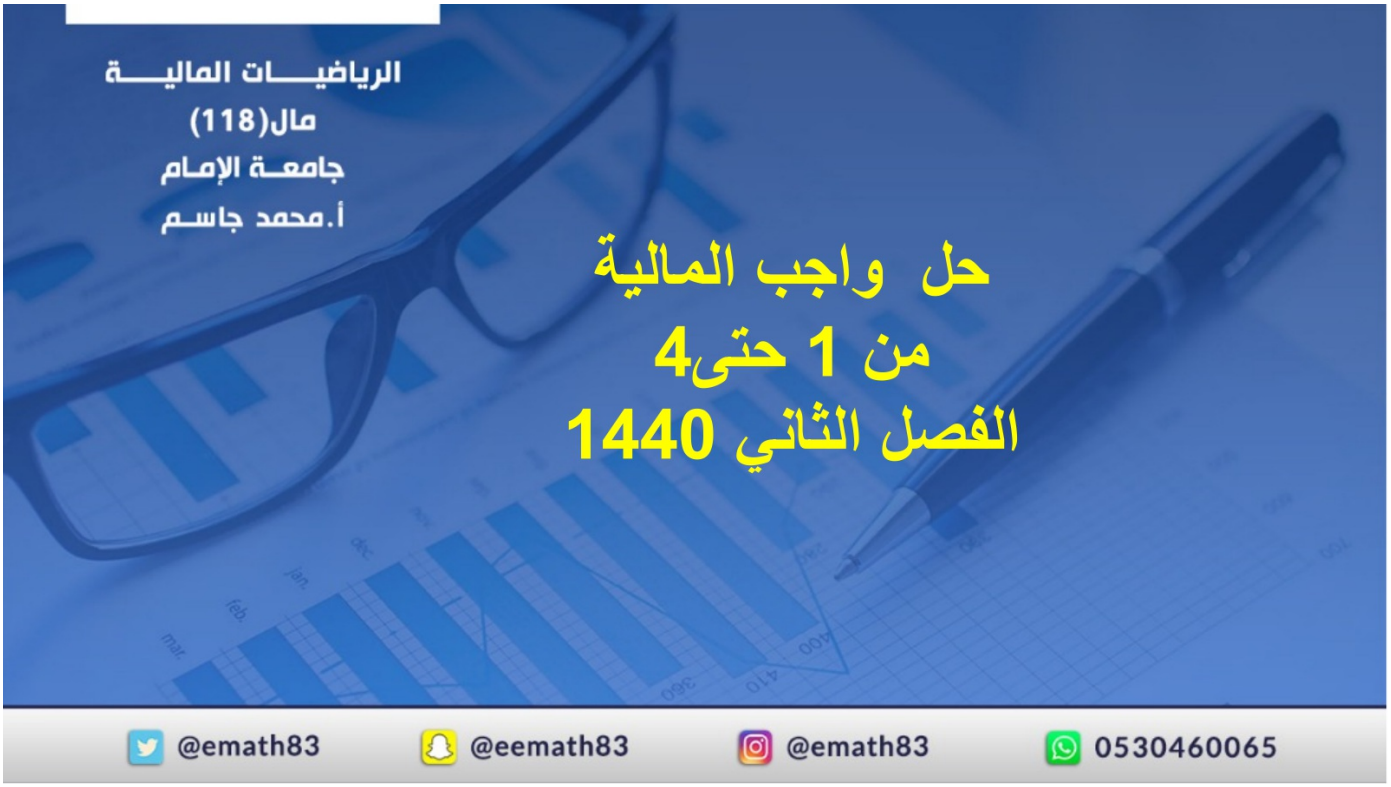
الرياضيـــات الماليـــة
مال(118)
جامعـة الإمـام
أ.محمد جاسـم
حل واجب المالية
من 1 حتى4
الفصل الثاني 1440
@emath83
@eemath83
@emath83
0530460065

ملاحظة

شرح المقرر كامل موجود كمقاطع فيديو في الموقع بالاضافة لبعض المراجعات وشرح نماذج اختبارات سابقة

