

The following 14 multiple choice questions are worth 5 points each.

1. Determine the equation that results if the following transformations are performed on the function $y = f(x)$.

I. Stretch vertically by a factor of 4.

II. Reflect on the y -axis.

III. Shift down 2 units.

a. $y = -f(4x) + 2$ c. $y = f(-4x) - 2$

b. $y = 4f(-x) + 2$ d. $y = -4f(x) - 2$

e. $y = 4f(-x) - 2$

2. Let $(-6, 2)$ be a point on the graph of $y = f(x)$. Under the transformation $y = \frac{1}{2}f(x-3) + 6$ the point $(-6, 2)$ will be translated to what point?

a. $(-3, 7)$ c. $(-3, 4)$

b. $(-4\frac{1}{2}, 8)$ d. $(-9, 4)$

e. $(-\frac{1}{2}, 8)$

3. Let $f(x) = (x-1)$ and $g(x) = \sqrt{x+3}$. Determine the domain of $\left(\frac{g}{f}\right)(x)$.

a. $(-\infty, 1) \cup (1, \infty)$ c. $(-\infty, -3) \cup (-3, 1) \cup (1, \infty)$

b. $[-3, 1) \cup (1, \infty)$ d. $(1, \infty)$

e. $[-3, \infty)$

4. Let f and g be defined by the following tables.

x	$f(x)$
-1	0
0	4
2	-1
4	2

x	$g(x)$
4	3
-1	5
0	-1
5	4

Determine which of the following is/or true.

I. $f^{-1}(g(0)) = 2$

II. $f(g^{-1}(-1)) = -1$

III. $(g \circ f)(2) = 0$

- a. None are true. c. Only I is true.
b. Only II and III are true. d. Only II is true.
e. Only I and III are true.

5. Let $f(x) = 5 - x$ and $g(x) = x^2 - 3x + 4$. Find $(g \circ f)(x)$.

- a. $-x^2 + 3x + 1$ c. $x^2 - 7x + 14$
b. $x^2 - 6x + 22$ d. $x^2 + 3x + 14$
e. $-x^2 - 3x + 14$

6. Let $f(x) = (x - 5)^3$. Determine the equation for $f^{-1}(x)$.

- a. $f^{-1}(x) = -(x - 5)^3$ c. $f^{-1}(x) = \sqrt[3]{x + 5}$
b. $f^{-1}(x) = \sqrt[3]{x} + 5$ d. $f^{-1}(x) = \sqrt[3]{x} + \sqrt[3]{5}$
e. $f^{-1}(x) = \frac{1}{(x - 5)^3}$

7. The area of a rectangular garden is 320 square feet. The garden is to be enclosed on three sides by a brick wall which costs \$20 per linear foot and on one side by a fence which costs \$12 per linear foot. Express the cost to enclose the garden, C , as a function of one of its dimensions x , where one side x has a brick wall and the opposite side x has the fence.

a. $C(x) = \frac{8}{x} + 32x$

c. $C(x) = \frac{360}{x} + 13x$

b. $C(x) = \frac{9}{x} + 13x$

d. $C(x) = 32x + \frac{12,800}{x}$

e. $C(x) = 40y + 32x$

8. Determine which of the following is/are true for the polynomial function:

$$P(x) = 2(x+4)(x+2)^2(x-1)^3$$

I. $P(x)$ has a y -intercept at $(0, -32)$.

II. For $P(x)$, as $x \rightarrow \infty$, $P(x) \rightarrow \infty$.

III. $P(x)$ has x -intercepts at $x = 4$, $x = 2$ and $x = -1$.

IV. $P(x) > 0$ on the interval $(-\infty, -4) \cup (1, \infty)$.

- a. Only I and II are true. c. Only II, III and IV are true.
b. Only I, III and IV are true. d. Only I, II and IV are true.
e. All are true.

9. Determine the equation of the quadratic function with vertex $(-6, 2)$ and which has a x -intercept at 4.

a. $y = -\frac{1}{50}(x+6)^2 + 2$

c. $y = -\frac{1}{2}(x-6)^2 + 2$

b. $y = \frac{3}{2}(x-2)^2 - 6$

d. $y = -\frac{1}{5}(x+6)^2 + 2$

e. $y = \frac{1}{18}(x+6)^2 + 2$

10. Determine which of the following is/are true.

- I. The maximum value of the function $g(x) = -x^2 + 36x + 480$ is 804.
- II. The range of $f(x) = -2(x+5)^2 - 3$ is $(-\infty, -3]$.
- III. The graph of $f(x) = -2(x+5)^2 - 3$ has one y -intercept and two x -intercepts.

- a. Only I is true.
- b. Only I and III are true.
- c. All are true.
- d. Only II and III are true.
- e. Only I and II are true.

