CH1 ① linear equation (.ج. X) معادلة خطية

$$A x + B = C$$

- the solution of the linear equation : $-3x - 2 = 4 - 5(x-4)$ is

  a) 13   b) -11 c) 8   d) -5

② Quadrtic equation (.ج. x^2) معادلة الدرجة الثانية

$$A x^2 + B x + C = 0$$

Δ $\left[\begin{array}{l} \Delta > 0 \quad\quad \text{two Solution} \\ \\ \Delta < 0 \quad\quad \text{No Solution} \\ \\ \Delta = 0 \quad\quad \text{one Solution} \end{array}\right.$

EX Solve $x^2 - 6x + 9 = 16$

الكل
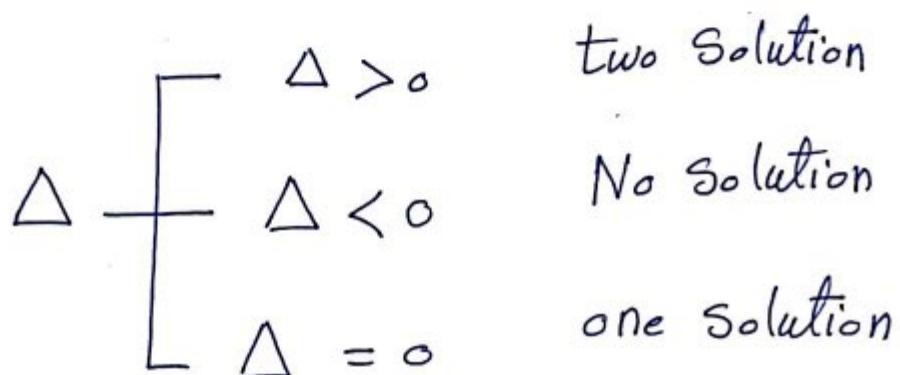
$x^2 - 6x + 9 - 16 = 0$

$x^2 - 6x - 7 = 0$ mood ⑤ ③

a	b	c
1	-6	-7

$x = 7$
$x = -1$

- the solution of the quadratic equation : $4x^2 - 9x - 20 = 2x^2 - 15x - 12$ is

  a) $x = -4$ b) $x = -1$ and $x = -4$ c) $x = -4$ and $x = 1$ d) $x = -2$ and $x = -1$

$4x^2 - 2x^2 - 9x + 15x - 20 + 12 = 0$

$2x^2 + 6x - 8 = 0$ mood ⑤ ③

x^2	x	□
2	6	-8

=

mood ①

$X = 1$
$X = -4$

لإرجاع الآلة   ١١ / أيمن غنيم

٠٠١٢٧١٥١٦

CH 1   1

MULTIPLE CHOICE QUESTIONS. Choose the one alternative that best answers the question.

نظري

- Any equation written in the form $Ax + By + c = 0$ is called a
  a) Quadratic equation   (b) Linear equation   c) Quadratic Function   d) Linear Function

- Any equation written in the form $Ax^2 + Bx + c = 0$ is called a
  (a) Quadratic equation   b) Linear equation   c) Quadratic Function   d) Linear Function

- When a quadratic equation has the discriminate delta equals to zero $(\Delta = 0)$
  a) No real root for the equation   b) The quadratic equation has only one real root.
  c) The quadratic equation has two distinct real root   d) The quadratic equation has three distinct real root.

- When a quadratic equation has the discriminate delta is positive value $(\Delta \succ 0)$
  a) No real root for the equation   b) The quadratic equation has only one real root.
  c) The quadratic equation has two distinct real root   d) The quadratic equation has three distinct real root.

- When a quadratic equation has the discriminate delta is negative value $(\Delta \prec 0)$
  a) No real root for the equation   b) The quadratic equation has only one real root.
  c) The quadratic equation has two distinct real root   d) The quadratic equation has three distinct real root.