كما يوجد قروب تلغرام للإجابة عن أسئلتكم حول المادة

مع تمنياتي لكم بالتوفيق والنجاح

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Financial Mathematics (Fin118)
Homework (Units 1, 2, 3 and 4)

1) Solve the equation: $7x - (5x - 1) = 2$

$$7x - 5x + 1 = 2$$
$$7x - 5x = -1 + 2$$
$$2x = 1$$
$$x = \frac{1}{2}$$

2) Solve the equation: $-5(2x + 1) - 2 = -2(x + 5) + 5x$

$$-10x - 5 - 2 = -2x - 10 + 5x$$
$$-10x + 2x - 5x = 5 + 2 - 10$$
$$-13x = -3$$
$$x = \frac{-3}{-13} = \frac{3}{13}$$

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3) Solve the equation: $x^2 + 14x - 5 = (x - 1)(x + 6)$

$$x^2 + 14x - 5 = x^2 + 6x - x - 6$$

$$x^2 + 14x - x^2 - 6x + x = 5 - 6$$

$$9x = -1$$

$$x = \frac{-1}{9}$$

4) Assume that the price per unit d of a certain item to the consumer is given by the equation $p = 35 - 0.1x$, where x is the number of units in demand. The price per unit from the supplier is given by the equation $p = 0.2x + 20$, where x is the number of units supplied. Find the equilibrium price and the equilibrium quantity.

$$35 - 0.1x = 0.2x + 20$$

$$-0.1x - 0.2x = -35 + 20$$

$$-0.3x = -15$$

$$x = \frac{-15}{-0.3} = \frac{15}{0.3} = 50 \Rightarrow 50 = \text{the equilibrium quantity.}$$

$$35 - 0.1(50) = 35 - 5 = 30 \Rightarrow 30 \text{ the equilibrium price}$$

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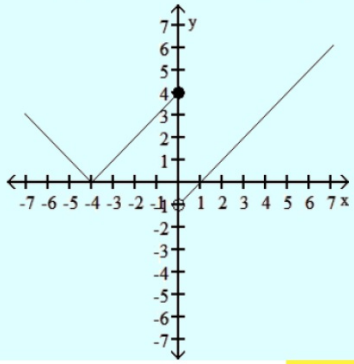
5) The graph of a function f is given below. Use the graph to answer the question.

Find $\lim_{x\to 0^-} f(x)$ and $\lim_{x\to 0^+} f(x)$.



$$\lim_{x\to 0^-} = 4$$

$$\lim_{x\to 0^+} = -1$$

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6) Find: $\lim_{x\to-\infty}\frac{6x+5}{5x-6}=$ $\lim_{x\to0^-}\frac{6x+5}{5x-6}=$ $\lim_{x\to0^+}\frac{6x+5}{5x-6}=$ $\lim_{x\to+\infty}\frac{6x+5}{5x-6}=$

$\lim_{x\to-\infty}\frac{6x+5}{5x-6}=\frac{6}{5}$

$\lim_{x\to0^-}\frac{6x+5}{5x-6}=\frac{6(0)+5}{5(0)-6}=\frac{5}{-6}$

$\lim_{x\to0^+}\frac{6x+5}{5x-6}=\frac{6(0)+5}{5(0)-6}=\frac{5}{-6}$

$\lim_{x\to+\infty}\frac{6x+5}{5x-6}=\frac{6}{5}$

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7) Given $\lim_{x\to 4} f(x) = -2$ and $\lim_{x\to 4} g(x) = 5$, find $\lim_{x\to 4} \frac{[g(x) - f(x)]}{-4\, f(x)}$.

$$= \frac{5-(-2)}{-4(-2)} = \frac{5+2}{8} = \frac{7}{8}$$

8) Evaluate the following limits

$$\lim_{x\to 2^-} \frac{1}{x-2} = \frac{1}{0^-} = -\infty$$

$$\lim_{x\to 2^+} \frac{1}{x-2} = \frac{1}{0^+} = \infty$$

What we can conclude?

