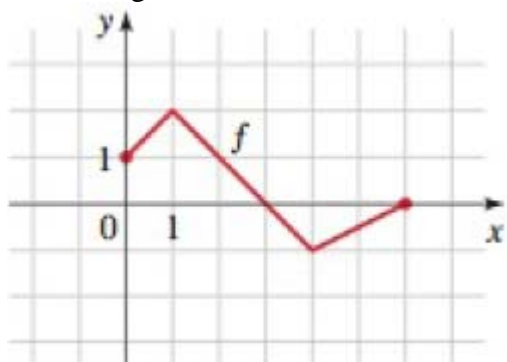


Serial #: _____ ID _____ NAME _____

Show all necessary steps for full marks.

Question 1: (5 points)(2.6 Textbook Exercise 73) : Graph of $y = f(x)$ is given. Sketch the graph of the following functions:



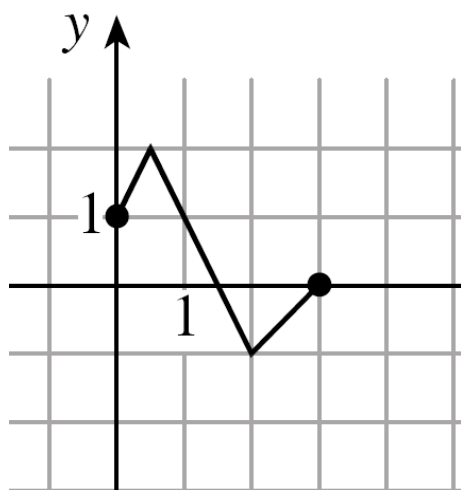
(a): Sketch the graph of $y = f(2x)$

(b): Sketch the graph of $y = f\left(\frac{1}{2}x\right)$

Solution:

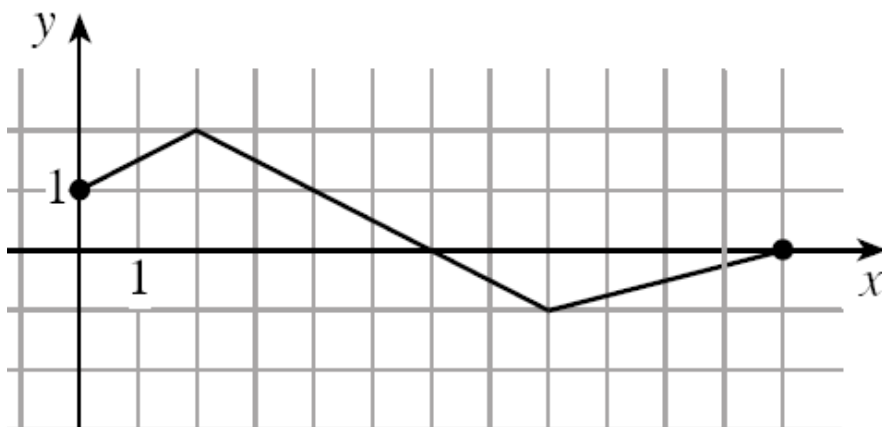
$y = f(x)$ (x, y)	(a): $y = f(2x)$ $\left(\frac{x}{2}, y\right)$	(b): $y = f\left(\frac{1}{2}x\right)$ $\left(\frac{x}{1/2}, y\right) = (2x, y)$
(0.1)	(0.1)	(0.1)
(1.2)	$\left(\frac{1}{2}, 2\right)$	(2.2)
(2.1)	(1.1)	(4.1)
(3.0)	$\left(\frac{3}{2}, 0\right)$	(6.0)
(4.-1)	(2.-1)	(4.-1)
(6.0)	(3.0)	(6.0)

(a):



$y = f(2x)$

(b):



$y = f\left(\frac{1}{2}x\right)$

Question 2: (5 points): Determine whether each function is even, odd, or neither.

A) $y = \frac{\sqrt{4x - x^3}}{x^7 + 1}$

B) $y = \frac{6x^2 + x^4}{x^3 + 2x}$

C) $y = |x^3|$

D) $y = 2x + 1$

E) $y = x\sqrt[3]{x^5 - x}$

Solution:

A) $y = \frac{\sqrt{4x - x^3}}{x^7 + 1}$ **Answer: None**

B) $y = \frac{6x^2 + x^4}{x^3 + 2x}$ **Answer: Odd**

C) $y = |x^3|$ **Answer: Even**

D) $y = 2x + 1$ **Answer: None**

E) $y = x\sqrt[3]{x^5 - x}$ **Answer: Even**

Question 3: (5 points): If $f(x) = \frac{1}{x^2 - 1}$ and $g(x) = \sqrt{x}$, find domain of $f \circ g$.

Solution: $(f \circ g)(x) = f[g(x)] = f(\sqrt{x}) = \frac{1}{(\sqrt{x})^2 - 1} = \frac{1}{x - 1}$

Domain of $\frac{1}{x - 1}$ is equal to $D = (-\infty, 1) \cup (1, \infty)$

Domain of $f \circ g$ is equal to $D_{f \circ g} = D_g \cap D$
 $= [0, \infty) \cap [(-\infty, 1) \cup (1, \infty)]$
 $= [0, 1) \cup (1, \infty)$

Question 4: (5 points): If $g(x) = 1 - x^3$ and $(g \circ f)(x) = 1 - 2x - x^2$, then find $f(x) = ?$ and $f(2) = ?$

Solution: $(g \circ f)(x) = g[f(x)] = 1 - [f(x)]^3$

$$1 - 2x - x^2 = 1 - [f(x)]^3$$

$$-2x - x^2 = -[f(x)]^3$$

$$2x + x^2 = [f(x)]^3$$

$$\sqrt[3]{2x + x^2} = f(x)$$

$$\Rightarrow f(2) = \sqrt[3]{2(2) + 2^2} = \sqrt[3]{8} = 2$$