

Precalc Chapter 1 Practice Test**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

1. Write the equation of the line that passes through the point $P(1, 3)$ and is perpendicular to the line $y = -5x + 1$.

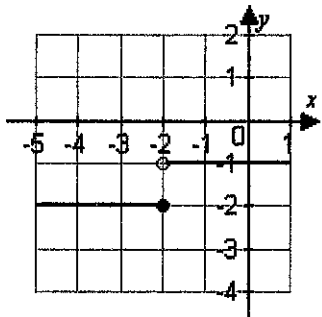
a. $y = \frac{1}{5}x + 1$ b. $y = \frac{1}{5}x + 2.8$ c. $y = x + 2.8$ d. $x = 2.8y + \frac{1}{5}$ e. $y = \frac{1}{5}x + 3.2$

2. Evaluate the difference quotient for the function.

$$f(x) = 6x - 9$$

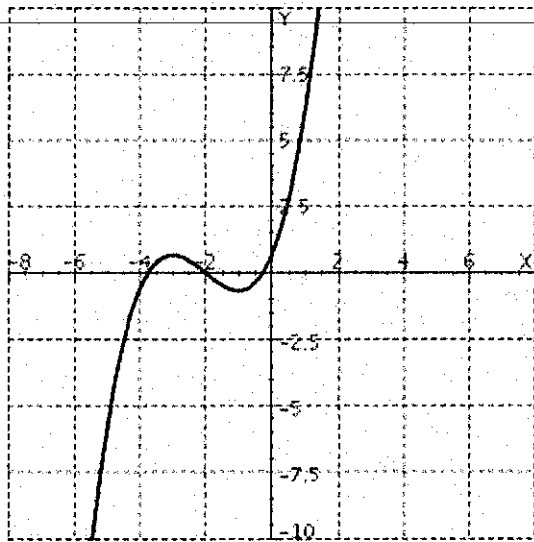
a. 9 b. $6x + 9$ c. -9 d. $\frac{3}{2}$ e. 6

3. Use the graph of the function to find the domain and range of f .



- a. domain: $(-\infty, -2) \cup (-2, \infty)$
range: $(-\infty, -2) \cup (-1, \infty)$
- b. domain: $(-\infty, -2) \cup (-2, \infty)$
range: $\{-2, -1\}$
- c. domain: all real numbers
range: $\{-2, -1\}$
- d. domain: $\{-2, -1\}$
range: all real numbers
- e. domain: $(-\infty, -2) \cup (-2, \infty)$
range: $(-1, 1)$

4. The graph of a function is sketched below.



Determine the interval on which the function is decreasing.

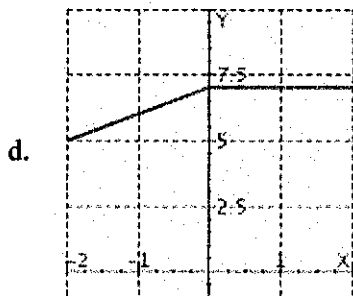
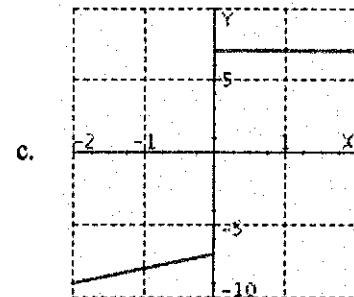
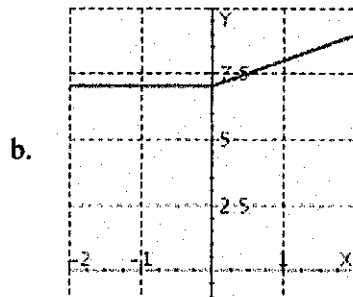
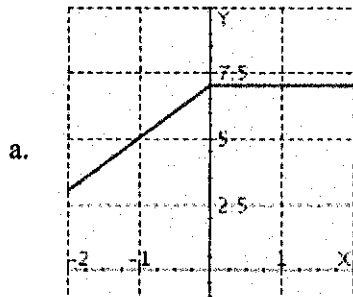
- a. $(-\infty, -3] \cap [-1, \infty)$ b. $[-3, -1]$ c. $(-\infty, -3] \cup [-1, \infty)$ d. $[-1, -1]$ e. $[1, 3]$
5. Use a graphing utility to graph the function and approximate (to two decimal places) any relative minimum or relative maximum values.

$$f(x) = x^3 + 2x^2 - 2x + 2$$

- a. relative maximum: $(6.27, -1.72)$
relative minimum: $(1.58, 0.39)$
- b. relative maximum: $(0.39, 1.58)$
relative minimum: $(-1.72, 6.27)$
- c. relative maximum: $(1.58, 0.39)$
relative minimum: $(6.27, -1.72)$
- d. relative maximum: $(-1.72, 6.27)$
relative minimum: $(0.39, 1.58)$
- e. relative maximum: $(1.58, 7.82)$
relative minimum: $(6.27, 314.35)$

6. Graph the piecewise-defined function.

$$y = f(x) = \begin{cases} x + 7 & \text{if } x < 0 \\ 7 & \text{if } x \geq 0 \end{cases}$$