$\lim_{x\to 2} \frac{1}{x-2}$ = D.N.E

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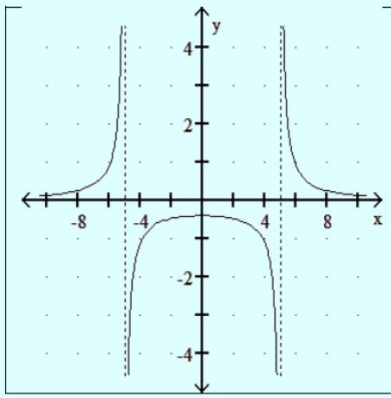
9) Let $f(x) = \begin{cases} \dfrac{x^2-16}{x+4} & \text{if } x>0 \\ \dfrac{x^2-16}{x-4} & \text{if } x<0 \end{cases}$

1. Find $\lim\limits_{x\to 0^-} f(x)$. $\dfrac{0-16}{0-4} = \dfrac{-16}{-4} = 4$
2. Find $\lim\limits_{x\to 0^+} f(x)$ $\dfrac{0-16}{0+4} = \dfrac{-16}{4} = -4$
3. Find $\lim\limits_{x\to 0} f(x)$ = dosenot exist (D.N.E)

10) The graph of a function f is given below. Use the graph to answer these questions.



$\lim\limits_{x\to-\infty} f(x) =$	0
$\lim\limits_{x\to-5^-} f(x) =$	$+\infty$
$\lim\limits_{x\to-5^+} f(x) =$	$-\infty$
$\lim\limits_{x\to5^-} f(x) =$	$-\infty$
$\lim\limits_{x\to5^+} f(x) =$	$+\infty$
$\lim\limits_{x\to+\infty} f(x) =$	0

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11) Find $\lim_{x \to \infty} \frac{5x^2 + 7x - 9}{-6x^2 + 2} = -\frac{5}{6}$

12) Find $\lim_{x \to \infty} \frac{3x^3 + 5x}{4x^4 + 10x^3 + 2} = 0$

13) The cost of manufacturing a particular videotape is $C(x) = 9000 + 9x$, where x is the number of tapes produced. The average cost per tape, denoted by $\bar{C}(x)$, is found by dividing $C(x)$ by x. Find $\lim_{x \to 9000} \bar{C}(x)$.

$$\bar{C}(x) = \frac{C(x)}{x} = \frac{9000 + 9x}{x}$$

$$\lim_{x \to 9000} \bar{C}(x) = \frac{9000 + 9(9000)}{9000} = 10$$

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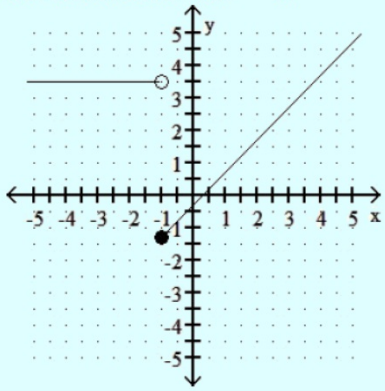
14) The graph of y = f(x) is shown. Use the graph to answer the question.
Is f continuous at x = -1?



$$\lim_{x\to -1^-} = 3.5$$

$$\lim_{x\to -1^+} = -1.5$$

15) Determine the points at which the function is discontinuous.

$$h(x) = \begin{cases} x^2 - 4 & \text{for } x < -1 \\ 0 & \text{for } -1 \le x \le 1 \\ x^2 + 4 & \text{for } x > 1 \end{cases}$$

$x = -1$
$f(-1) = 0$
$RHL = 0$
$LHL = 3$
$\Rightarrow$ *discontinuous*

x=1
$f(1) = 0$
$RHL = 5$
$LHL = 0$
$\Rightarrow$ *discontinuous*

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16) Let C(x) be the cost function and R(x) the revenue function. Compute the marginal cost, marginal revenue, and the marginal profit functions.