الدّال

- the solution of the linear equation : $3x + 1 = 6x - 4$
  a) -2 b) $+\frac{5}{3}$ c) $\frac{5}{2}$ d) 2

الحسائل

العرض
- A company market is characterized by a demand function $\boxed{p = 1400 - 20q}$ and a supply function $\boxed{p = 200 + 20q}$ where q is the quantity produced and p is market price. Find the quantity and price equilibrium?
  1- the Equilibrium quantity is
  a) $q = 10$ b) $q = 20$ c) $q = 30$ d) $q = 40$

$$1400 - 20q = 200 + 20q \qquad \text{الدّال}$$

$$q = 30$$

عوض في أحدهما تعطي نفس الحل

السحب
  2- the Equilibrium price is
  a) $p = 400$ b) $p = 600$ c) $p = 800$ d) $p = 1000$

$$P = 200 + 20(30) = 800$$

.٥.١٢٧١٥١٦   ا/ أيمن حليم

CH 1 2

Homework Unit One

MULTIPLE CHOICE QUESTIONS. Choose the one alternative that best answers the question.

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

الداله

A) $-\frac{1}{12}$ B) $\frac{1}{2}$ C) $\frac{1}{12}$ D) $-\frac{1}{2}$

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

A) $\left\{\frac{3}{7}\right\}$ B) $\left\{\frac{3}{13}\right\}$ C) $\left\{-\frac{6}{13}\right\}$ D) $\left\{\frac{9}{13}\right\}$

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

A) $\left\{-\frac{1}{9}\right\}$ B) $\{-1, 6\}$ C) $\left\{-\frac{1}{9}, \frac{1}{9}\right\}$ D) $\{1, -6\}$

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

$$x^2 - x^2 + 14x - 6x + x - 5 + 6 = 0$$

مطابقة

$$P = 35 - 0.1x$$

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.

$$P = 0.2x + 20$$

A) equilibrium price: $50 per unit; equilibrium quantity: 30 units
B) equilibrium price: $35 per unit; equilibrium quantity: 50 units
C) equilibrium price: $20 per unit; equilibrium quantity: 50 units
D) equilibrium price: $30 per unit; equilibrium quantity: 50 units

$$35 - 0.10x = 2x + 20$$

الداله

$$x = 50$$

عموم

price سعر $P = 35 - 0.1(50) = 30$

ا / أيمن غنيم

C.H 1 3

$$\boxed{CH\ 2}\ \underline{limit}\ \text{النهايات} \qquad \boxed{1}\ \underline{\text{التعويض}}$$

$$\lim_{x \to -1} \frac{2x+5}{3-x} = \frac{2(-1)+5}{3-(-1)} = \frac{3}{4}$$

—————— * ——————— * ———————

$$\boxed{2}\ \text{نظرية مالاند نهاية (أكبر أس}$$

$$\underline{\text{(}}$$

$$\boxed{EX}\ \lim_{x \to \infty} -3x^{③}-7x^2+8x-9$$

اكبر

$$\boxed{-3(+1)^3} = -\infty$$

—————— * ——————— * ———————

$$\boxed{EX}\ \lim_{x \to -\infty} 3x^{②}-7x+5$$

اكبر

$$\boxed{3(-1)^2} = +\infty$$

—————— * ——————— * ———————

$$\boxed{1}\ \text{رتبة البسـط = رتبة المقام (نأخذ معاملات أكبر أس)}$$

$$\boxed{EX}\ \lim_{x \to \infty} \frac{3x^{②}-7x+5}{2x^{②}+3} = \frac{3}{2}$$

$$\boxed{2}\ \text{رتبة المقام أكبر من البسـط = 0}$$

$$\boxed{EX}\ \lim_{x \to \infty} \frac{3x^{①}-7}{5x^{②}+6x-1} = 0$$

$\dfrac{\text{عدد}}{\infty} = 0$	$\dfrac{\infty}{\text{عدد}} = \infty$ (حسب الإشارة)

٥٠١٢٧١٥١٦   ا / أيمن غنيم

$$\boxed{CH\ 2/1}$$

③ رتبة البسط أكبر من المقام = ∞ (حسب الإشارة)

$$\text{Ex} \quad \lim_{x \to \infty} \frac{3x^{③}-5x-6}{2x^{①}+8} = \boxed{\frac{3(+1)^3}{2(+1)^1}} = +\infty$$

$$\text{Ex} \quad \lim_{x \to -\infty} \frac{5x^{⑤}-7x}{3x^{③}+2} = \boxed{\frac{5(-1)^5}{3(-1)^3}} = +\infty$$

──────── * ──────── * ──────── * ──────── *

* نهاية الدالة المعرفة بقاعدتين (لازم نهاية اليمين = نهاية اليسار)

