

Math 120 – Week 2 Outlined Old Exam Question Test Prep – Dr. Loveless

Here is an example of an old midterm 1 question that involves working with lines, circles and speed.

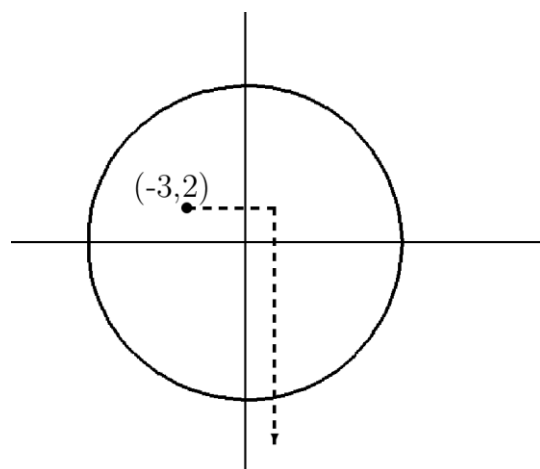
- Take 5 minutes to write down anything you can to try to make progress on this problem.
- After 5 minutes, flip to the next page to see a solution outline and grading rubric. Grade yourself to see how you did.
- Then discuss the solution with your TA.

Old Midterm 1 Question

A certain radio station broadcast can be picked up within a radius of 10 miles.

George starts at a point 2 miles north and 3 miles west of the station and turns his radio on. He bikes east at 10 mph for 30 minutes, then turns south continuing at the same constant speed.

How much total time (in hours) will George be in the broadcast region? (*round your final answer to 2 digits after the decimal*)



Answer:

George leaves the broadcast region at about _____ hours after he starts biking.

Participation Code: Enter the final answer to this question in the participation quiz for today for credit. (*round to 2 digits after the decimal when you enter it*)

Outline of Solution with typical grade marks (a few blanks have been left for you to fill in):

$$x^2 + y^2 = 10^2$$

(+1 pt) equation for points on the circle

10 mph for 30 minutes, so George turns in 5 miles.

Thus, the turning point is (2,2)

(+1 pt) George's turning point

$$x = 2$$

(+1 pt) equation of vertical line

Need to find the intersection of $x^2 + y^2 = 10^2$ and $x = 2$.

Combining gives $4 + y^2 = 100$, so $y^2 = 96$.

Giving, $y =$

(+4 pts) correctly finding intersection

Thus, the intersection point is (2 ,)

Total dist traveled = miles

(+2 pt) find total distance traveled

Total time = $\frac{\text{distance}}{\text{speed}} =$ hours

(+1 pt) find the total time

Answer:

George leaves the broadcast region at about _____ hours after he starts biking.

Again... Participation Code: Enter the final answer to this question in the participation quiz for today for credit. *(round to 2 digits after the decimal when you enter it)*