$C(x) = 0.0004x^3 - 0.012x^2 + 100x + 10{,}000$

$R(x) = 350x$

$$C'(x) = 3(0.0004)x^2 - 2(0.012)x + 100 + 0$$
$$= 0.0012x^2 - 0.024x + 100$$
$$R'(x) = 350$$
$$P'(x) = R'(x) - C'(x) = 350 - (0.0012x^2 - 0.024x + 100)$$
$$= 350 - 0.0012x^2 + 0.024x - 100 = -0.0012x^2 + 0.024x + 250$$

17) Find f'(x) for $f(x) = 3e^x - 6x + 2$ ⇒ $f' = 3e^x - 6$

18) Find f'(x) for $f(x) = (5x - 5)(4x^3 - x^2 + 1)$

$$= f'(x).g(x) + f(x).g'(x)$$
$$= 5(4x^3 - x^2 + 1) + (5x - 5)(12x^2 - 2x)$$
$$= 20x^3 - 5x^2 + 5 + 60x^3 - 60x^2 - 10x^2 + 10x$$
$$= 80x^3 - 75x^2 + 10x + 5$$

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19) Find $f'(x)$ for $f(x) = \dfrac{x}{9x-3}$

$$= \frac{(1)(9x-3)-(9)(x)}{(9x-3)^2} = \frac{9x-3-9x}{(9x-3)^2} = \frac{-3}{(9x-3)^2}$$

20) Find $f'(x)$ for $f(x) = -7\ln x - x^5 + 3$ ⇨ $f'(x) = -\dfrac{7}{x} - 5x^4$

21) Find $f'(x)$ for $f(x) = 8e^x + 4\ln x^3$ ⇨ $f'(x) = 8e^x + \dfrac{12}{x}$

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22) Dalco Manufacturing estimates that its weekly profit, P, in hundreds of dollars, can be approximated by the formula $P = -3x^2 + 6x + 10$, where x is the number of units produced per week, in thousands.

How many units should the company produce per week to earn the maximum profit? (Find the maximum weekly profit)

$P'(x) = -6x + 6$

$P'(x) = 0 \Rightarrow -6x + 6 = 0 \Rightarrow -6x = -6 \Rightarrow \frac{-6x}{-6} = \frac{-6}{-6} \Rightarrow \boxed{x = 1}$

x	$-\infty$		1		$+\infty$
P'		$+$	0	$-$	
P		↗	max	↘	

max profit at $x = 1$

$P(1) = -3(1)^2 + 6(1) + 10 = 13$

max profit is 13

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23) Find $\int (3x^8 - 7x^3 + 7)\,dx$

$$= \frac{3x^9}{9} - \frac{7x^4}{4} + 7x + C = \frac{1}{3}x^9 - \frac{7}{4}x^4 + 7x + C$$

24) Given $\int_1^3 f(x)\,dx = 4$ and $\int_1^3 g(x)\,dx = 2$, use properties of definite integrals to evaluate $\int_1^3 [2f(x) + 5g(x)]\,dx$.

$$= 2(4) + 5(2) = 8 + 10 = 18$$

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25) Evaluate $\int_0^b 9x^8\,dx$

$$= \left[\frac{9x^9}{9}\right]_0^b = \left[x^9\right]_0^b = b^9 - 0^9 = b^9$$

26) Evaluate $\int_1^e \left(16x - \frac{5}{x}\,dx\right)$

$$= \left[\frac{16x^2}{2} - 5\ln|x|\right]_1^e = \left[8x^2 - 5\ln|x|\right]_1^e$$

$$= \left[8e^2 - 5\ln|e|\right] - \left[8(1)^2 - 5\ln|1|\right]$$

$$= (8e^2 - 5) - (8 - 0) = 8e^2 - 13$$

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27) Find $\int 9e^{0.2x}\,dx$.

$$= \frac{9}{0.2} e^{0.2x} + C = 45 e^{0.2x} + C$$

28) Find $\int (5+x^3)(4-x^2)\,dx$

$$= \int (20 - 5x^2 + 4x^3 - x^5)\,dx$$

$$= 20x - \frac{5x^3}{3} + 4\frac{x^4}{4} - \frac{x^6}{6} + C$$

$$= 20x - \frac{5}{3} + x^4 - \frac{1}{6}x^6 + C$$

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