① النهاية موجودة في متصلة   Continuos

© النهاية غير موجودة (D.N.E) في غير متصلة   discotinuos

$$\text{Ex} \quad f(x) = \begin{cases} 2x+1 & x \geqslant 2 \quad 2(2)+1 = \boxed{5} \\ x^2+1 & x < 2 \quad \text{يسار} \quad (2)^2+1 = \boxed{5} \end{cases}$$

① $\lim\limits_{x \to 2^+} f(x) = \text{------}$ يمين   ⓐ 4   ⓑ 5 ✓   © 2

② $\lim\limits_{x \to 2^-} f(x) = \text{------}$ يسار   ⓐ 5 ✓   ⓑ 3   © 4

③ $\lim\limits_{x \to 2} f(x) =$ ⓐ D.N.E   ⓑ 2   © 5 ✓

④ $f(x)$ Continuos متصلة   ⓐ yes ✓   ⓑ No

⑤ $f(0) = \underset{\text{تعويض}}{\text{------}}$ $x^2+1 = (0)^2+1 = 1$

$f(2) = \text{------}$ $2x+1 = 2(2)+1 = 5$

$\xleftarrow{\quad x^2+1 \quad | \quad 2x+1 \quad}$
$\qquad\qquad 2$

↓ حد (عوض في يساوي)   CH2(2)   أ / أيمن غنيم   ٠٠١٢٧١٥١٦

MULTIPLE CHOICE QUESTIONS. Choose the one alternative that best answers the question.

(النزريه غير موجودة اليمين ≠ اليسار)

نظري

- The limit of a function f at $x \rightarrow a$ <u>does not exist</u> if : غير موجودة

  a) $f(a) \neq f(-a)$ ✓b) $\lim\limits_{x \to a^-} f(x) \neq \lim\limits_{x \to a^+} f(x)$ c) $\lim\limits_{x \to a} f(x) \neq a$ d) $\lim\limits_{x \to a} f(x) \neq f(a)$

- The limit of a function f at $x \rightarrow a$ <u>exists</u> if : موجودة

  a) $f(a) = f(-a)$ ✓b) $\lim\limits_{x \to a^-} f(x) = \lim\limits_{x \to a^+} f(x)$ c) $\lim\limits_{x \to a} f(x) = a$ d) $\lim\limits_{x \to a} f(x) = f(a)$

- The limit of a function f at $x \rightarrow a$ <u>continuous</u> if : متصله

  a) $f(a) = f(-a)$ b) $\lim\limits_{x \to a^-} f(x) = \lim\limits_{x \to a^+} f(x)$ c) $\lim\limits_{x \to a} f(x) = a$ (d) $\lim\limits_{x \to a} f(x) = f(a)$)   شروط إلاتصال

- Let $f(x) = \begin{cases} x^2 - 1 & if \ x < -1 \\ x^2 + 1 & if \ x \geq -1 \end{cases}$ يسار $(-1)^2 - 1 = \boxed{0}$ يمين $(-1)^2 + 1 = \boxed{2}$

  $\xleftarrow{\qquad x^2-1 \quad | \quad x^2+1 \qquad}$
  $\qquad\qquad\qquad -1$
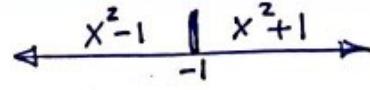
  1- Calculate $f(-1)$ and $f(0)$

  a) $f(-1) = 0$ and $f(0) = -1$ b) $f(-1) = -1$ and $f(0) = 0$

  c) $f(-1) = -1$ and $f(0) = 1$ ✓d) $f(-1) = 2$ and $f(0) = 1$

  ياوي $f(-1) = x^2 + 1 = (-1)^2 + 1 = 2$
  $f(0) = x^2 + 1 = (0)^2 + 1 = 1$

  إحسب

  2- Calculate $\lim\limits_{x \to -1^-} f(x)$ and $\lim\limits_{x \to -1^+} f(x)$

  a) $\lim\limits_{x \to -1^-} f(x) = 2$ and $\lim\limits_{x \to -1+} f(x) = 2$ b) $\lim\limits_{x \to -1^-} f(x) = 0$ and $\lim\limits_{x \to -1^+} f(x) = 0$

  ✓c) $\lim\limits_{x \to -1^-} f(x) = 0$ and $\lim\limits_{x \to -1^+} f(x) = 2$ d) $\lim\limits_{x \to -1^-} f(x) = 2$ and $\lim\limits_{x \to -1^+} f(x) = 0$

