



Quiz # 3
Math 101-Section 13 Calculus I
25 October 2018, Thursday
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Solution Key



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Q-1) The point P is moving along the y -axis upwards with the constant speed of $2\text{cm}/\text{sec}$ and the point Q is moving along the x -axis towards right with the constant speed of $5\text{cm}/\text{sec}$. In the beginning P is at $(0, 15)$ and Q is at the origin. How fast is the distance between P and Q changing 3 seconds later.

Solution:

We notice that $P(t) = (0, 15 + 2t)$ and $Q(t) = (5t, 0)$. Letting $d(t)$ be the distance between them at time t , we get

$$d(t)^2 = 29t^2 + 60t + 225.$$

Taking derivatives of both sides with respect to t ,

$$2d(t)d'(t) = 58t + 60.$$

We note that $d(3)^2 = 666$, so

$$d'(3) = \frac{39}{\sqrt{74}} \approx 4.5.$$

Hence 3 seconds later the distance between these two points is increasing at a rate of $4.5\text{cm}/\text{sec}$.