7. The function $f(x) = x^2 - 6$ is one-to-one on the domain $(x \leq 0)$. Find $f^{-1}(x)$.

- a. $f^{-1}(x) = \sqrt{x-6}$ b. $f^{-1}(x) = \sqrt{x+6}$ c. $f^{-1}(x) = x^2 + 6$ d. $f^{-1}(x) = -\sqrt{x+6}$
 e. $f^{-1}(x) = \frac{1}{x^2 - 6}$

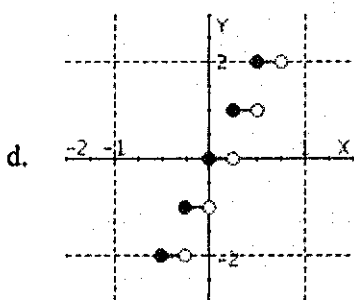
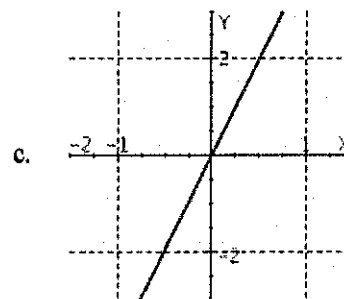
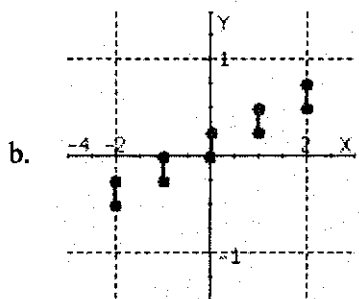
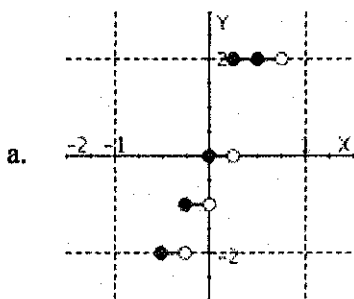
8. Describe the sequence of transformations from the related common function $f(x) = \sqrt{x}$ to g .

$$g(x) = -\sqrt{x} + 5$$

- a. reflection in the y -axis; then horizontal shift 5 units right b. reflection in the y -axis; then vertical shift 5 units up
 c. reflection in the y -axis; then horizontal shift 5 units left d. reflection in the x -axis; then vertical shift 5 units up
 e. reflection in the x -axis; then vertical shift 5 units down

9. Graph the function.

$$y = \lceil 4x \rceil$$



10. Evaluate the function at the specified value of the independent variable and simplify.

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

$$f\left(-\frac{3}{4}\right)$$

- a. $-\frac{81}{64}$ b. $\frac{3}{20}$ c. $\frac{45}{64}$ d. $-\frac{3}{4}$ e. $-\frac{15}{16}$

Short Answer

11. A line passes through the two points $P(2,2)$, and $Q(-1, -1)$. Write the equation in slope-intercept form.
12. Let the function f be defined by the equation $y = f(x)$, where x and $f(x)$ are real numbers. Find the domain of the function $f(x) = \sqrt{36x^2 - 4}$.

Please enter your answer in interval notation.

13. Find the inverse of the one-to-one function.

$$y = 2x + 7$$

$$f^{-1}(x) = \underline{\hspace{2cm}}$$

14. Evaluate the function at the specified value of the independent variable and simplify.

$$q(p) = \frac{-5p}{2p-1}$$

$$q(y-4)$$

15. Use the functions given by $f(x) = \frac{x}{8} - 1$ and $g(x) = x^3$ to find the indicated value.

$$(f \circ g)^{-1}(3)$$

16. Find $g \circ f$.

$$f(x) = x + 3 \quad g(x) = x^2$$

17. Use a graphing utility to graph the function and visually determine the intervals over which the function is increasing, decreasing, or constant.

$$f(x) = x\sqrt[3]{x+4} + 2$$

18. Find the difference quotient and simplify your answer.

$$f(x) = 6x^2 - 5x, \frac{f(1+h) - f(1)}{h}, h \neq 0$$

19. Find all real values of x such that $f(x) = 0$.

$$f(x) = \frac{-3x-2}{7}$$

20. Find the value(s) of x for which $f(x) = g(x)$.

$$f(x) = x^2 + 19x + 10 \quad g(x) = 9x + 1$$

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Answer Section

MULTIPLE CHOICE

1. B
2. E
3. C
4. B
5. D
6. D
7. D
8. D
9. D
10. E

SHORT ANSWER

11. $y = x$
12. $\left(-\infty, \frac{-1}{3}\right] \cup \left[\frac{1}{3}, \infty\right)$
13. $\frac{x-7}{2}$
14. $\frac{-5y+20}{2y-9}$
15. $\sqrt[3]{2}$ $2\sqrt[3]{4}$
16. $(g \circ f)(x) = x^2 + 6x + 9$
17. decreasing on $(-\infty, -3)$
increasing on $(-3, \infty)$
18. $7 + 6h$
19. $-\frac{2}{3}$
20. $-9, -1$