11. Consider the function $f(x) = \frac{x+3}{x^2+2x-3}$. Which of the following is/are true.

- I. The horizontal asymptote is $y = 0$.
- II. The vertical asymptotes are $x = 3$ and $x = -1$.
- III. The y -intercept is $(0, 3)$.

- a. Only II and III are true.
- b. Only I and II are true.
- c. None are true.
- d. Only II is true.
- e. Only I is true.

12. Find the solution set of $\frac{(x-6)}{(x+2)} \geq 0$.

- a. $(-\infty, 0) \cup (2, \infty)$
- b. $(-3.65, -2) \cup (1.65, \infty)$
- c. $(-\infty, -2) \cup [6, \infty)$
- d. $(-\infty, -2)$
- e. $(-3.65, 0) \cup (1.65, \infty)$

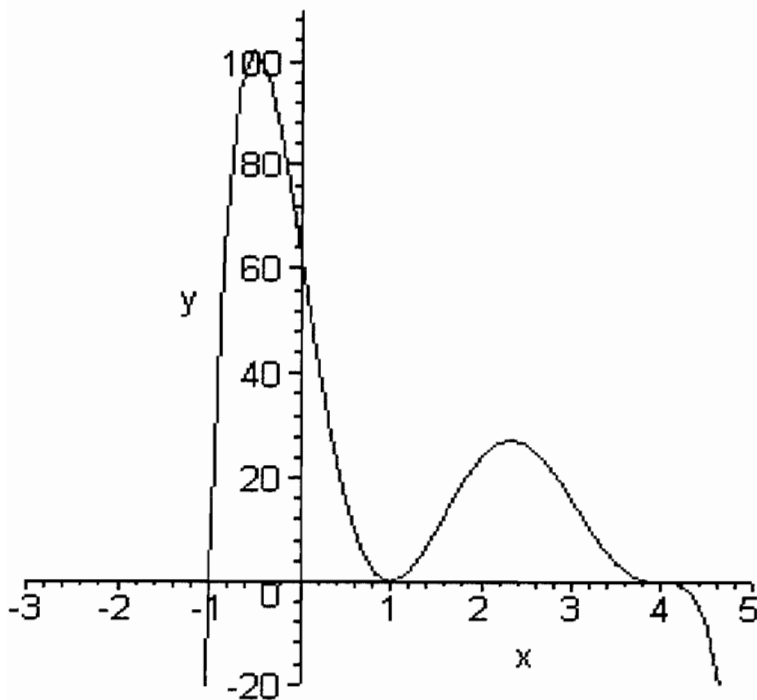
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Questions 15-18 are free response.

Pages 6 and 7 should be turned in with your answer sheet.

15. (6 pts) Let $h(x) = \frac{1}{2x-5}$. Find two functions, f and g , so that $(f \circ g)(x) = h(x)$.

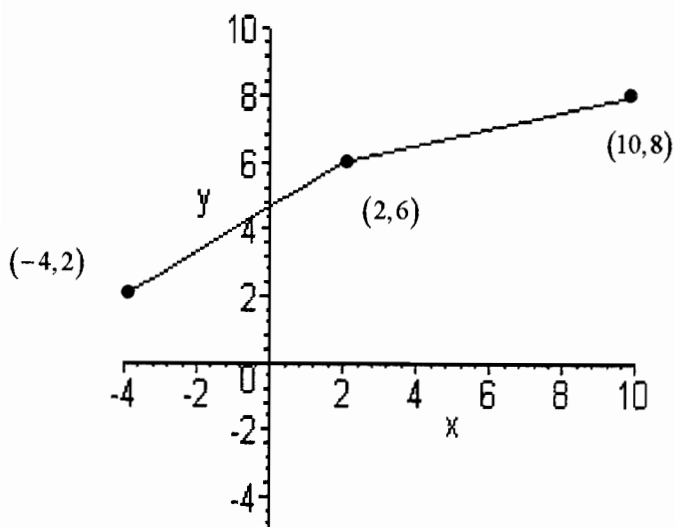
16. (8 pts) Write the equation, expressed as the product of factors, of a polynomial function, $f(x)$, that would have the graph below. Use a leading coefficient of 1 or -1 , and make the degree of f as small as possible.



17. (8 pts) Write the equation of the rational function, $f(x)$, where f has:

- a. vertical asymptotes at $x = -4$ and $x = 2$
- b. a horizontal asymptote at $y = 3$
- c. x-intercepts at 3 and -3

18. (8 pts) Given the graph of $y = f(x)$ below, sketch the graph of $y = f^{-1}(x)$ on the same set of axes and complete the table using interval notation.



	f	f^{-1}
Domain	_____	_____
Range	_____	_____

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Multiple Choice Key – White

Question	Answer Choice
1	E
2	A
3	B
4	C
5	C
6	B
7	D
8	D
9	A
10	E
11	E
12	C
13	A
14	C