

# PRINTABLE VERSION

## Practice Test 3

### Question 1

Given the following function, calculate  $f(-7)$ .

$$f(x) = \begin{cases} x^3 + 1 & x < -7 \\ -342 & x = -7 \\ -2x & x > -7 \end{cases}$$

- a)  -342
- b)  7
- c)  14
- d)  -14
- e)  344
- f)  None of the above

### Question 2

For the function  $f$  given by  $f(x) = -3x - 8$ , evaluate  $f\left(\frac{1}{a+1}\right)$ .

- a)   $\frac{-8a - 11}{a + 1}$
- b)   $\frac{-8a + 5}{a + 1}$
- c)   $\frac{8a - 11}{a + 1}$
- d)   $\frac{-8a + 5}{a + 2}$
- e)   $\frac{-8a - 11}{a + 2}$

f)  None of the above

**Question 3**

For the function  $f$  given by  $f(x) = 9x^2 + 8$ , evaluate  $\frac{f(x+h) - f(x)}{h}$ .

- a)   $18h + 9x$
- b)   $9h + 9x$
- c)   $18h + 18x$
- d)   $-9h + 18x$
- e)   $9h + 18x$
- f)  None of the above

**Question 4**

Find the domain of the following function. Express the answer in interval notation.

$$f(x) = \sqrt{-3x + 4}$$

- a)   $\left[\frac{4}{3}, \infty\right)$
- b)   $\left(\frac{4}{3}, \infty\right)$
- c)   $\left(-\infty, \frac{4}{3}\right]$
- d)   $\left(-\infty, \frac{4}{3}\right)$
- e)  All real numbers
- f)  None of the above

**Question 5**

Find the domain of the following function. Express the answer in interval notation.

$$f(x) = \frac{x + 3}{x^2 - 9}$$

- a)  All real numbers.
- b)   $(-\infty, -3) \cup (-3, \infty)$
- c)   $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$
- d)   $(-\infty, 3) \cup (3, \infty)$
- e)   $[3, \infty)$
- f)  None of the above

**Question 6**

Find the domain of the function  $f(x) = \frac{\sqrt{x-9}}{x+6}$

- a)   $(9, \infty)$
- b)   $[9, -6) \cup (-6, \infty)$
- c)   $[9, \infty)$
- d)   $[9, -6] \cup [-6, \infty)$
- e)   $(9, -6] \cup [-6, \infty)$
- f)  None of the above

**Question 7**

Given:

$$f(x) = \begin{cases} -9 & x < -2 \\ 1 & x = -2 \\ 4x - 10 & x > -2 \end{cases}$$

Which point below is on the graph of  $f(x)$ ?

- a)   $(0, -15)$
- b)   $(-1, -16)$
- c)   $(-5, -4)$

- d)   $(-1, -14)$
- e)   $(-2, 2)$
- f)  None of the above

**Question 8**

Determine whether the following function is even, odd, or neither.

$$f(x) = x^7 - \frac{4}{x^2} + x - 8$$

- a)  Even
- b)  Odd
- c)  Neither

**Question 9**

Suppose that  $y = f(x)$  is an even function such that  $(4, 2)$  is a point on the graph of  $f$ . Which of the following points belong to the graph of  $f$ ?

- a)   $(-4, -2)$
- b)   $(-2, -4)$
- c)   $(-4, 2)$
- d)   $(4, -2)$
- e)   $(2, -4)$
- f)  None of the above

**Question 10**

What transformation is needed to go from the graph of the basic function

$$f(x) = |x|$$

to the graph of

$$g(x) = |x + 7|$$

- a)  Shift left 7 units
- b)  Reflect across the  $y$ -axis
- c)  Shift up 7 units
- d)  Shift right 7 units
- e)  Shift down 7 units
- f)  None of the above

