MA109 — College Algebra Fall 2016
Exam 1 2016-09-21

Name: KEY Sec.: _____

Do not remove this answer page — you will turn in the entire exam. You have two hours to do this exam. No books or notes may be used. You may use an ACT-approved calculator during the exam, but NO calculator with a Computer Algebra System (CAS), networking, or camera is permitted. Absolutely no cell phone use during the exam is allowed.

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)

Do not circle answers on this page, but please circle the letter of each correct response in the body of the exam. It is your responsibility to make it CLEAR which response has been chosen. You will not get credit unless the correct answer has been marked on both this page and in the body of the exam.

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.

1. Simplify the expression. $14 - 4 \cdot 8^2$

Possibilities:

(a) -1010
(b) -50
(c) 6400
(d) -242
(e) 270

$14 - 4 \cdot 8^2$
$14 - 4(64)$
$14 - 256$
-242

2. Simplify the expression without using a calculator. Your answer should not have any radicals in it.

$$\sqrt{12}\sqrt{75}$$

Possibilities:

(a) 30
(b) 87
(c) 90
(d) 900
(e) 10

$\sqrt{12}\sqrt{75}$
$\sqrt{12 \cdot 75}$
$\sqrt{900}$
$\sqrt{9 \cdot 100}$
$\sqrt{9}\sqrt{100}$
$3 \cdot 10 \Rightarrow 30$

3. What is the first operation applied to x in the following expression? $6 - (x+3)^8$

Possibilities:

(a) Take the 8th root
(b) Subtract it from 6
(c) Multiply by -1
(d) Raise it to the 8th power
(e) Add 3

$6 - (x+3)^8$
1st ⇒ adding three
2nd ⇒ raising to 8th power
3rd ⇒ negating
4th ⇒ adding six

4. Simplify, and write the given number without using absolute values. $1 - |3 - 8|$

Possibilities:

(a) 12

(b) 6

(c) -4

(d) 4

(e) -10

$1 - |3-8|$

$1 - |-5|$

$1 - 5$

-4

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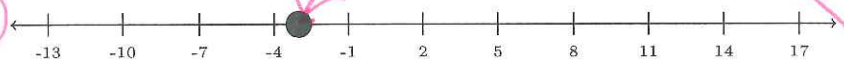
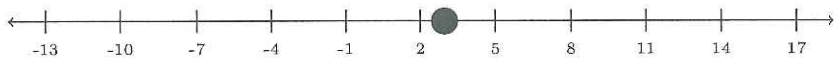
5. Find the given number on the number line: $4 - |-7|$

Possibilities:

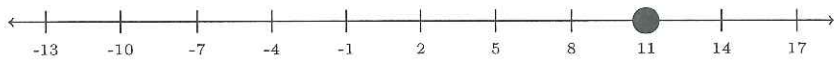
(a)



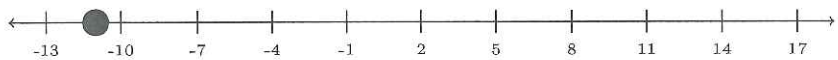
(b)



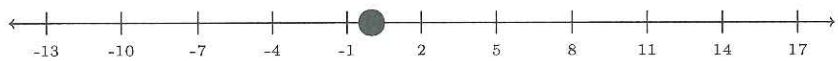
(c)



(d)



(e)



$4 - |-7|$

$4 - 7$

-3

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6. Simplify, and write the given number without using absolute values. $|\sqrt{7} - 3|$

Possibilities:

(a) 2

(b) $3 + \sqrt{7}$

(c) $\sqrt{7} - 3$

(d) $-3 - \sqrt{7}$

(e) $3 - \sqrt{7}$

$|\sqrt{7} - 3|$

$-(\sqrt{7} - 3)$

$-\sqrt{7} + 3$

$3 - \sqrt{7}$

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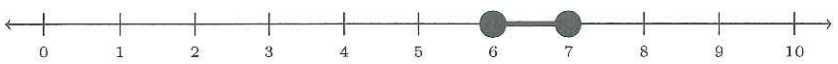
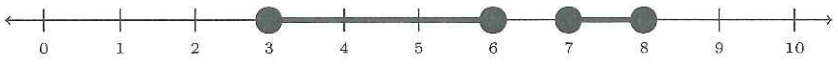
7. Which of the following number lines represents the union of intervals $[3, 6) \cup [7, 8)$?

