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

Name: _____ **Sec.:** _____

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The exam consists of multiple choice questions. Record your answers on this page. For each multiple choice question, you will need to fill in the circle corresponding to the correct answer. For example, if (a) is correct, you must write

(a) **b** **c** **d** **e**

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GOOD LUCK!

1.	**a**	**b**	**c**	**d**	**e**	**11.**	**a**	**b**	**c**	**d**	**e**
2.	**a**	**b**	**c**	**d**	**e**	**12.**	**a**	**b**	**c**	**d**	**e**
3.	**a**	**b**	**c**	**d**	**e**	**13.**	**a**	**b**	**c**	**d**	**e**
4.	**a**	**b**	**c**	**d**	**e**	**14.**	**a**	**b**	**c**	**d**	**e**
5.	**a**	**b**	**c**	**d**	**e**	**15.**	**a**	**b**	**c**	**d**	**e**
6.	**a**	**b**	**c**	**d**	**e**	**16.**	**a**	**b**	**c**	**d**	**e**
7.	**a**	**b**	**c**	**d**	**e**	**17.**	**a**	**b**	**c**	**d**	**e**
8.	**a**	**b**	**c**	**d**	**e**	**18.**	**a**	**b**	**c**	**d**	**e**
9.	**a**	**b**	**c**	**d**	**e**	**19.**	**a**	**b**	**c**	**d**	**e**
10.	**a**	**b**	**c**	**d**	**e**	**20.**	**a**	**b**	**c**	**d**	**e**

For grading use:

Number Correct	
	(out of 20 problems)

Total	
	(out of 100 points)

Name: _____

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.

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1. Find an equation for a linear function $f(x) = mx + b$ for which $f(2) = 5$ and $f(9) = 13$.

   Possibilities:

   (a) $f(x) = \frac{13}{9}x + 13$

   (b) $f(x) = \frac{5}{2}x + 5$

   (c) $f(x) = \frac{9}{2}x + \frac{13}{5}$

   (d) $f(x) = -\frac{7}{8}x + \frac{27}{4}$

   (e) $f(x) = \frac{8}{7}x + \frac{19}{7}$

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2. A total of \$7,000 was invested, part of it at 2.5% interest and the remainder at 3.1%. If the total yearly interest amount is \$180.46, how much was invested at 3.1%?

   Possibilities:

   (a) \$1,033 at 3.1%

   (b) \$6,090 at 3.1%

   (c) \$5,967 at 3.1%

   (d) \$7,000 at 3.1%

   (e) \$910 at 3.1%

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3. Casey the contractor purchases a backhoe for \$84,600. Fuel and standard maintenance cost \$7.90 per hour, and the operator is paid \$28.75 per hour, including benefits.

   If Casey charges \$74.25 per hour, how many hours must the backhoe be used and paid for to break-even?

   Possibilities:

   (a) 1950 hours

   (b) 2050 hours

   (c) 2150 hours

   (d) 2250 hours

   (e) 2350 hours

---

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 9 units and down 8 units?

Possibilities:

(a) $g(x) = |x - 8| - 9$

(b) $g(x) = |x + 8| + 9$

(c) $g(x) = |x + 9| - 8$

(d) $g(x) = \frac{9}{8}|x|$

(e) $g(x) = |x - 9| + 8$

---

5. Let $f(x) = 9x^2 + 8x + 7$. If the graph of $y = f(x)$ is reflected vertically over the x-axis, the result is the graph of $y = g(x)$. Which of the following gives the formula for $g(x)$?

Possibilities:

(a) $g(x) = -9x^2 - 8x - 7$

(b) $g(x) = 9x^2 - 8x + 7$

(c) $g(x) = -\frac{4}{9} + \frac{1}{9}\sqrt{-47 + 9x}$

(d) $g(x) = 9\,(x - 1)^2 + 8x - 1$

(e) $g(x) = -9x^2 + 8x - 7$

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6. Let $f(x) = mx + b$ be a linear function. If the graph of $y = f(x)$ is shifted left by 2 the result is the graph of $y = g(x)$. Find the slope and y-intercept of g.

Possibilities:

(a) Slope: $-2m + b$ y-intercept: m

(b) Slope: m y-intercept: $b + 2m$

(c) Slope: $\frac{1}{2}m$ y-intercept: b

(d) Slope: $-2m - b$ y-intercept: $b + 2m$

(e) Slope: $-2m$ y-intercept: b

---

7. Let $f(x) = x^2 + 3x + 4$. Let $g(x) = 5(x+9)^2 + 15(x+9) + 27$.

   What graph transformations take f to g?

   Possibilities:

   (a) Shift left 9, then vertically scale by $\frac{1}{5}$, then shift down 7.

   (b) Shift right 9, then vertically scale by $\frac{1}{5}$, then shift up 7.

   (c) Shift left 9, then vertically scale by 5, then shift up 7.

   (d) Shift right 5, then vertically scale by 3, then shift up 4.

   (e) Shift right 9, then vertically scale by 5, then shift down 7.