**Question 11**

What transformation is needed to go from the graph of the basic function

$$f(x) = \sqrt{x}$$

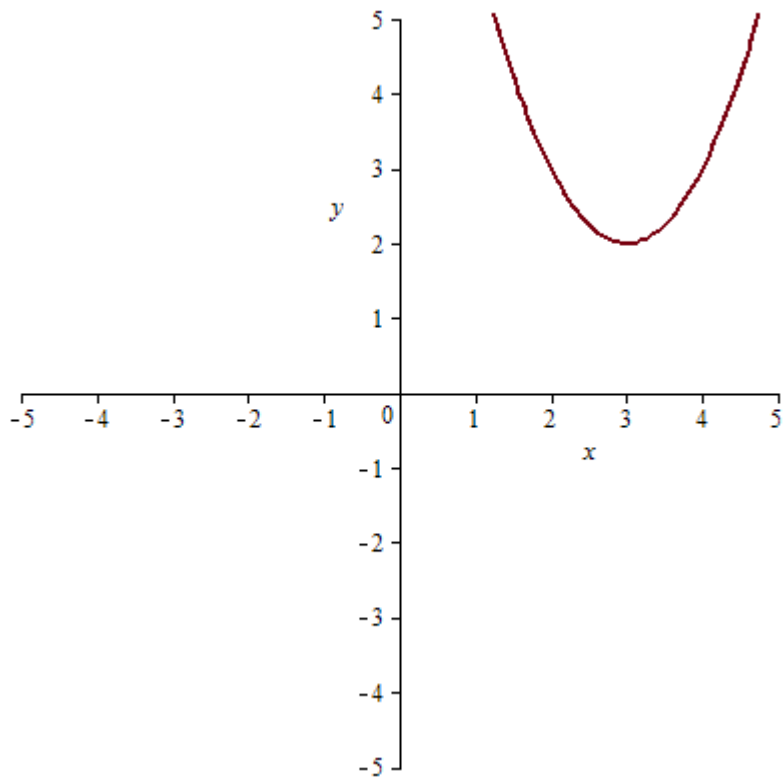
to the graph of

$$g(x) = -\sqrt{x-3}$$

- a)  Reflect across the  $x$ -axis and then shift up 3 units.
- b)  Reflect across the  $x$ -axis and then shift right 3 units.
- c)  Reflect across the  $x$ -axis and then shift left 3 units.
- d)  Reflect across the  $y$ -axis and then shift right 3 units.
- e)  Reflect across the  $y$ -axis and then shift left 3 units
- f)  None of the above

**Question 12**

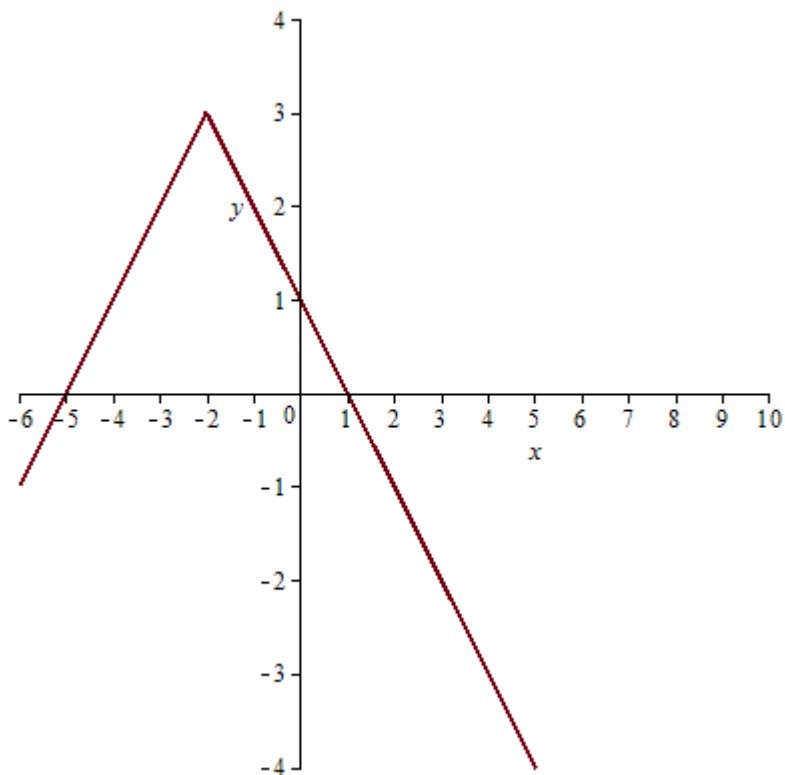
Which of the following functions matches the graph below?



- a)   $f(x) = (x - 3)^2 - 2$
- b)   $f(x) = (x - 3)^2 + 2$
- c)   $f(x) = (x + 3)^2 + 2$
- d)   $f(x) = (x + 2)^2 - 3$
- e)   $f(x) = (x - 2)^2 - 3$
- f)  None of the above

**Question 13**

Which of the following functions matches the graph below?



