MA109 — College Algebra   Fall 2018
Practice Exam 2   2018-10-17

Name: _____ **Sec.:** _____

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For grading use:

Number Correct	
	(out of 20 problems)

Total	
	(out of 100 points)

Multiple Choice Questions
Show all your work on the page where the question appears.
Clearly mark your answer both on the cover page on this exam
and in the corresponding questions that follow.

1. Find an equation for a linear function $f(x) = mx + b$ for which $f(2) = 3$ and $f(6) = -17$.

   Possibilities:

   (a) $f(x) = -5x + 13$

   (b) $f(x) = -\frac{1}{5}x + \frac{17}{5}$

   (c) $f(x) = -\frac{17}{6}x - 17$

   (d) $f(x) = 5x - 7$

   (e) $f(x) = \frac{3}{2}x + 3$

2. A driver for a ridesharing company buys a car that costs $\$30,000$. If the driver can earn $\$12$ per hour, then which of these functions gives the driver's profit as a function of hours?

   Possibilities:

   (a) $f(x) = 2,500x$

   (b) $f(x) = 2,500x - 30,000$

   (c) $f(x) = 2,500$

   (d) $f(x) = 12x - 30,000$

   (e) $f(x) = 12x + 30,000$

3. A can of paint can cover 40 square feet. How many cans of paint are needed to cover a wall that measures 8 feet by 300 feet?

   Possibilities:

   (a) 40

   (b) 7.7

   (c) 240

   (d) 120

   (e) 60

4. Let $f(x) = |x|$ be the absolute value function. Which of these functions is obtained when the graph of $y = f(x)$ is shifted left 2 units and up 5 units?

Possibilities:

(a) $g(x) = |x + 2| + 5$

(b) $g(x) = |x - 2| + 5$

(c) $g(x) = |x + 5| - 2$

(d) $g(x) = |x + 2| - 5$

(e) $g(x) = |x + 5| + 2$

5. Let $f(x) = x^2 + 3x + 4$. Which of these functions is obtained when the graph of $y = f(x)$ is reflected horizontally about the y-axis?

Possibilities:

(a) $g(x) = -x^2 - 3x + 4$

(b) $g(x) = x^2 + 3x + 4$

(c) $g(x) = -x^2 - 3x - 4$

(d) $g(x) = -x^2 + 3x + 4$

(e) $g(x) = x^2 - 3x + 4$

6. Let $f(x) = mx + b$ be a linear function. Let g be the function obtained by horizontally stretching by a factor of 2, and then shifting down by 4 units. What is the y-intercept of g?

Possibilities:

(a) $\frac{1}{2}b - 4$

(b) $2b + 4$

(c) $b + 2$

(d) $b - 4$

(e) $2b - 4$

7. Let $f(x) = x^2 + x + 5$. Let $g(x) = 3(x-4)^2 + 3(x-4) + 15$.

What graph transformations take f to g?

Possibilities:

(a) Shift right 4, then vertically scale by a factor of $1/3$, then shift down 5.

(b) Shift right 4, then vertically scale by a factor of 3, then shift up 5.

(c) Shift right 4, then vertically scale by a factor of 3.

(d) Shift left 4, then vertically scale by a factor of 3.

(e) Shift left 4, then vertically scale by a factor of 3, then shift up 5.

8. Let $f(x)$ given by the left hand graph. Which of the following is the equation for the right hand graph?

Possibilities:

(a) $y = f(x-2) - 1$

(b) $y = f(-x) + 2$

(c) $y = -f(2-x) + 1$

(d) $y = -f(x-1) + 2$

(e) $y = f(x-4) + 2$
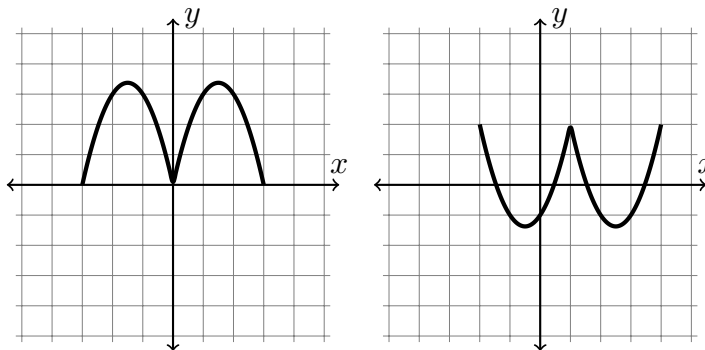
9. Let $f(x) = x^3 + 4$, and $g(x) = -2x + 5$.

