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Quiz 3

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. §2.3 #67 *(4 marks)* Given the supply and demand equations, where x represents the quantity demanded in units of a thousand and p the unit price in dollars, find the equilibrium quantity and the equilibrium price.

$p = -2x^2 + 80$ and $p = 15x + 30$

Equilibrium at intersection

$-2x^2 + 80 = 15x + 30$

$0 = 2x^2 + 15x - 50$

$=$

$2x^2(-50) = -100x^2 = ab$

s.t. $a + b = 15x$

$20x - 5x = 15x$

$0 = 2x^2 + 20x - 5x - 50$

$0 = 2x(x+10) - 5(x+10)$

$0 = (2x-5)(x+10)$

$x = \dfrac{5}{2}$ $x = \cancel{-10}$ not valid

So $p = 15\left(\dfrac{5}{2}\right) + 30$

$= \dfrac{75}{2} + 30$

$= \dfrac{135}{2}\ \$$

∴ equilibrium quantity is 2500 and price is 67.50 $

Question 2.

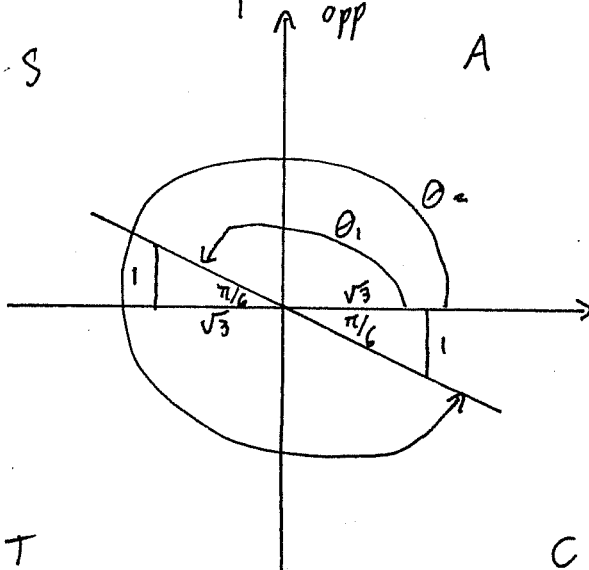a. *(1 mark)* §12.1 #8 Convert the angle 330° to radian measure.   a. $330°\dfrac{\pi}{180} = \dfrac{33}{18}\pi = \dfrac{11\pi}{6}$

b. *(1 mark)* §12.1 #14 Convert the angle $\frac{7}{6}\pi$ to degree measure.

b. $\dfrac{7\pi}{6} \cdot \dfrac{180}{\pi} = 7(30°) = 210°$

Question 3. §12.1 #17 *(4 marks)* Find all values of θ that satisfy the equation over the interval $[0, 2\pi]$

$\cot\theta = -\dfrac{\sqrt{3}}{1} = \dfrac{adj}{opp}$

$\theta_1 = \pi - \dfrac{\pi}{6} = \dfrac{5\pi}{6}$

$\theta_2 = 2\pi - \dfrac{\pi}{6} = \dfrac{11\pi}{6}$