- a)   $f(x) = |x - 2| + 3$
- b)   $f(x) = -|x + 2| + 3$
- c)   $f(x) = |x - 2| - 3$
- d)   $f(x) = -|x + 2| - 3$
- e)   $f(x) = |x + 2| - 3$
- f)  None of the above

**Question 14**

Write the function

$$f(x) = x^2 + 14x + 13$$

in the standard form

$$f(x) = a(x - h)^2 + k$$

- a)   $f(x) = (x + 7)^2 - 62$
- b)   $f(x) = (x + 7)^2 - 36$

- c)   $f(x) = (x - 7)^2 - 49$
- d)   $f(x) = (x - 7)^2 + 62$
- e)   $f(x) = (x + 7)^2 + 36$
- f)  None of the above

**Question 15**

Find the vertex of the graph of

$$f(x) = 2x^2 - 4x - 10$$

- a)   $(1, -8)$
- b)   $(1, -12)$
- c)   $(-1, 4)$
- d)   $(-1, 12)$
- e)   $(1, 8)$
- f)  None of the above

**Question 16**

Find the maximum or minimum value of the function

$$f(x) = x^2 - 10x + 19$$

- a)  The minimum value is 6.
- b)  The maximum value is 6.
- c)  The maximum value is  $-6$ .
- d)  The minimum value is  $-5$ .
- e)  The minimum value is  $-6$ .
- f)  None of the above

**Question 17**



Find  $(g \circ f)(x)$ , given the following functions:

$$f(x) = 4x - 3$$

$$g(x) = \sqrt{x}$$

- a)   $2x - 3$
- b)   $\sqrt{4x - 3}$
- c)   $4\sqrt{x} - 3$
- d)   $\sqrt{4x + 3}$
- e)   $2\sqrt{x} - 3$
- f)  None of the above

### Question 18

Given the following functions, find  $(f \circ g)(x)$ .

$$f(x) = \frac{4 - x}{x + 4}$$

$$g(x) = x + 2$$

- a)   $\frac{x + 12}{x + 4}$
- b)   $\frac{-x + 3}{x + 5}$
- c)   $\frac{-x + 1}{x + 1}$
- d)   $\frac{-x + 2}{x + 6}$
- e)   $\frac{-x + 6}{x + 6}$
- f)  None of the above

### Question 19

Given the following functions, find  $g(f(7))$ .

$$f(x) = \frac{1}{x - 10}$$

$$g(x) = \frac{1}{x}$$

- a)  -7
- b)  10
- c)  -3
- d)  -10
- e)  3
- f)  None of the above

**Question 20**

Let

$$f(x) = x^3 - 8$$

Suppose  $g$  is the inverse function of  $f$ . Find  $g(x)$ .

- a)   $g(x) = \sqrt[3]{x - 8}$
- b)   $g(x) = x + 8$
- c)   $g(x) = (x + 8)^3$
- d)   $g(x) = \sqrt[3]{x + 8}$
- e)   $g(x) = \sqrt[3]{x} + \sqrt[3]{8}$
- f)  None of the above

**Question 21**

Given

$$f(x) = \frac{8}{x - 4}$$

Let  $g$  be the inverse of  $f$ . Find  $g(x)$ .

- a)   $g(x) = \frac{4x - 8}{x}$
- b)   $g(x) = \frac{-4x - 8}{x}$
- c)   $g(x) = \frac{-4x + 8}{x}$
- d)   $g(x) = -\frac{4}{x + 8}$
- e)   $g(x) = \frac{4x + 8}{x}$
- f)  None of the above

**Question 22**

Find the quadratic function whose vertex is  $(-3, 9)$  and  $y$ -intercept is  $-2$ .

- a)   $f(x) = -\frac{11}{9}(x + 3)^2 - 9$
- b)   $f(x) = -\frac{11}{9}(x - 3)^2 + 9$
- c)   $f(x) = \frac{7}{9}(x + 3)^2 - 9$
- d)   $f(x) = \frac{7}{9}(x - 3)^2 - 9$
- e)   $f(x) = -\frac{11}{9}(x + 3)^2 + 9$
- f)  None of the above

**Question 23**

Given  $f(x) = \sqrt[3]{x + 5}$ , find its inverse if possible.

- a)   $f^{-1}(x) = -x^3 - 5$
- b)   $f^{-1}(x) = x^3 - 5$
- c)  No inverse

- d)   $f^{-1}(x) = x^3 + 25$
- e)   $f^{-1}(x) = x^3 + 5$
- f)  None of the above

**Question 24**

Given  $f(x) = x^3 + 8$ , find its inverse if possible.

- a)   $f^{-1}(x) = \sqrt[3]{-x - 8}$
- b)   $f^{-1}(x) = \sqrt[3]{x - 8}$
- c)   $f^{-1}(x) = \sqrt[3]{x + 8}$
- d)   $f^{-1}(x) = \sqrt[3]{-x + 8}$
- e)  No inverse
- f)  None of the above

**Question 25**

What transformations are needed to go from the graph of the basic function

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

to the graph of

$$g(x) = \sqrt[3]{x - 3} - 9$$

- a)  Shift left 3 units, and shift up 9 units.
- b)  Shift down 3 units, and shift up 9 units.
- c)  Shift up 3 units.
- d)  Shift left 9 units, and shift up 3 units.
- e)  Shift right 3 units, and shift down 9 units.
- f)  None of the above