  3- $\lim\limits_{x \to -1} f(x)$

  a) $\lim\limits_{x \to -1} f(x) = 0$ b) $\lim\limits_{x \to -1} f(x) = 2$

  c) $\lim\limits_{x \to -1} f(x) = 0$ and $\lim\limits_{x \to -1} f(x) = 2$ ✓d) $\lim\limits_{x \to -1} f(x)$ <u>DNE</u>

  4- The function f is

  a) Continuous at x = -1   ✓b) Discontinuous at x = -1

  c) Not defined at x = -1   d) None of these answers at x = -1

- the functions f is said to be <u>continuous</u> at x = a if

  a) $f(a) = f(-a)$ (b) $\lim\limits_{x \to a} f(x) = f(a)$)

  c) f is increasing   d) $\lim\limits_{x \to a} f(x) = a$

- For any <u>constant function</u> $f(x) = k$, the $\lim\limits_{x \to +\infty} f(x)$ is equal   نزريه الداله الثابته هو داله ثابت

  داله ثابته

  a) $-\infty$ b) 0   ✓c) k d) $+\infty$

٠٥٠١٢٧١٥١٦

ا / أيمن غنيم

CH 2/3

- consider the following function $f(x) = \begin{cases} 2-x & if & x \leq 0 \\ 4+x & if & 0 < x \leq 4 \\ 4 & if & x > 4 \end{cases}$
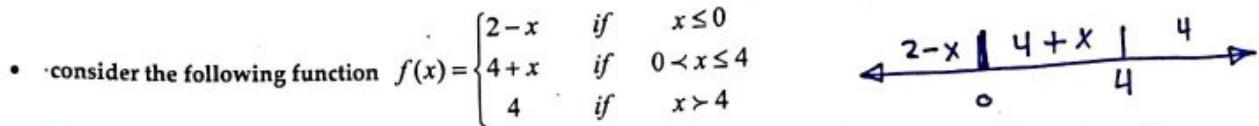
1- Calculate:

$f(-2) = 2-x = 2-(-2) = 4$

$f(2) = 4+x = 4+2 = 6$

يساوي $f(0) = 2-x = 2-0 = 2$

$f(4) = 4+x = 4+4 = 8$

2- Calculate

$\lim_{x \to 0^-} f(x) = 2-x = 2-0 = \boxed{2}$

$\lim_{x \to 0+} f(x) = 4+x = 4+0 = \boxed{4}$

$\lim_{x \to 4^-} f(x) = 4+x = 4+4 = \boxed{8}$

$\lim_{x \to 4^+} f(x) = \boxed{4}$

3- Is the function f continuous at x = 4

No

Let $f(x) = \begin{cases} \dfrac{8}{x^2+1} & if & x \leq 1 \\ 2 & if & x > 1 \end{cases}$ يسار

$\dfrac{8}{(1)^2+1} = \boxed{4}$

$\boxed{2}$ يمين
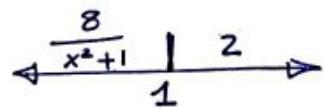
نهاية 1- Calculate $f(1)$

a) $-\infty$　　　　b) 4 ✓　　　　c) $+\infty$　　　　d) 2

2- Calculate $\lim_{x \to 1^-} f(x)$

a) $-\infty$　　　　b) 4 ✓　　　　c) $+\infty$　　　　d) 2

3- $\lim_{x \to -1^+} f(x)$

a) $-\infty$　　　　b) 4　　　　c) $+\infty$　　　　d) 2 ✓

4- From the result above the function $f(x)$ is

a) Not continuous at x = -1
c) Not continuous at x = 3

b) Not continuous at x = 1 ✓
d) Continuous at x = 1

Scanned with CamScanner

Homework Unit Two

MULTIPLE CHOICE QUESTIONS. Choose the one alternative that best answers the question.

