The following 12 multiple choice questions are worth 6 points each.

1. **Let $f(x)=x-2$ and $g(x)=\sqrt{x+5}$. Determine the domain of $\left(\frac{g}{f}\right)(x)$.**

   a. $[-5,\infty)$

   b. $(2,\infty)$

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

   d. $(-\infty,2)\cup(2,\infty)$

   e. $(-\infty,-5]\cup(-5,2)\cup(2,\infty)$

2. **Let f and g be defined by the following tables:**

x	f(x)		x	g(x)
-1	0		4	3
0	4		-1	2
2	-1		0	-1
4	2		2	4

Determine which of the following is/are true.

I. $f\left[g^{-1}(-1)\right]=4$

II. $(f\circ g)(0)=3$

III. $f^{-1}\left[g(2)\right]=2$

a. All are true

b. None are true

c. I and II are true

d. Only I is true

e. I and III are true

3. Let $f(x)=\frac{x-7}{8}$ and $g(x)=3x-8$. Determine $(g\circ f)(x)$.

a. $(g\circ f)(x)=\frac{3x-85}{8}$

b. $(g\circ f)(x)=\frac{3x^2-29x+56}{8}$

c. $(g\circ f)(x)=\frac{4x-15}{8}$

d. $(g\circ f)(x)=\frac{3x-15}{8}$

e. $(g\circ f)(x)=\frac{3x-71}{8}$

4. Let $h(x)=\sqrt{x^3-5}$. Determine two functions f and g such that $h(x)=(f\circ g)(x)$.

a. $g(x)=x^3,\ f(x)=\sqrt{x}-5$

b. $g(x)=x^3-5,\ f(x)=\sqrt{x}$

c. $g(x)=\sqrt{x^3},\ f(x)=x-5$

d. $g(x)=\sqrt{x},\ f(x)=x^3-5$

e. $g(x)=\sqrt{x-5},\ f(x)=x^3$

5. Determine which of the following statements about quadratic functions and their graphs is/are true.

I. All quadratic functions have a range of $(-\infty,\infty)$

II. The vertex of $f(x)=-4(x+5)^2+8$ is located at $(5,8)$.

III. The x-intercepts of $f(x)=-4(x+5)^2+8$ are $(-5-\sqrt{2},0)$ and $(-5+\sqrt{2},0)$.

a. All are true

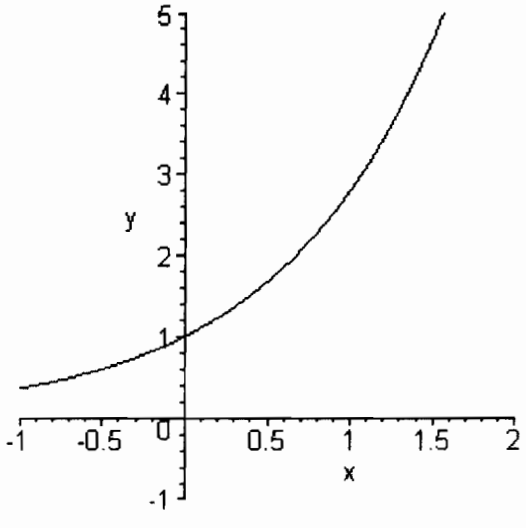
b. None are true

c. I and II are true

d. II and III are true

e. Only III is true

6. The graph of an exponential function is given below. Determine which equation represents the graph.



a. $y=0.45^x$

b. $y=2.8^x$

c. $y=0.31^x$

d. $y=1.1^x$

e. $y=1.5^x+1$

7. **A rectangular field bordered on one side by a river is divided into two equal corrals by three wooden fences (of equal length perpendicular to the river). A stone wall is parallel to the river and connects to the wooden fences to form the corrals. The area of the field is 350 square feet. It costs \$12 per linear foot for the wooden fences and \$25 per linear foot for the stone wall. Express the cost to enclose the field, C, as a function of its dimension x, the length of the wooden fence.**

a. $C(x)=24x+25y$

b. $C(x)=36x+\frac{25}{x}$

c. $C(x)=36x+\frac{8750}{x}$

d. $C(x)=\frac{14}{x}+36x$

e. $C(x)=\frac{375}{x}+12x$

8. **Determine the equation of the quadratic function with vertex $(-5,7)$ and another point at $(-8,-2)$.**

a. $f(x)=1(x+5)^2+7$

b. $f(x)=\frac{5}{9}(x+8)^2-2$

c. $f(x)=\frac{-9}{169}(x-5)^2+7$

d. $f(x)=\frac{-5}{169}(x+5)^2+7$

e. $f(x)=-1(x+5)^2+7$

9. Given the following polynomial function, $P(x)=-2(x+4)(x+2)^2(x-2)$, determine which of the following statements is/are true.

I. For $P(x)$, as $x\to\infty, P(x)\to\infty$.

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

III. $P(x)$ has a y-intercept at $(0,64)$.

IV. $P(x)\geq 0$ on the interval $[-4,2]$

a. All are true

b. None are true

c. II and III are true

d. I, II and III are true

e. II, III and IV are true

10. If f and g are inverse functions, then $(f\circ g)(x)=(g\circ f)(x)=$ ____.

a. $-x$

b. 0

c. $\frac{1}{x}$

d. x

e. 1

11. Given the function $f(x)=\frac{x-5}{x^2-3x-10}$, determine which of the following is/are true.

I. The y-intercept is $\left(0,\frac{1}{2}\right)$

II. The horizontal asymptote is $y=0$.

III. The vertical asymptote(s) are $x=5$ *and* $x=-2$

a. None are true

b. I and II are true

c. II and III are true

d. All are true

e. I and III are true

12. Determine the solution set of $\frac{(x-8)}{x+3}\leq 0$.

a. $(-3,8]$

b. $(-\infty,-3)\cup[8,\infty)$

c. $(-3,\infty)$

d. $(3,8]$

e. $(-\infty,3)\cup[8,\infty)$

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Questions 13-15 are free response. Pages 7 and 8 should be turned in with your answer sheet. Show all work for full credit.

13. **Let** $f(x)=\sqrt{x+7}$, $x \geq -7$.

a. Determine the equation of $f^{-1}(x)$. **To receive full credit, show all your work or provide a complete explanation. [6 points]**

b. Express the domain and range of f **and** f^{-1}. **[4 points]**

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

14. A breeder of horses wants to form a rectangular grazing area along a river. The river will serve as one side and 460 yards of fencing are available. Determine the largest possible area that the breeder can enclose. [10 points]

15. Determine the equation of the rational function, $f(x)$, which fits the following criteria. [8 points]

- **Vertical Asymptotes at x = 5 and x = -2**
- **Horizontal Asymptote at y = 2**
- **x-intercepts at –1 and 1**

$f(x) =$ _____

Multiple Choice Key
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1. C
2. D
3. A
4. B
5. E
6. B
7. C
8. E
9. E
10. D
11. B
12. A