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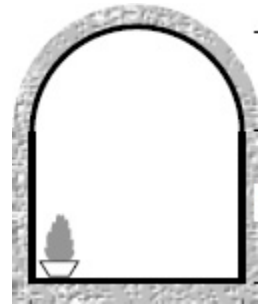
1. Use a linear approximation to estimate the given number (30)

(1) $\frac{1}{4.002}$

(2) $\tan 44^\circ$

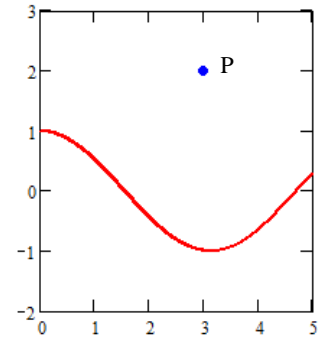
2. A Norman window has the shape of a rectangle surmounted by a semicircle. (Thus the diameter of the semicircle is equal to the width of the rectangle). (30)

- (1) If the perimeter of the window is 10 m, find the dimensions of the window so that the greatest possible amount of light is admitted.

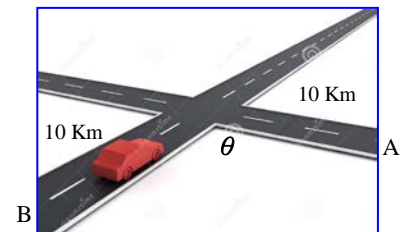


- (2) If the opening area of the window is 2 m², find the dimensions of the window so that the least amount of perimeter is used.

3. Find two points on curve $y = \cos(x)$ in the interval $0 \leq x \leq 5$ that is farthest or closest to the point $P(3,2)$. (20)



4. 藍軍 is traveling west at 30 km/h from point A and 綠軍 is traveling north at 42 km/h from point B . Both are headed for the intersection of the two roads . (40)



- (1) At what rate are the cars approaching each other 10 min later ? (20)
- (2) When will they approach closest distance ? (10)
- (3) If the intersection angle θ of the two road is 60° , calculate the result of (1) (10)