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

Find $\lim\limits_{x\to 0^-} f(x)$ and $\lim\limits_{x\to 0^+} f(x)$.
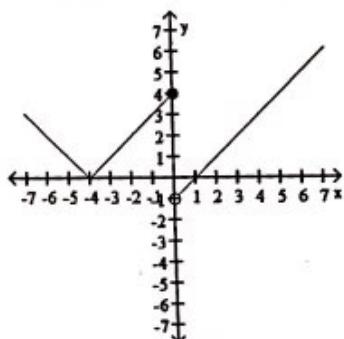
$$\lim_{x\to 0^-} f(x) = 4$$

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

A) 4; Does not exist   B) Does not exist; does not exist   C) -1; 4   D) 4; -1

6) Find: $\lim\limits_{x\to -1} \dfrac{6x+5}{5x-6} = \dfrac{6(-1)+5}{5(-1)-6} = \dfrac{1}{11}$

A) $\dfrac{1}{11}$ B) 1   C) -11   D) $-\dfrac{1}{11}$

7) Given $\lim\limits_{x\to 4} f(x) = -2$ and $\lim\limits_{x\to 4} g(x) = 5$, find $\lim\limits_{x\to 4} \dfrac{[g(x)-f(x)]}{-4\,f(x)} = \dfrac{[5--2]}{-4(-2)} = \dfrac{7}{8}$

تعويض مباشر

A) $\dfrac{3}{8}$ B) $-\dfrac{3}{8}$ C) $-\dfrac{7}{8}$ D) $\dfrac{7}{8}$

8) Evaluate the following limit

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

عوض بعدد مصغير (2) لمعرفة الإشارة

A) 2   B) ∞ C) $-\infty$ D) Does not exist

10) Evaluate the following limit.

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

عوض بعدد مكبر (2) لمعرفة الإشارة

A) 2   B) ∞ C) $-\infty$ D) Does not exist

* ملحوظة $\dfrac{\text{عدد}}{\text{عدد}} = 0$

$\dfrac{\text{عدد}}{0} = \infty$ (لازم تحدد الإشارة)

أ / ابن غنيم

٠٠.١٢٧١٥١٦

CH2 5

14) A company training program determines that, on average, a new employee can do P(x) pieces of work per day after s days of on-the-job training, where $P(x) = \frac{90 + 60x}{x + 5}$. Find $\lim\limits_{x \to 5} P(x)$.

A) 42   B) 30   C) 105   D) Does not exist

$$\frac{90 + 60(5)}{5 + 5} =$$

15) 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 $\overline{C}(x)$, is found by dividing C(x) by x. Find $\lim\limits_{x \to 9000} \overline{C}(x)$.

قسمة

A) 14   B) 6   C) 10   D) Does not exist

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

$$= \frac{9000 + 9(9000)}{9000} =$$

16) The graph of y = f(x) is shown. Use the graph to answer the question. Is f continuous at x = -1?
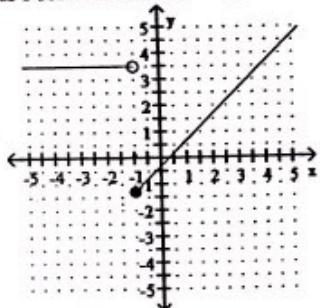
$$\lim_{x \to -1^+} f(x) = \boxed{-1}$$

$$\lim_{x \to -1^-} f(x) = \boxed{3.5}$$

A) Yes   B) No

17) Determine the points at which the function is **discontinuous**.

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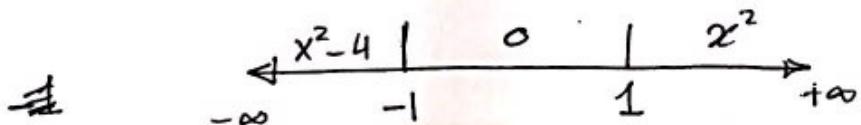
نقاط عدم الإتصال

A) -1, 1   B) 1   C) -1, 0, 1   D) None

$\neq$

$\neq$

$-1 < \begin{array}{l} 0 \\ (-1)^2 - 4 = -3 \end{array}$ غير متصل

$1 < \begin{array}{l} (1)^2 = 1 \\ 0 \end{array}$ غير متصل

CH2 9

$$* \quad f(x) = 7 \longrightarrow f'(x) = 0$$

$$* \quad f(x) = x \longrightarrow f'(x) = 1$$

$$* \quad f(x) = x^3 \xrightarrow[\text{واضربها في (1)}]{\text{نزل الأس}} f'(x) = 3x^2$$

$$* \quad f(x) = \ln x \longrightarrow f'(x) = \frac{1}{x}$$

$$* \quad f(x) = e^x \longrightarrow f'(x) = e^x$$

(Ex) find **first** and **second** dervative

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

$$\Big\downarrow \text{اشتق}$$

$$f'(x) = 9x^2 - 14x - 5$$

$$f''(x) = 18x - 14$$

(Ex) find **first** dervative

$$f(x) = x^2 - 3\ln x + 5e^x - 7$$

$$\Big\downarrow \text{اشتق}$$

$$f'(x) = 2x - \frac{3}{x} + 5e^x$$

(CH3/1)