Which of these is the formula for $(f \circ g)(x)$, or $f(g(x))$?

Possibilities:

(a) $-8x^3 + 9$

(b) $-2x^3 + 9$

(c) $(-2x + 5)^3 + 4$

(d) $(-2x + 5)^3 + 9$

(e) $-2x^3 + 69$

10. Let $f(x)$ and $g(x)$ be defined from the following tables:

x	f(x)
1	3
2	6
3	9

x	g(x)
1	2
2	4
3	8

What number is $f(g(1))$?

Possibilities:

(a) 2

(b) 6

(c) 4

(d) 8

(e) 3

11. Refer to the tables in the previous problem. What number is $f^{-1}(9)$?

Possibilities:

(a) 3

(b) -3

(c) -9

(d) $\frac{1}{9}$

(e) Cannot be determined from the table

12. Refer to the same tables as the previous problem. Additionally, let $h(x) = 5x - 10$.
What number is $f(1) + (h \circ g)(2)$?

Possibilities:

(a) 13

(b) 3

(c) 18

(d) 5

(e) 15

13. Let $f(x) = \dfrac{1}{x-2}$. What is the formula for $f^{-1}(x)$?

Possibilities:

(a) $x - 2$

(b) $\dfrac{1}{x} + 2$

(c) $\dfrac{1}{2x^2}$

(d) $\dfrac{3}{x}$

(e) $\dfrac{1}{x+2}$

14. Let $g(x) = \dfrac{x+1}{4-x}$. What is $g(g(x))$?

Possibilities:

(a) $\dfrac{4x-1}{x+1}$

(b) $\dfrac{4-x}{x+1}$

(c) $\dfrac{1}{3-x}$

(d) $\dfrac{x+1}{x-4}$

(e) x

15. Suppose the point $(2, -3)$ is on the graph of a function $f(x)$. Which of these points is on the graph of $f^{-1}(x)$?

Possibilities:

(a) $(-2, 3)$

(b) $(2, -\frac{1}{3})$

(c) $(-2, -3)$

(d) $(3, -2)$

(e) $(-3, 2)$

16. Solve $x^2 - 16 = 0$.

    Possibilities:

    (a) $x = -4$

    (b) $x = 4$

    (c) $x = -2, \ 2$

    (d) $x = -4, \ 4$

    (e) No real solutions

17. Solve $x^2 - 10x - 18 = 0$.

    Possibilities:

    (a) $x = 18, \ x = 28$

    (b) $x = 2, \ x = 9$

    (c) $x = 10 \pm \sqrt{18}$

    (d) $x = -5 \pm \sqrt{7}$

    (e) $x = 5 \pm \sqrt{43}$

18. What is the x-coordinate of the vertex of $f(x) = x^2 - 24x + 140$?

    Possibilities:

    (a) $x = 140$

    (b) $x = 12$

    (c) $x = -24$

    (d) $x = 70$

    (e) $x = 14, \ x = 10$

19. Which quadratic function has vertex $(3, 4)$ and y-intercept 5?

    Possibilities:

    (a) $3x^2 + 4x + 5$

    (b) $\frac{1}{9}(x - 3)^2 + 4$

    (c) $(3x + 4)(5 - x)$

    (d) $(x - 4)^2 + 8$

    (e) $5x^2 - 4x + 3$

20. How many solutions does $x^2 + 7x + 12 = 0$ have?

    Possibilities:

    (a) 1

    (b) 0

    (c) 2

    (d) -4 and -3

    (e) More than 2

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