MA109 — College Algebra Fall 2016
Exam 2 2016-10-24

Name: _____ **Sec.:** _____

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GOOD LUCK!

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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)

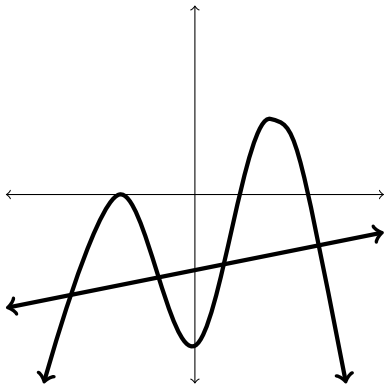
Total	
	(out of 100 points)

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.

1. The graph of two equations is shown below. Determine the number of solutions for the system of equations.



Possibilities:

(a) 4

(b) 3

(c) 2

(d) 0

(e) 1

2. Use the substitution method to find all solutions of the system of equations.

$$\begin{aligned} x + y^2 &= 17 \\ y - x &= -5 \end{aligned}$$

Possibilities:

(a) $(x = 1, y = -4)$ and $(x = 8, y = 3)$

(b) $(x = 1, y = 4)$ and $(x = 9, y = -4)$

(c) $(x = 1, y = -4)$ only

(d) $(x = 8, y = 3)$ only

(e) No real solutions

3. Use the elimination method to solve the system. The multiple choice problem only asks you for y.

$$\begin{array}{rcrcl} 17x & + & 19y & = & 127 \\ 17x & + & 18y & = & 123 \end{array}$$

Possibilities:

(a) Every solution has $y = 3$

(b) Every solution has $y = 4$

(c) Every solution has $y = \dfrac{4}{17}$

(d) Every solution has $y = \dfrac{4}{19}$

(e) Every solution has $y = -19$

4. Suppose you are solving the system of equations below using the substitution method. You solve for y in the first equation and substitute it into the second equation. What equation must you solve then?

$$\begin{array}{rcrl} 4x^5 & + & y & = 7 \\ 6x & + & 9y^3 & = 2 \end{array}$$

Possibilities:

(a) $6\left(7 - 4x^5\right) + 9y^3 = 2$

(b) $6x + 9\left(\sqrt[5]{7 - y}\right) = 2$

(c) $6x + 9\left(\sqrt[5]{7 - 4x^5}\right) = 2$

(d) $6x + 9\left(7 - 4x^5\right)^3 = 2$

(e) $6\left(\sqrt[5]{7 - 4x^5}\right) + 9y^3 = 2$

5. Use the elimination method to find all solutions of the system of equations.

$$\begin{cases} \dfrac{47}{x} + \dfrac{6}{y} = 43 \\ \dfrac{17}{x} + \dfrac{3}{y} = 16 \end{cases}$$

Possibilities:

(a) $(x = -47, y = 6)$ and $(x = -17, y = 3)$

(b) $\left(x = \dfrac{13}{11}, y = \dfrac{13}{7}\right)$ only

(c) $(x = 47, y = 6)$, $(x = -47, y = 6)$, $(x = 17, y = 3)$, and $(x = -17, y = -3)$

(d) $\left(x = \dfrac{13}{11}, y = \dfrac{13}{7}\right)$ and $\left(x = -\dfrac{13}{11}, y = -\dfrac{13}{7}\right)$

(e) $(x = 47, y = 6)$ and $(x = 17, y = 3)$

---

6. Use substitution to solve the system.

$$\begin{aligned} 3x + 2y &= 19 \\ 9x + 8y &= 23 \end{aligned}$$

Possibilities:

(a) $x = \frac{19}{3}, \quad y = \frac{23}{9}$

(b) $x = 103, \quad y = 355$

(c) $x = \frac{53}{3}, \quad y = -17$

(d) $x = \frac{6}{103}, \quad y = \frac{6}{355}$

(e) $x = -17, \quad y = \frac{53}{3}$

---

7. Use algebraic, graphical, or numerical methods to find all real solutions of the equation, approximating when necessary to four decimal places.

$$\frac{12x}{x+72} = 5$$

Possibilities:

(a) $x = 51.4235$

(b) $x = 51.4252$

(c) $x = 51.4269$

(d) $x = 51.4286$

(e) $x = 51.4303$

---

8. Find an equation that helps solve for the worker's old salary, call it x, in the following problem:

   A worker gets a 4.75% pay raise and now makes \$1350 per month. What was the worker's old salary?

