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Course: Multi-Variable and Vector
Calculus -- Calculus III Spring 2018

Assignment: Section 11.1 Homework

1. Consider the following parametric equations.

$$x = \sqrt{t} + 6, y = 5\sqrt{t}; 0 \leq t \leq 16$$

- a. Eliminate the parameter to obtain an equation in x and y.
b. Describe the curve and indicate the positive orientation.

- a. Eliminate the parameter to obtain an equation in x and y.

$y = 5x - 30$ (Type an equation.)

- b. Choose the correct answer below.

- ☐ A. The curve is a parabola that opens upward.
☒ B. The curve is a line going up and to the right as t increases.
☐ C. The curve is a parabola that opens downward.
☐ D. The curve is a line going down and to the left as t increases.

2. Eliminate the parameter to find a description of the following circle (or circular arc) in terms of x and y. Give the center and radius, and indicate the positive orientation.

$$x = 2 \cos t, y = 2 \sin t; 0 \leq t \leq \pi$$

What is the radius?

r = 2 (Type an integer or a decimal.)

What is the center?

(0,0) (Type an ordered pair.)

What is the equation of the circle (or circular arc) in terms of x and y?

- ☒ A. $x^2 + y^2 = 4$
☐ B. $4 \cos^2 x + 4 \sin^2 y = 2$
☐ C. $(x + 2)^2 + (y + 2)^2 = 4$
☐ D. $(x - 2)^2 + (y - 2)^2 = 4$

Describe the circle (or circular arc) and give the positive orientation.

It is the upper half of a circle generated counterclockwise.

3. Find parametric equations that describe the circular path of the following object. Assume (x,y) denotes the position of the object relative to the origin at the center of the circle. Use the units of time given in the description.

A go-cart moves counterclockwise with constant speed around a circular track of radius 400 m, completing one lap in 1.2 min.

Assume the center of the track is at the origin and that the go-cart starts at $(400,0)$. What are the parametric equations?

$$x(t) = 400 \cos \left(\frac{2\pi}{1.2}t \right) \text{ and } y(t) = 400 \sin \left(\frac{2\pi}{1.2}t \right)$$

(Type exact answers, using π as needed.)

Determine the interval of t .

$$0 \leq t \leq 1.2 \quad (\text{Simplify your answers.})$$

4. Find the slope of the line and a point on the line. Then graph the line.

$$x = 4 + 5t, y = 5 + 4t$$

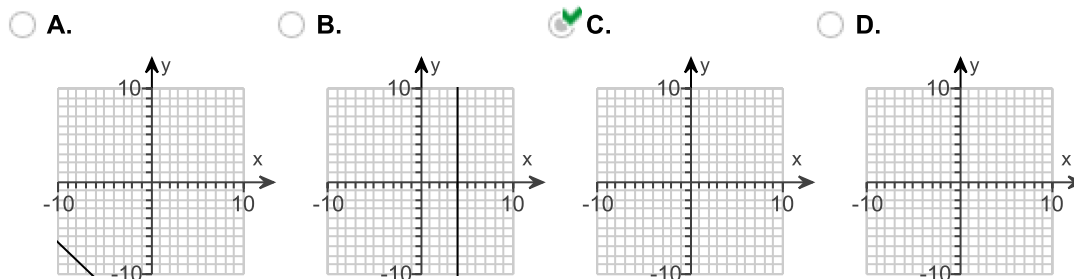
What is the slope? Select the correct answer below and, if necessary, fill in the answer box within your choice.

- ☒ **A.** The slope is $\frac{4}{5}$. (Type an integer or a simplified fraction.)
- ☐ **B.** The slope is undefined.

Determine a point on the line. Select the correct answer below.

- ☐ **A.** $(3,1)$ ☐ **B.** $(-4,2)$
- ☒ **C.** $(4,5)$ ☐ **D.** $(8,-5)$
- ☐ **E.** $(-7,9)$ ☐ **F.** $(7,-9)$
- ☐ **G.** $(-9,3)$ ☐ **H.** $(-6,-4)$

Graph the line. Choose the correct graph below.



5. Find a parametric description of the line segment from the point P to the point Q.

$$P(-2,5), Q(1,12)$$

Identify the correct set of parametric equations and the correct interval. Choose the correct answer below.

- ☐ **A.** $x(t) = -2 + 3t, y(t) = 5 + 7t; 0 \leq t \leq 2$
- ☐ **B.** $x(t) = 5 + 7t, y(t) = -2 + 3t; 0 \leq t \leq 1$
- ☒ **C.** $x(t) = -2 + 3t, y(t) = 5 + 7t; 0 \leq t \leq 1$
- ☐ **D.** $x(t) = 5 + 7t, y(t) = -2 + 3t; 0 \leq t \leq 2$

6. Find a parametric description of the line segment from the point P to the point Q.

P(5,2), Q(13,14)

Identify the correct set of parametric equations and the correct interval. Choose the correct answer below.

