

# SOLUTION GUIDE

MAT 145

Quiz #1

Name \_\_\_\_\_

10 points

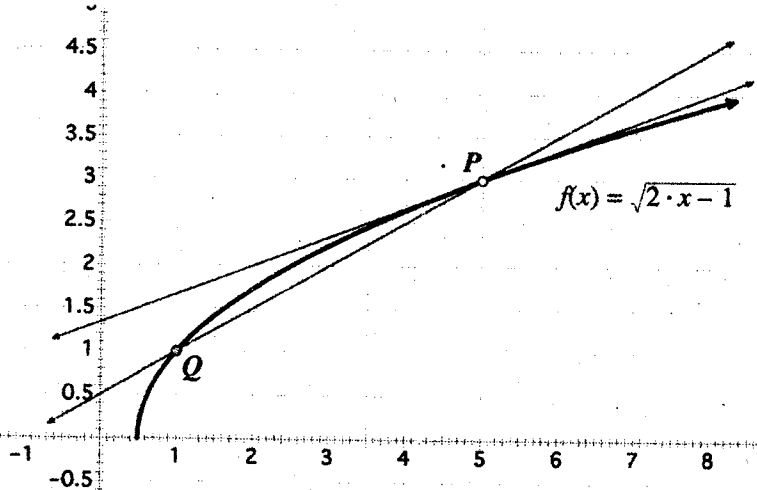
Calculator Used \_\_\_\_\_

Impact on Course Grade: approximately 1%

Score \_\_\_\_\_

*Show evidence to support your responses!*

Here is a graph of the function  $y = \sqrt{2x - 1}$  showing fixed point  $P$  and moving point  $Q$ . Note that the  $x$ -coordinate of  $P$  is 5 and that  $Q$  is currently 4 units to the left of  $P$ . Use this information to answer the following questions.



- (1) Calculate the exact value of the  $y$ -coordinate of fixed point  $P$ . (1 pt)

$$P = (5, 3) \text{ so } y = 3$$

- (2) Calculate the exact value of the current  $y$ -coordinate of moving point  $Q$ . (1 pt)

$$Q = (1, 1) \text{ so } y = 1$$

- (3) Calculate the exact value of the current slope of secant line  $PQ$ . (2 pts)

$$\frac{\Delta y}{\Delta x} = \frac{3-1}{5-1} = \frac{2}{4} = \frac{1}{2}$$

$$\text{slope} = \frac{1}{2}$$

- (4) Check *each* of the following statements that is *always true* as we move point  $Q$  closer to fixed point  $P$ . (4 pts total)

- a) Point  $P$  moves closer and closer to  $Q$ . F
- b) Point  $P$  moves closer and closer to the origin. F
- c) Point  $Q$  moves closer and closer to  $P$ . T
- d) Point  $Q$  moves closer and closer to the origin. F
- e) The slope of secant line  $PQ$  changes as point  $Q$  moves. T
- f) The value of the slope of secant line  $PQ$  approaches the value of the slope of the line tangent to  $y$  at point  $P$ . T
- g) The slope of the line tangent to  $y$  at point  $P$  changes as point  $Q$  moves. F

- (5) Think about how we have been using secant-line slopes to predict tangent-line slopes. Explain why we *cannot* compute a tangent-line slope at a fixed point on a curve just by knowing how to calculate slope. Be specific, accurate, and precise! (2 pts)

We cannot use  $\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$  to calculate slope because we only have one point!

Review your responses. Do they seem reasonable for this situation?

Using one pt. gives us  $\frac{0}{0}$ , an indeterminate form.