Possibilities:

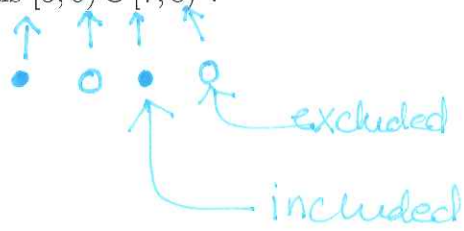
(a) 

(b) 

(c) 

(d) 

(e) 



[3, 6) ∪ [7, 8)

8. Solve the equation for L. $A = b \cdot \dfrac{L+R}{2}$

Possibilities:

(a) $L = \dfrac{2bA - Rb}{2}$

(b) $L = \dfrac{2A}{b} - R$

(c) $L = \dfrac{A + 2Rb}{b}$

(d) $L = \dfrac{2A - Rb}{Rb}$

(e) $L = \dfrac{2A + b}{Rb}$

$A = b \cdot \dfrac{L+R}{2}$ ·2

$\dfrac{2A}{b} = \dfrac{b(L+R)}{b}$

$\dfrac{2A}{b} = L + R$

$\dfrac{2A}{b} - R = L$

9. Find the x-intercept(s) of the graph of $x^2 + xy + y^2 + 10y - 2 = 0$.

Possibilities:

(a) $(\pm\sqrt{2}, -5 \pm \sqrt{2})$

(b) $(0, \pm\sqrt{2})$

(c) $(\pm\sqrt{2}, 0)$

(d) $(0, -5 \pm \sqrt{2})$

(e) $(-5 \pm \sqrt{2}, 0)$

x-intercepts $\Rightarrow y = 0$

$x^2 + x(0) + (0)^2 + 10(0) - 2 = 0$

$x^2 - 2 = 0$

$x^2 = 2$

$x = \pm\sqrt{2}$ → $(\sqrt{2}, 0)$, $(-\sqrt{2}, 0)$

10. Solve for x in $5 + |2 - x| = 7$.

Possibilities:

(a) 10 and 0

(b) 0 and 4

(c) 4 only

(d) 0 only

(e) 10 only

$5+|2-x|=7$

$|2-x|=2$

$2-x=2$ OR $2-x=-2$

$-x=0$ $-x=-4$

$x=0$ $x=4$

CHECK!

$5+|2-0| \stackrel{?}{=} 7$

$5+|2| \stackrel{?}{=} 7$

$5+2 \stackrel{\checkmark}{=} 7$

$5+|2-4| \stackrel{?}{=} 7$

$5+|-2| \stackrel{?}{=} 7$

$5+2 \stackrel{\checkmark}{=} 7$

11. The point $(6, 3)$ is on the graph of which of the following equations?

Possibilities:

(a) $x^2 + x - 9 = -y^2 + 42$

(b) $-xy + 36 = -xy + 9$

(c) $x^2 - 18 = y^2 - 18$

(d) $xy = 3y$

(e) $x = y - 3$

(a) $6^2+6-9 \stackrel{?}{=} -(3)^2+42$

$36+6-9 \stackrel{?}{=} -9+42$

$21 \stackrel{\checkmark}{=} 21$

(b) $-(6)(3)+36 \stackrel{?}{=} -(6)(3)+9$

$-18+36 \neq -18+9$

(c) $(6)^2-18 \stackrel{?}{=} (3)^2-18$

$36-18 \neq 9-18$

(d) $(6)(3) \stackrel{?}{=} 3(3)$

$18 \neq 9$

(e) $6 \stackrel{?}{=} 3-3$

$6 \neq 0$

12. The graph of $x^2 + y^2 - 18x - 10y + 97 = 0$ is a circle. Find its center and its radius.

Possibilities:

