

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 a graphing calculator during the exam, but NO calculator with a Computer Algebra System (CAS) or a QWERTY keyboard is permitted. Absolutely no cell phone use during the exam is allowed.

The exam consists of multiple choice and short answer questions. Record your answers on this page. For each multiple choice question, you will need to fill in the box 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 do 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. <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input checked="" type="checkbox"/> d <input type="checkbox"/> e | 11. <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input checked="" type="checkbox"/> d <input type="checkbox"/> e |
| 2. <input type="checkbox"/> a <input checked="" type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e | 12. <input type="checkbox"/> a <input checked="" type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e |
| 3. <input checked="" type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e | 13. <input type="checkbox"/> a <input checked="" type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e |
| 4. <input type="checkbox"/> a <input type="checkbox"/> b <input checked="" type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e | 14. <input type="checkbox"/> a <input checked="" type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e |
| 5. <input type="checkbox"/> a <input checked="" type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e | 15. <input type="text" value="4, -4"/> |
| 6. <input type="checkbox"/> a <input type="checkbox"/> b <input checked="" type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e | 16. <input type="text" value="3"/> |
| 7. <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input checked="" type="checkbox"/> d <input type="checkbox"/> e | 17. <input type="text" value="frac{k+l-xn}{x}"/> |
| 8. <input checked="" type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e | 18. <input type="text" value="-115/3"/> |
| 9. <input type="checkbox"/> a <input type="checkbox"/> b <input checked="" type="checkbox"/> c <input type="checkbox"/> d <input type="checkbox"/> e | 19. <input type="text" value="y - 5 = frac{3}{23}(x + 8)"/> |
| 10. <input type="checkbox"/> a <input type="checkbox"/> b <input type="checkbox"/> c <input checked="" type="checkbox"/> d <input type="checkbox"/> e | 20. <input type="text" value="frac{-5}{2}"/> |

For grading use:

Total	
	(out of 100 pts)

Multiple Choice Questions

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

1. Solve.

$$4x^2 - 8x + 1 = 0$$

Possibilities:

(a) $\frac{-8}{8} \pm \sqrt{48}$

(b) $\frac{8 \pm \sqrt{80}}{8}$

(c) $\frac{-8 \pm \sqrt{80}}{8}$

(d) $\frac{8 \pm \sqrt{48}}{8}$

(e) $\frac{-8 \pm \sqrt{48}}{8}$

2. The endpoints of a diameter of a circle are $A(3, 5)$ and $B(2, -5)$. Find the center of the circle.

Possibilities:

(a) $(1/2, 5)$

(b) $(5/2, 0)$

(c) $(\sqrt{101}, 0)$

(d) $(-1/2, -5)$

(e) $(0, \sqrt{101})$

3. Which of the following is a point on the graph of $x^2 - x + y = -7$?

Possibilities:

(a) $(1, -7)$

(b) $(1, 0)$

(c) $(0, 0)$

(d) $(-7, 0)$

(e) All of the above.

4. Find all real solutions.

$$2(x + 2)^4 + 10 = 14$$

Possibilities:

- (a) $x = \sqrt[4]{10}$
- (b) $x = -\sqrt[4]{2} - 2$
- (c) $x = \sqrt[4]{2} - 2$ and $x = -\sqrt[4]{2} - 2$
- (d) $x = \sqrt[4]{2}$
- (e) $x = \sqrt[4]{2} - 2$

5. Find all the solutions of the equation.

$$|x - 4| + 5 = 12$$

Possibilities:

- (a) There are exactly two solutions: $x = 3$ and $x = -11$.
- (b) There are exactly two solutions: $x = -3$ and $x = 11$.
- (c) The only solution is $x = 3$.
- (d) The only solution is $x = -3$.
- (e) The equation does not have any solutions.

6. How many real solutions does each equation have?

$$\text{(I)} \quad x^2 = -4$$

$$\text{(II)} \quad x^3 + 12 = 0$$

Possibilities:

- (a) Equation **(I)** has two real solutions, and equation **(II)** has one real solution.
 - (b) Equation **(I)** has two real solutions, and equation **(II)** has three real solutions.
 - (c) Equation **(I)** has no real solutions, and equation **(II)** has one real solution.
 - (d) Equation **(I)** has one real solution, and equation **(II)** has one real solution.
 - (e) Equation **(I)** has no real solutions, and equation **(II)** has no real solutions.
-

7. How many real solutions does each equation have?

(I) $3x^2 - 5x + 2 = 0$

(II) $x^2 + 8x + 16 = 0$

Possibilities:

- (a) Equation (I) has 1 real solution, and equation (II) has 1 real solution.
 - (b) Equation (I) has 2 real solutions, and equation (II) has 0 real solutions.
 - (c) Equation (I) has 1 real solution, and equation (II) has 0 real solutions.
 - (d) Equation (I) has 2 real solutions, and equation (II) has 1 real solution.
 - (e) Equation (I) has 2 real solutions, and equation (II) has 2 real solutions.
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8. Find all real solutions or state that there are no solutions.

$$\sqrt{x - 9} = x - 11.$$

Possibilities:

- (a) $x = 13$
 - (b) $x = 10$
 - (c) $x = 9$ or $x = 11$
 - (d) No Solutions
 - (e) $x = 13$ or $x = 10$
-

