

Topic 20: Understand functions – definition, notation, domain, difference quotients, and composition

1. The point (2, -1) is on the graph of a function which is symmetric with respect to the origin. Another point on the graph would be

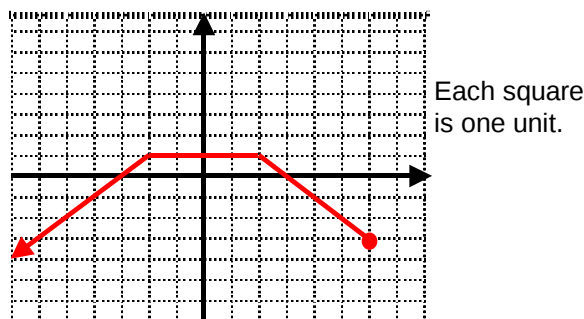
- (A) (-1,2) (B) (-2,1) (C) (-2,-1) (D) Cannot be determined

2. Given $f(x) = 2x - 1$ and $g(x) = x^2 + 4$, find the following and simplify:

- (a) $(f \circ g)(-1)$ (b) $(g \circ f)(x)$ (c) $f^{-1}(x)$

3. Given the graph of a function, f , below, answer the following.

- (a) Domain of $f(x)$ (b) Range of $f(x)$ (c) Interval(s) where $f(x)$ is increasing.
 (d) Interval(s) where $f(x)$ is decreasing. (e) Interval(s) where $f(x)$ is constant.
 (f) What is the value of $f(-2)$? (g) Find x when $f(x) = 0$.
 (h) Is $f(4)$ positive or negative? (i) Is $f(x)$ a 1:1 function?



4. Given $f(x) = 2x - 7$ find the difference quotient $\frac{f(x+h) - f(x)}{h}$.

5. State the domain of each function.

- (a) $f(x) = x^2 - 3x + 2$ (b) $f(x) = \sqrt{x}$ (c) $f(x) = \sqrt{x+4}$

Answers

1. B

2. (a) 9 (b) $4x^2 - 4x + 5$ (c) $f^{-1}(x) = \frac{x+1}{2}$

3. (a) $(-\infty, 6]$ (b) $(-\infty, 1]$ (c) $(-\infty, -2)$ (d) (2,6) (e) (-2,2) (f) 1 (g) -3,3 (h) Negative (i) No

4. 2

5. (a) $(-\infty, \infty)$ (b) $(-\infty, 2) \cup (2, \infty)$ (c) $[-4, \infty)$