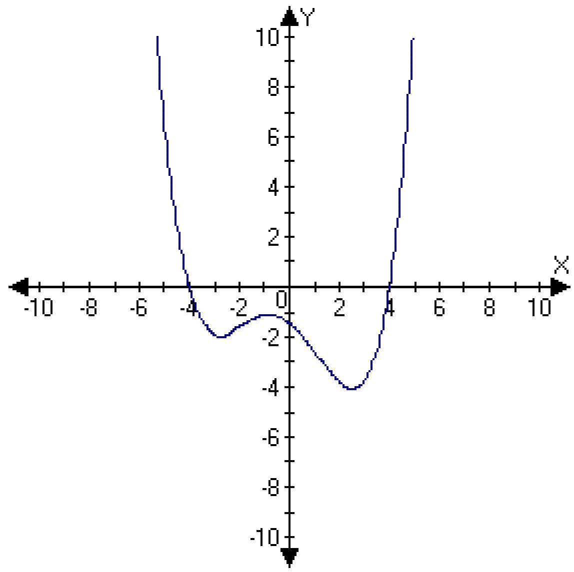
$f(w) = w^6 + w^4 - w^2$

Find f(-w) and compare with f(w)

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

f(-w) = f(w), so the function is even

Exercise 5: Use the given graph of the function g(x) to determine each of the following.



a) Domain: $(-\infty, \infty)$

b) Range: $[-4, \infty)$

c) x-intercept(s): $(-4, 0)$ *and* $(4, 0)$

d) y-intercept: $(0, -1.5)$

e) Intervals where g(x) is increasing: $(-2.5, -0.5) \cup (2.5, \infty)$

f) Intervals where g(x) is decreasing: $(-\infty, -2.5) \cup (-0.5, 2.5)$

g) Intervals where g(x) is constant: None

h) Relative Maximum: None

i) Relative Minimum: $(-2.5, -2)$ *and* $(2.5, -4)$

j) Is g(x) even, odd or neither? Neither