- ☒ A. $x(t) = 5 + 2t$, $y(t) = 2 + 3t$; $0 \leq t \leq 4$
☐ B. $x(t) = 2 + 3t$, $y(t) = 5 + 2t$; $0 \leq t \leq 4$
☐ C. $x(t) = 2 + 3t$, $y(t) = 5 + 2t$; $0 \leq t \leq 2$
☐ D. $x(t) = 5 + 2t$, $y(t) = 2 + 3t$; $0 \leq t \leq 2$

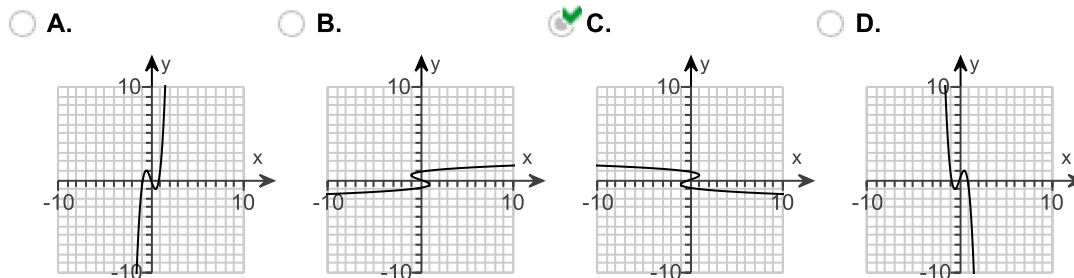
7. Give a set of parametric equations that describe the following curve. Graph the curve and indicate the positive orientation. Be sure to specify the interval over which the parameter occurs.

The complete curve $x = -4y^3 + 3y$

Identify the correct set of parametric equations and the correct interval. Choose the correct answer below.

- ☒ A. $x = -4t^3 + 3t$, $y = t$; $-\infty < t < \infty$
☐ B. $x = -4t^3 + 3t$, $y = t$; $-3 \leq t \leq 3$
☐ C. $x = t$, $y = -4t^3 + 3t$; $-\infty < t < \infty$
☐ D. $x = t$, $y = -4t^3 + 3t$; $-3 \leq t \leq 3$

Choose the correct graph below.



What is the positive orientation?

- ☐ Right
☒ Left

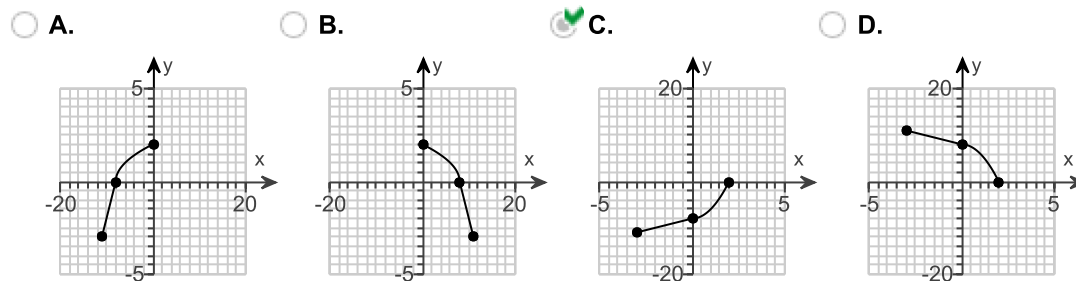
8. Give a set of parametric equations that describe the following curve. Graph the curve and indicate the positive orientation. Be sure to specify the interval over which the parameter occurs.

The path consisting of the line segment from $(-3, -11)$ to $(0, -8)$, followed by the segment of the parabola $y = -8 + 2x^2$ from $(0, -8)$ to $(2, 0)$

Identify the correct set of parametric equations and the correct interval. Choose the correct answer below.

- ☐ A. $x = -8 + t, y = t; -3 \leq t \leq 0$
 $x = -8 + 2t^2, y = t; 0 \leq t \leq 2$
☒ B. $x = t, y = -8 + t; -3 \leq t \leq 0$
 $x = t, y = -8 + 2t^2; 0 \leq t \leq 2$
☐ C. $x = 8 - t, y = t; -3 \leq t \leq 0$
 $x = 8 - 2t^2, y = t; 0 \leq t \leq 2$
☐ D. $x = t, y = 8 - t; -3 \leq t \leq 0$
 $x = t, y = 8 - 2t^2; 0 \leq t \leq 2$

Choose the correct graph below.



What is the positive orientation?

- ☒ Right
☐ Left