(a) Radius: 6 Center: $(18, 10)$

(b) Radius: 3 Center: $(-9, -5)$

(c) Radius: 3 Center: $(9, 5)$

(d) Radius: $\sqrt{97}$ Center: $(-9, -5)$

(e) Radius: $\sqrt{97}$ Center: $(9, 5)$

$x^2-18x+81+y^2-10y+25 = -97+81+25$

$(x-9)(x-9)+(y-5)(y-5) = -97+106$

$(x-9)^2 + (y-5)^2 = 3^2$

"h" "k" "r"

Center: $(9,5)$

radius: 3

13. Find an equation for the circle shown below:

Possibilities:

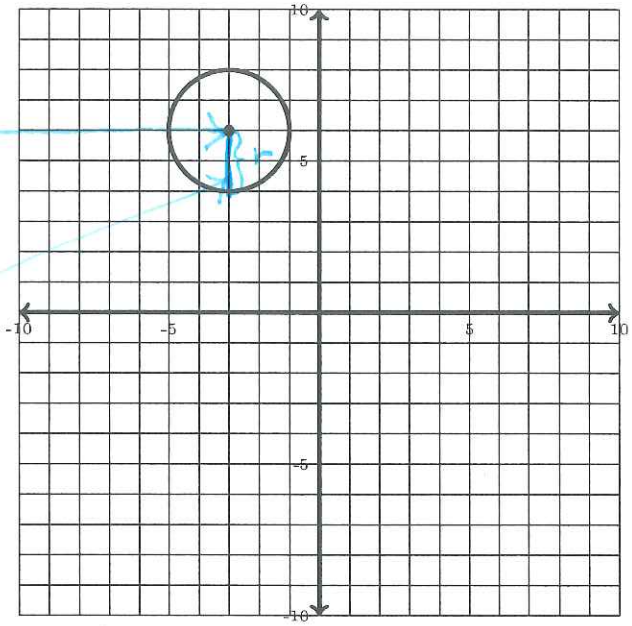
(a) $(x+3)^2+(y+6)^2=2$

(b) $(x+6)^2+(y+12)^2=-4$

(c) $(x-3)^2+(y-6)^2=2$

(d) $(x+3)^2+(y-6)^2=4$

(e) $(x-3)^2+(y+6)^2=4$



Center: $(-3, 6)$

radius: 2

$(x-h)^2+(y-k)^2=r^2$

$\boxed{(x+3)^2+(y-6)^2=2^2}$

14. Find all distinct, real solutions x to $\sqrt{10x+2}=x-4$

Possibilities:

(a) $9+\sqrt{67}$ and $9-\sqrt{67}$

(b) $9+\sqrt{67}$ only

(c) 3 and $\sqrt{65}$

(d) 4 and $-\frac{1}{5}$

(e) $9-\sqrt{67}$ only

$\left(\sqrt{10x+2}\right)^2=(x-4)^2$

$10x+2=x^2-8x+16$

$0=x^2-18x+14$

$-14+81=x^2-18x+81$

$67=(x-9)^2$

$\pm\sqrt{67}=x-9$

$9\pm\sqrt{67}=x$

$\boxed{9+\sqrt{67}=x}$

CHECK!

$\sqrt{10(9+\sqrt{67})+2} \stackrel{?}{=} 9+\sqrt{67}-4$

$\sqrt{92+10\sqrt{67}} = 5+\sqrt{67}$ ✓

$\sqrt{10(9-\sqrt{67})+2} \stackrel{?}{=} 9-\sqrt{67}-4$

$\sqrt{92-10\sqrt{67}} \neq 5-\sqrt{67}$

15. Find an equation for the line through the points $(6, 3)$ and $(8, 7)$.

$x_1\ y_1$ $\quad$ $x_2\ y_2$

Possibilities:

(a) $y - 3 = 2(x - 6)$

(b) $y - 3 = \frac{1}{2}(x - 6)$

(c) $y + 3 = \frac{1}{2}(x + 6)$

(d) $y = -\frac{1}{2}(x - 6) - 3$

(e) $y + 3 = 2(x + 6)$

Slope: $m = \frac{y_2 - y_1}{x_2 - x_1}$

$m = \frac{7-3}{8-6} = \frac{4}{2} = 2$

Pt.-slope form:

$y - y_1 = m(x - x_1)$

$y - 3 = 2(x - 6)$

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16. Rewrite the expression $x^2 - 6x + 3$ by completing the square.

