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| MATH 1121 - Fall 2015 - Dr. Clontz - Test 1 |
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Name: _____ Section: _____

- This test is worth 250 points toward your overall grade. Each problem is labeled with its value toward this total.
- On multiple choice problems, you do not need to show your work. No partial credit will be given.
- On full response problems, show all of your work and give a complete solution. When in doubt, don't skip any steps. Partial credit will be given at the discretion of the instructor.
- This exam is open notes, provided that these notes are completely in your own handwriting. The professor may take up notes you use with your test and return them after the test is graded.
- Tests submitted after the end of 70 minutes will be docked 25 points, with 25 points deducted every following minute.

Multiple Choice (150 points total)

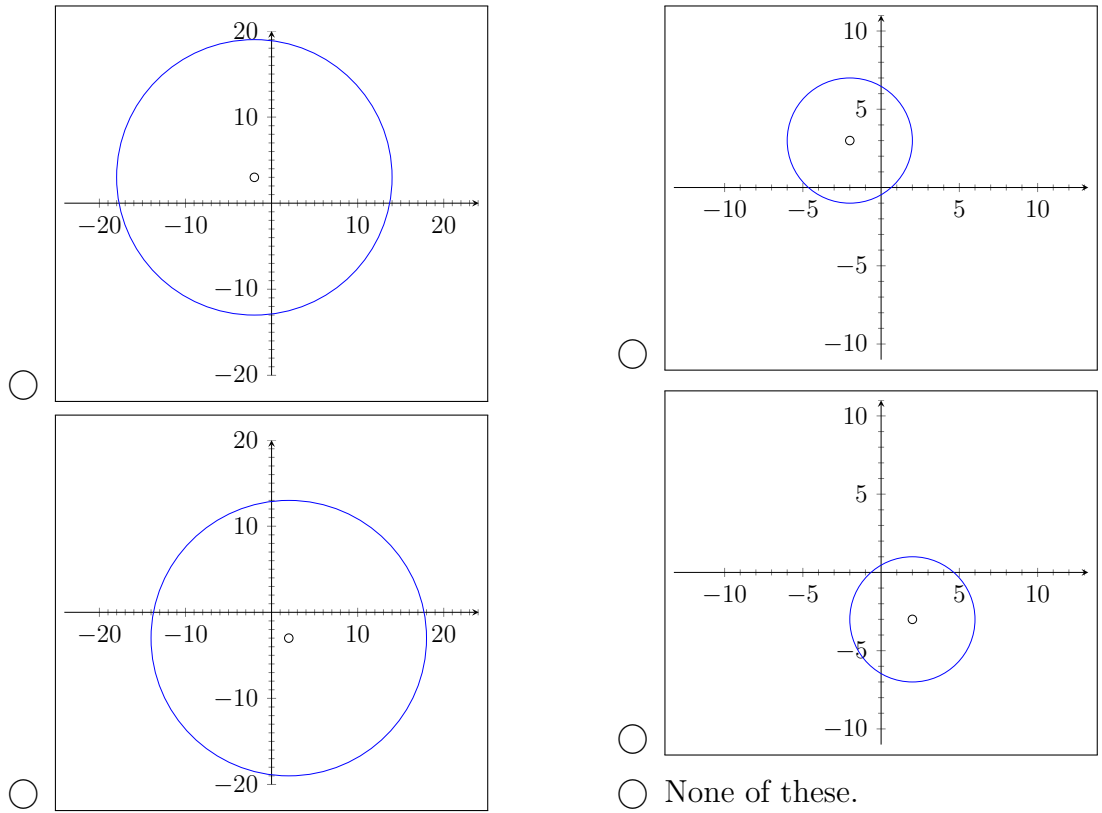
1. (15 points) Two endpoints of a line segment are $(-1, -1)$ and $(-1, 3)$. What must the y -coordinate of the line segment's midpoint be?
 - ☐ -1
 - ☐ 0
 - ☐ 1
 - ☐ 3
 - ☐ None of these

2. (15 points) What is the distance between the points with coordinates $(3, -2)$ and $(0, -6)$?
 - ☐ 5
 - ☐ $\sqrt{7}$
 - ☐ $\sqrt{35}$
 - ☐ 25
 - ☐ None of these

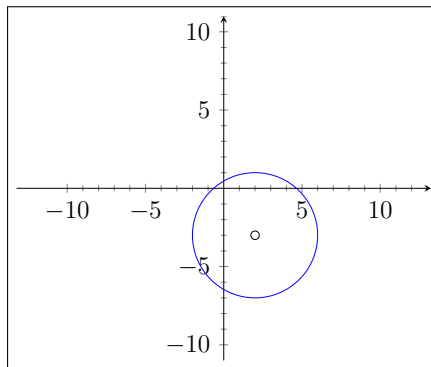
3. (15 points) Consider the lines with equations $y = \frac{1}{2}x + 5$ and $2x + y + 3 = 0$. Which of these statements is true?
 - ☐ The lines are parallel, but not perpendicular.
 - ☐ The lines are perpendicular, but not parallel.
 - ☐ The lines are both parallel and perpendicular.
 - ☐ The lines are neither parallel nor perpendicular.

4. (15 points) Which of the following plots corresponds to the circle with the following equation?

$$(x + 2)^2 + (y - 3)^2 = 16$$



5. (15 points) Which of the following equations corresponds to the parabola sketched here?



Full Response (100 points total)

1. (5 points) Compute the angle between the vectors $\vec{\mathbf{u}} = \langle 2, 2\sqrt{3} \rangle$ and $\vec{\mathbf{v}} = \langle -5, 0 \rangle$.

2. (5 points) Find an equation for the plane passing through $(0, 0, 0)$, $(1, 0, -3)$, and $(-2, 3, 0)$.

3. (5 points) Sketch $x^2 + 9y^2 - 4z^2 = 16$ and its traces in the planes $x = 0$, $y = 0$, and $z = 0$. Then use these traces to name the quadric surface.

4. (5 points) Explain why the parametric equations $x = 4 \sin t$ and $y = \cos t$ yield points on the ellipse $x^2 + 16y^2 = 16$.

5. (5 points) Find $\vec{\mathbf{r}}(t)$ given $\vec{\mathbf{r}}'(t) = \langle 4t^3, -\sin t, e^t \rangle$ and $\vec{\mathbf{r}}(0) = \langle 1, 2, 3 \rangle$.

6. (5 points) Recall from the notes that the work done by moving an object along the displacement vector $\vec{\mathbf{D}}$ using a force vector $\vec{\mathbf{F}}$ is given by

$$W = \vec{\mathbf{F}} \cdot \vec{\mathbf{D}}$$

Use this formula to show how much work is done in moving an object from the point $(1, 3)$ to the point $(4, 7)$ using a force of magnitude 10 units oriented in the positive y -direction.