# MTH 102, Calculus for Business, Quiz one, Spring 2013

Ayman Badawi

**QUESTION 1.**   (i) $Lim_{x \to 2} \dfrac{\sqrt{x^2+5}}{x+1}$

(ii) $Lim_{x \to 2} \dfrac{\sqrt{x+7}-3}{x^2-9}$

(iii) $Lim_{x \to 4^+} \dfrac{x-7}{x-4}$

(iv) $Lim_{x \to \infty} \dfrac{x^2+7x-7}{5x^2-4}$

(v) $Lim_{x \to -\infty} \dfrac{4x^2-7}{3x-4}$

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# MTH 102, Calculus for Business, Quiz Two, Spring 2013

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**QUESTION 1.** Find $f'(x)$ and do not simplify:

a) $f(x) = 2\sqrt{4x+1} - \frac{7}{5x-3} + \frac{3}{x} + 10$

b) $f(x) = (3x+7)(2x^2 - 5x + 1)^8$

**QUESTION 2.** Let $x$ be number of units of a certain product in hundreds and $P(x) = \sqrt{x^2 - 8x + 17}$ be the profit function in hundred of DHS.

a) Find $P(5)$ and $P(6)$.

b) Find the marginal profit when $x = 5$

c) Relate the answer in (b) to part (a). i.e., write a statement that is so clear for a reader.

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# MTH 102, Calculus for Business, Quiz three, Spring 2013

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**QUESTION 1.** Find $f'(x)$ and do not simplify:

a) $f(x) = ln(3x^2 - 6x + 1) - 12x^2 + 5$

b) $f(x) = ln[(3x + 7)(2x^2 - 5x + 1)^8] + 6$

**QUESTION 2.** Let $x$ be the number of items of a certain product in hundreds and

$$C(x) = \sqrt{x}^3 - 9x^2 + 24x + 1$$

be the cost of producing $x$ items in hundred of DHS where $1 \le x \le 5$.

   a) What is the minimum cost?

   b) How many items do we need to produce in order to obtain the minimum cost?

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# MTH 102, Calculus for Business, Quiz Four, Spring 2013

Ayman Badawi

**QUESTION 1.** Find $f'(x)$ and do not simplify:

a) $f(x) = (x+1)e^{(-3x^2+2x)} + 7x - 10$

b) $\left(\sqrt{3e^{(2x+2)}} + 5x - 2\right)^5$

**QUESTION 2.** a) Find H.A and y-intercept for $y = -3e^{(-4x+2)} - 2$, then make a rough sketch.

b) Find H.A and y-intercept for $y = 2e^{(-x+2)} + 3$, then make a rough sketch.

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# MTH 102, Calculus for Business, Quiz 6, Spring 2013

Ayman Badawi

**QUESTION 1.** Given a profit function $P(x) = \sqrt{3x + 1} + x - 1$ where $x$ is number of items in hundreds.

a) Find the equation of the tangent line to the curve of $P(x)$ when $x = 1$.

b) Use part (a) to approximate the profit when $x = 1.04$ (i.e., number of items is 104)

c) What is the actual profit when $x = 1.04$?

**QUESTION 2.** Given a profit function $P(x) = \sqrt{-x^3 + 6x^2}$ where $x$ is number of items in tens and $1 \leq x \leq 4$

a) For what values of $x$ does the profit increase?

b) For what values of $x$ does the profit decrease?

c) What is the maximum profit?

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# MTH 102, Calculus for Business, Quiz 6, Spring 2013

Ayman Badawi

**QUESTION 1.** Given a profit function $P(x) = \sqrt{3x + 1} + x - 1$ where $x$ is number of items in hundreds.

a) Find the equation of the tangent line to the curve of $P(x)$ when $x = 1$.

b) Use part (a) to approximate the profit when $x = 1.04$ (i.e., number of items is 104)

c) What is the actual profit when $x = 1.04$?

**QUESTION 2.** Given a profit function $P(x) = \sqrt{-x^3 + 6x^2}$ where $x$ is number of items in tens and $1 \leq x \leq 4$

a) For what values of $x$ does the profit increase?

b) For what values of $x$ does the profit decrease?

c) What is the maximum profit?

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# MTH 102, Calculus for Business, Quiz 8, Spring 2013

Ayman Badawi

**QUESTION 1.** Sketch the graph of $f(x) = \dfrac{-2x^2 - 18}{x^2 - 9}$. First find y-intercept, V.A, H. A, and the first derivative.

**QUESTION 2.** Given $P(x, y) = y\sqrt{x} + x\sqrt{y} - 2$ is the total profit in 100's of DHS on two different products (x is number of items from the first product, y is the number of items from the second product).

a) Find $P(25, 4)$ and $P_x(25, 4)$.

b) Use (a) to approximate $P(26, 4)$.

c) Find $P_y(25, 4)$.

d) Approximate $P(25, 5)$ (you should use part (c)).

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# MTH 102, Calculus for Business, Quiz 9, Spring 2013

Ayman Badawi

**QUESTION 1.** Given

$$P(x,y) = 2xe^{(3y-15)} + ln(3y + 4x - 30) + xy - 2x + 2y - 10$$

is the profit in hundreds of DHS on two products (x is number of items in hundreds from the first product, y is number of items in hundreds from the second product).

a) Find $P(4,5)$

b) Linearalize $P(x,y)$ at the point (4, 5)

d) Use (b) to approximate $P(4.2, 4.8)$. Then use a calculator to find the actual value of $P(4.2, 4.8)$.

**QUESTION 2.** Given

$$\sqrt{3x+1} + ln(3y + 4x - 46) = -ye^{(x-8)} + 10$$

a) Show that the point (8, 5) lies on the curve of the above equation.

b) Find the equation of the tangent line to the curve at the point (8, 5).

c) Use (b) to approximate the value of $y$ when $x = 8.3$.

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