Possibilities:

(a) $(x + 6)^2 - 3$

(b) $(x - 6)^2 + 3$

(c) $(x + 3)^2 + 6$

(d) $(x - 3)^2 - 6$

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

$x^2 - 6x + \left(\frac{-6}{2}\right)^2 - 9 + 3$

$x^2 - 6x + 9 \quad -9 + 3$

$(x - 3)(x - 3) - 6$

$(x - 3)^2 - 6$

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17. Find all distinct, real solutions x to $(x^2 - 5)(x - 2)(x - 7) = 0$.

Possibilities:

(a) $x = \pm\sqrt{5}$, $x = -2$, and $x = -7$

(b) $x = \pm\sqrt{5}$, $x = 2$, and $x = 7$

(c) $x = 5$, $x = 2$, and $x = 7$

(d) $x = -5$, $x = -2$, and $x = -7$

(e) No solution

$x^2 - 5 = 0 \quad x - 2 = 0 \quad x - 7 = 0$

$x^2 = 5 \quad x = 2 \quad x = 7$

$x = \pm\sqrt{5}$

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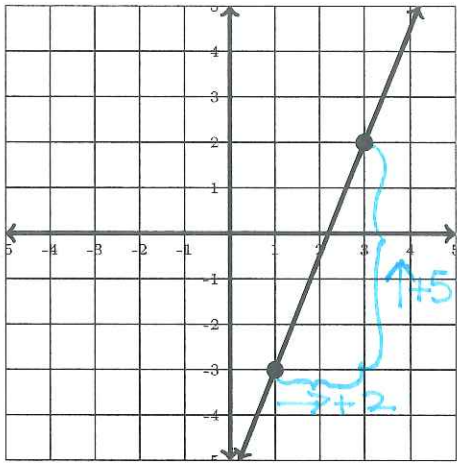
18. Find the slope of the line in the graph.



Possibilities:

(a) $-\frac{2}{5}$

(b) $-\frac{5}{2}$

(c) $\frac{2}{5}$

(d) $\frac{5}{2}$

(e) The slope is not defined.

$m = \frac{\text{rise}}{\text{run}}$

$m = \frac{+5}{+2}$

$m = 5/2$

19. Find all distinct, real solutions x to $x^6 - 7x^3 + 10 = 0$

Possibilities:

(a) $x = 2$ only

(b) $x = 5$ and $x = 2$

(c) $x = \sqrt[3]{5}$ and $x = \sqrt[3]{2}$

(d) $x = 5^3$ and $x = 2^3$

(e) $x = 5$ only

$u = x^3 \Rightarrow u^2 - 7u + 10 = 0$

$u^2 = (x^3)^2 = x^6$

$(u-5)(u-2) = 0$

$u - 5 = 0$ $\quad$ $u - 2 = 0$

$u = 5$ $\quad$ $u = 2$

$x^3 = 5$ $\quad$ $x^3 = 2$

$x = \sqrt[3]{5}$ $\quad$ $x = \sqrt[3]{2}$

20. What is the distance between $(5, 2)$ and $(-7, -6)$?

$x_1\ y_1 \quad x_2\ y_2$

Possibilities:

(a) $2\sqrt{5}$

(b) $\sqrt{10}$

(c) 12

(d) 8

(e) $4\sqrt{13}$

Distance: $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

$\sqrt{(5+7)^2 + (2+6)^2}$

$\sqrt{12^2 + 8^2}$

$\sqrt{144 + 64}$

$\sqrt{208}$

simplify!

$\sqrt{16 \cdot 13}$

$\sqrt{16}\sqrt{13}$

$4\sqrt{13}$