---

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

   Possibilities:

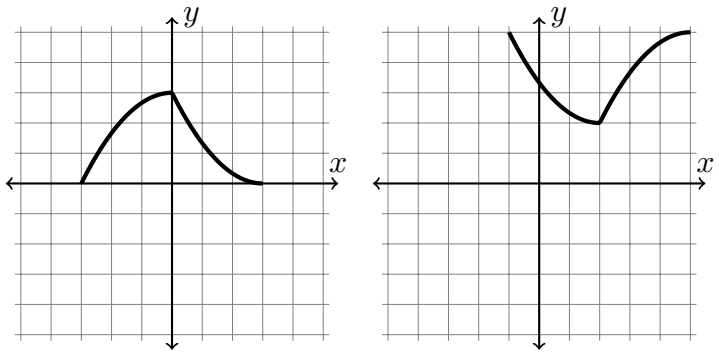
   (a) $y = 2f(-x) - 5$

   (b) $y = -f(x-2) + 5$

   (c) $y = f^{-1}(x-2) + 5$

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

   (e) $y = f(x+2) - 5$



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9. Let $f(x) = 3x^2 + 4x + 5$, and $g(x) = x - 6$.

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

   Possibilities:

   (a) $f(g(x)) = \dfrac{2 \pm \sqrt{7}}{3}$

   (b) $f(g(x)) = 3(x-6)^2 + 4(x-6) + 5$

   (c) $f(g(x)) = 3x^2 - 6 + 4x - 6 + 5$

   (d) $f(g(x)) = 137$

   (e) $f(g(x)) = 3x^2 + 4x + 5 - 6$

---

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

x	f(x)
1	9
2	8
3	4

x	g(x)
1	7
2	3
3	2

What number is $f(g(3))$?

Possibilities:

(a) $f(g(3)) = 4$

(b) $f(g(3)) = 9$

(c) $f(g(3)) = 7$

(d) $f(g(3)) = 8$

(e) $f(g(3)) = 3$

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11. Refer to the tables in the previous problem. What number is $f^{-1}(4)$?

Possibilities:

(a) $f^{-1}(4) = -4$

(b) $f^{-1}(4) = 3$

(c) $f^{-1}(4) = \frac{1}{4}$

(d) $f^{-1}(4) = -3$

(e) $f^{-1}(4)$ cannot be determined from the table

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12. Refer to the same tables as the previous problem. Additionally, let $h(x) = 10x + 100$.
What number is $(h \circ g)(2)$?

Possibilities:

(a) $h(g(2)) = 130$

(b) $h(g(2)) = 20$

(c) $h(g(2)) = 107$

(d) $h(g(2)) = 110$

(e) $h(g(2)) = 102$

---

13. Let $f(x) = \dfrac{2}{3x+11}$ and $g(x) = \dfrac{x}{5}$. Find a simplified formula for $f \circ g$.

Possibilities:

(a) $f(g(x)) = x$

(b) $f(g(x)) = \dfrac{2x}{3x+16}$

(c) $f(g(x)) = \dfrac{10}{3x+55}$

(d) $f(g(x)) = \dfrac{6x+22}{33x+127}$

(e) $f(g(x)) = \dfrac{2-11x}{3x}$

---

14. Let $g(x) = \dfrac{9x+3}{7x+2}$. What is $g^{-1}(\frac{13}{10})$?

Possibilities:

(a) $g^{-1}(\frac{13}{10}) = x$

(b) $g^{-1}(\frac{13}{10}) = \frac{13}{10}$

(c) $g^{-1}(\frac{13}{10}) = 5$

(d) $g^{-1}(\frac{13}{10}) = 4$

(e) $g^{-1}(\frac{13}{10}) = \frac{49}{37}$

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15. Suppose the point $(-13, 3)$ is on the graph of $y = f(x)$. Which point must be on the graph of $y = f^{-1}(x)$?

Possibilities:

(a) $(13, 3)$ must be on the graph of $y = f^{-1}(x)$

(b) $(-3, \frac{1}{13})$ must be on the graph of $y = f^{-1}(x)$

(c) $(3, -13)$ must be on the graph of $y = f^{-1}(x)$

(d) $(-\frac{1}{13}, \frac{1}{3})$ must be on the graph of $y = f^{-1}(x)$

(e) $(-13, -3)$ must be on the graph of $y = f^{-1}(x)$

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16. Solve $x^2 - 9 = 91$.

Possibilities:

(a) $x = \pm\sqrt{91}$

(b) No real solutions

(c) $x = \pm 91$

(d) $x = \pm 3$

(e) $x = \pm 10$

---

17. Find all solutions x to $x^2 - 10x = K$ assuming K is a positive number.

Possibilities:

(a) $x = K \pm \sqrt{K + 10}$

(b) $x = -10 \pm \sqrt{K}$

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

(d) $x = 10 \pm \sqrt{K}$

(e) $x = 5 \pm \sqrt{25 + K}$

---

18. What is the x-coordinate of the vertex of $f(x) = x^2 - 10x - 96$?

Possibilities:

(a) $x = 5$ only

(b) $x = -96$ only

(c) $x = -10$ only

(d) $x = 48$ only

(e) $x = -6$ and $x = 16$

---

19. Which quadratic function has vertex $(10, -3)$ and y-intercept 17?

Possibilities:

(a) $f(x) = (x-10)^2 + 3$

(b) $f(x) = 17x^2 + 10x - 3$

(c) $f(x) = 2(x+3)^2 + 10$

(d) $f(x) = \frac{1}{5}(x-10)^2 - 3$

(e) $f(x) = 10x^2 - 3x + 17$

20. How many solutions does $x^2 - 10x - 96 = 0$ have?

Possibilities:

(a) Exactly 2

(b) Exactly 1

(c) Exactly 0

(d) Exactly -96

(e) 6 and -16

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