Possibilities:

(a) $x = (4.75)(1350)$

(b) $x = 1350 - 4.75$

(c) $x + 0.0475x = 1350$

(d) $4.75x = 1350$

(e) $0.0475x = 1350$

---

9. A concrete walk of uniform width is to be built around a giant circular pool. The radius of the pool is 14 meters, and enough concrete is available to cover 44.25π square meters (approximately). If all the concrete is to be used, how wide should the walk be (approximately)? Choose the closest answer.

Possibilities:

(a) 3.16 meters wide

(b) 7.35 meters wide

(c) 30.2 meters wide

(d) 14 meters wide

(e) 1.5 meters wide

---

10. Find the equilibrium price. In the supply and demand equations, p is price (in dollars) and x is quantity (in thousands). Please round your answer to the nearest hundredth (the nearest cent).

$$\begin{array}{rrcrcr} \text{Supply:} & p & = & 9x & - & 7 \\ \text{Demand:} & p & = & -5x & + & 4 \end{array}$$

Possibilities:

(a) $p = \$0.79$

(b) $p = \$3$

(c) $p = \$0.07$

(d) $p = \$7$

(e) $p = \$4$

11. A radiator contains 4 quarts of fluid, 25% of which is antifreeze. How much fluid should be drained and replaced with pure (100%) antifreeze so that the new mixture is 55% antifreeze?

Possibilities:

(a) 1 quarts drained and replaced

(b) 4.8 quarts drained and replaced

(c) 2.2 quarts drained and replaced

(d) 1.6 quarts drained and replaced

(e) 4 quarts drained and replaced

12. Solve the inequality. Express your answer in interval notation.

$$|x - 4| \leq 5$$

Possibilities:

(a) $[0, 4]$

(b) $[-1, 9]$

(c) $[0, 5]$

(d) $[4, 5]$

(e) $[0, 9]$

---

13. Solve the inequality. Answer in interval notation.

$6x + 9 \leq 4x + 14$

Possibilities:

(a) $(-\infty, \infty)$

(b) $(-\infty, 6] \cup [9, \infty)$

(c) $[\frac{5}{2}, \infty)$

(d) $[\frac{3}{2}, \frac{7}{2}]$

(e) $(-\infty, \frac{5}{2}]$

---

14. A rectangle must have a length of 25 inches and an area of at most 600 square inches. How wide can this rectangle be?

Possibilities:

(a) at most 24 inches

(b) at most 15000 inches

(c) at least 24 inches

(d) at most 15 inches

(e) at least 15 inches

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15. A business executive is considering two options for leasing a car. The first option is \$415 per month, but the first month costs \$90 extra. The second option is \$430 per month with no extra cost for the first month. The business executive wants to know which option is cheapest based on how many months they plan on leasing the car. Which choice below most accurately describes the situation?

Possibilities:

(a) Both options cost the same regardless of the length of the lease.

(b) The first option is cheaper if the lease is 14 months or shorter,
the second option is cheaper if the lease is 16 months or longer,
and the two options are the same price if the lease is exactly 15 months

(c) The first option is cheaper if the lease is 5 months or shorter,
the second option is cheaper if the lease is 7 months or longer,
and the two options are the same price if the lease is exactly 6 months

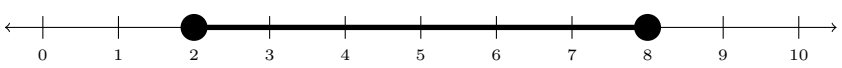
(d) The first option is cheaper if the lease is 16 months or longer,
the second option is cheaper if the lease is 14 months or shorter,
and the two options are the same price if the lease is exactly 15 months

(e) The first option is cheaper if the lease is 7 months or longer,
the second option is cheaper if the lease is 5 months or shorter,
and the two options are the same price if the lease is exactly 6 months

16. Solve the inequality. Answer by choosing the correct number line.

$0 < (x-2)(x-8)^2$

Possibilities:

(a)