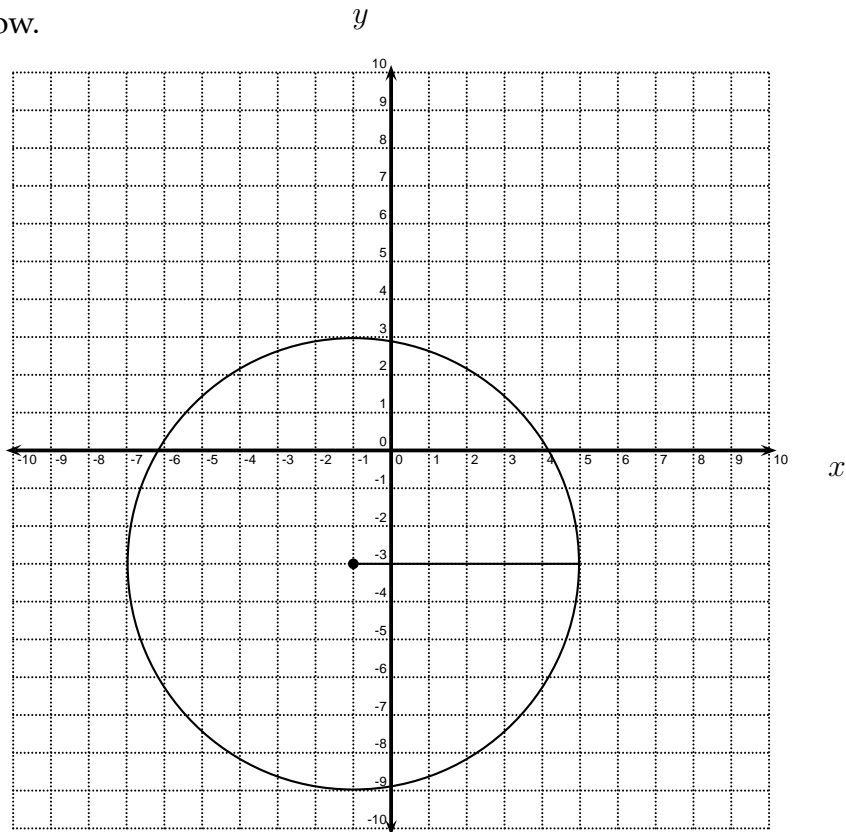
9. Solve for r .

$$\frac{(5r - 1)^3}{4} = 2$$

Possibilities:

- (a) $\frac{11}{5}$
 - (b) 15
 - (c) $\frac{3}{5}$
 - (d) $\frac{9}{5}$
 - (e) $\frac{1}{5}$
-

10. Find an equation for the circle shown below.



Possibilities:

- (a) $(x - 1)^2 - (y - 3)^2 = 36$
- (b) $(x + 1)^2 + (y + 3)^2 = 6$
- (c) $(x - 1)^2 + (y - 3)^2 = 12$
- (d) $(x + 1)^2 + (y + 3)^2 = 36$
- (e) $(x - 1)^2 - (y - 3)^2 = 144$

11. Find the intercept(s) of the graph of $y = x^2 - 11x + 24$.

Possibilities:

- (a) x -intercepts: $(-8, 0)$ and $(-3, 0)$
 y -intercept: $(0, 24)$
 - (b) x -intercept: $(-24, 0)$
 y -intercepts: $(0, -8)$ and $(0, -3)$
 - (c) x -intercepts: $(8, 0)$ and $(3, 0)$
 y -intercept: $(0, -24)$
 - (d) x -intercepts: $(8, 0)$ and $(3, 0)$
 y -intercept: $(0, 24)$
 - (e) x -intercept: $(24, 0)$
 y -intercepts: $(0, 8)$ and $(0, 3)$
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12. The graph of $x^2 - 8x - 32 + y^2 - 2y = 0$ is a circle. Find its center and its radius.

Possibilities:

- (a) Center: $(-4, -1)$ Radius: 49
 - (b) Center: $(4, 1)$ Radius: 7
 - (c) Center: $(-4, -1)$ Radius: 7
 - (d) Center: $(-8, -2)$ Radius: 32
 - (e) Center: $(4, 1)$ Radius: 49
-

13. Find an equation for the line that is perpendicular to the line $y = \frac{2}{3}x + 3$ and that passes through the point $(5, -15)$.

Possibilities:

- (a) $y - 15 = \frac{2}{3}(x + 5)$
 - (b) $y + 15 = \frac{-3}{2}(x - 5)$
 - (c) $y - 15 = \frac{-3}{2}(x + 5)$
 - (d) $y + 15 = \frac{3}{2}(x - 5)$
 - (e) $y + 15 = \frac{2}{3}(x - 5)$
-

14. Which of the following are linear equations.

$$\text{(I)} y - 7 = \frac{1}{5}(x - 3) \quad \text{(II)} y = \frac{1}{x + 1} \quad \text{(III)} y = 3x + 5$$

Possibilities:

- (a) Only **(I)**.
 - (b) Only **(I)** and **(III)**.
 - (c) Only **(II)** and **(III)**.
 - (d) Only **(III)**.
 - (e) All of **(I)**, **(II)**, and **(III)**.
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Short Answer Questions

Clearly write your answers in the spaces provided on the following pages.

15. Find all real solutions or state that there are NONE.

$$x^4 - 15x^2 - 16 = 0.$$

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16. Find all real solutions or state that there are NONE.

$$x^3 + x + 1 = x + 28.$$

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17. Solve the equation for a .

$$x(a + n) = k + l.$$

18. Find all real solutions or state that there are NONE.

$$\frac{8}{x-9} + \frac{6}{x^2-x-72} = \frac{5}{x+8}$$

19. Find an equation for the line through the points $(-8, 5)$ and $(15, 8)$.

20. Find the slope of the line in the graph shown below.