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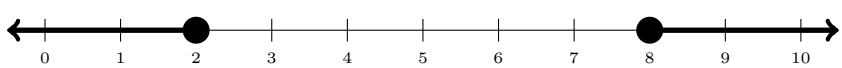

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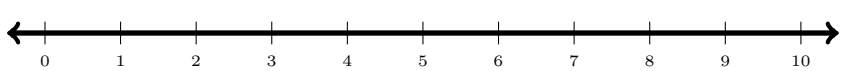

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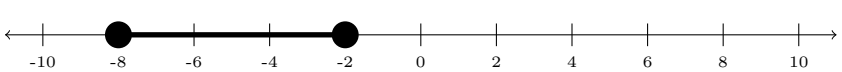

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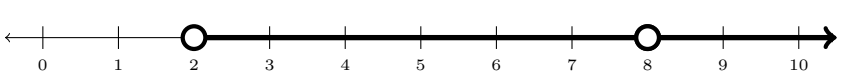
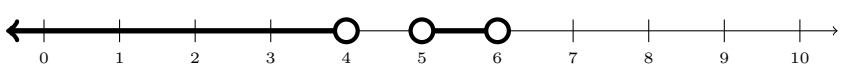
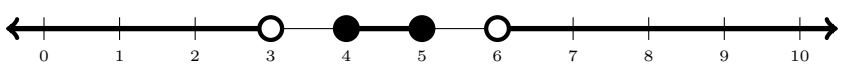


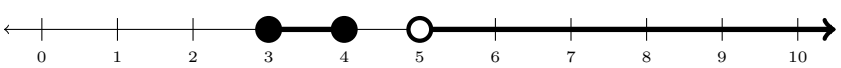
17. Solve the inequality. Answer by choosing the correct number line.

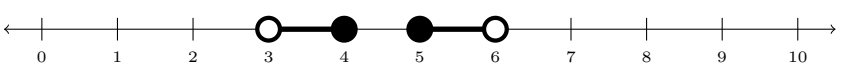
$$0 \leq \frac{(x-4)(x-5)}{(x-6)(x-3)}$$

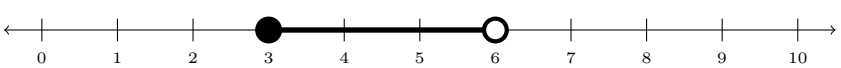
Possibilities:

(a) 

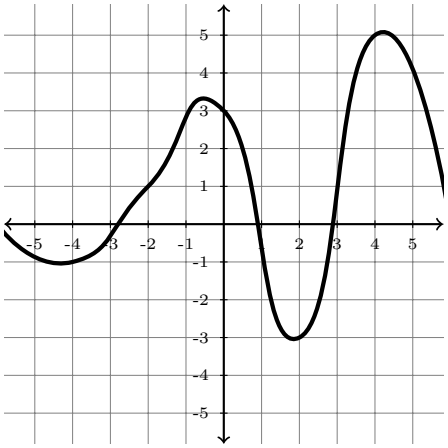
(b) 

(c) 

(d) 

(e) 

18. Find $f(4)$ from the graph of $y = f(x)$.



Possibilities:

(a) $f(4) = 3$

(b) $f(4) = 0$

(c) $f(4) = 5$

(d) $f(4) = 4$

(e) $f(4) = 7$

19. Let the piecewise function $g(x)$ be given by:

$$g(x) = \begin{cases} x^2 + 3 & \text{if } x \leq 2 \\ |x - 11| & \text{if } 2 < x \leq 4 \\ 10x + 2 & \text{if } 4 < x < 8 \\ \sqrt{x - 5} & \text{if } 8 \leq x \end{cases}$$

Evaluate $g(5)$

Possibilities:

(a) $g(5) = 52$

(b) $g(5) = 6$

(c) $g(5) = 0$

(d) $g(5) = \sqrt{47}$

(e) $g(5) = 28$

20. Let $f(x) = 2x^2 + 4x$. Find $\dfrac{f(x+h) - f(x)}{h}$ if $h \neq 0$. Simplify your answer.

Possibilities:

(a) $4x + 4h$

(b) 8

(c) $2h + 4$

(d) $4x + 2h + 4$

(e) $\dfrac{h + 8x}{h}$

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