أ / ايمن غنيم

* قواعد الإشتقاق

① مشتقة قوس له أس = نزل الأس واطرح منه (١) x مشتقه مابداخله

(Ex) find first dervative

$$f(x) = (2x^2 - 3)^5$$

اشتق

$$f^{'}(x) = 5(2x^2 - 3)^4 (4x) = 20x(2x^2 - 3)^4$$

(Ex) find critical point $\quad f(x) = -x^2 + 6x - 5$
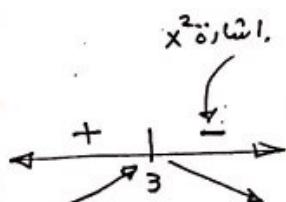
حرجه ($f^{'}(x) = 0$)

اشتق

$$f^{'}(x) = -2x + 6$$
$$-2x + 6 = 0 \qquad \text{(الحل)}$$

$$x = 3 \qquad \underline{\text{critical}}$$

اشارة x^2

$$f(3) = -(3)^2 + 6(3) - 5 = 4 \qquad (3 \text{ و } 4) \underline{max}$$

$f^{'}(x) = 0$ حرجه critical	$f^{'}(x) > 0$ ~~maxmum~~ Incrasing تزايد
$f^{''}(x) = 0$ Inflection انقلاب	$f^{'}(x) < 0$ ~~اظل~~ decrasing تناقص
	$f^{''}(x) > 0$ صغرى minmum
	$f^{''}(x) < 0$ عظمى maxmum
٠٠.١٢٧١٥١٦	ا/ أيمن غنيم

(CH 3 2)

- The function f is increasing تزايد in the interval $[a,b]$ if
  a) $f'(x) = 0$ and $f''(x) \prec 0$
  b) $f'(x) \prec 0$
  c) $f'(x) = 0$ and $f''(x) \succ 0$
  d) $f'(x) \succ 0$

- If the second derivative of the function f is positive ($f''(x_0) \succ 0$) then أعلى
  a) $f(x) \succ 0$ أسفل
  b) the graph of f has the form of $\cup$
  c) the graph of f has the form of $\cap$
  d) f is increasing

- The point $I(x_0, f(x_0))$ is a critical point if : مرتبة
  a) $f'(x_0) \prec 0$
  b) $f''(x_0) \prec 0$
  c) $f''(x_0) = 0$
  d) $f'(x_0) = 0$

- The point $M(x_0, f(x_0))$ is a maximum point if:
  a) $f'(x_0) = 0$ and $f''(x) \succ 0$
  b) $f'(x_0) = 0$
  c) $f''(x_0) = 0$ and change signs
  d) $f'(x_0) = 0$ and $f''(x) \prec 0$.

- The first derivative of a function f is positive ($f'(x_0) \succ 0$), then the function is
  a) increasing
  b) decreasing
  c) concave up wards
  d) concave down wards

- The point $M(x_0, f(x_0))$ is a local maximum point if:
  a) $f'(x_0) = 0$
  b) $f'(x_0) = 0$ and $f''(x_0) \succ 0$
  c) $f''(x_0) = 0$ and $f''(x) \prec 0$
  d) $f''(x_0) = 0$

  // ١١

- The point $I(x_0, f(x_0))$ is an inflection point if :
  a) $f''(x) = 0$ and change signs
  b) $f'(x_0) = 0$
  c) $f'(x_0) \prec 0$
  d) $f''(x_0) \prec 0$

- The first derivative of the function $f(x) = (g(x))^n$ مشتقة قوس لـ أس ـن
  a) $f'(x) = n(g(x))^{n-1}$
  b) $f'(x) = ng'(x)^{n-1}$
  c) $f'(x) = ng(x)(g'(x))^{n-1}$
  d) $f'(x) = ng'(g(x))^{n-1}$

- the first derivative of $f(x) = -4x^3 - \ln x + 2x - 10$ is المسائل
  a) $f'(x) = -12x^2 - \dfrac{1}{x} + 2$
  b) $f'(x) = -12x^2 - x + 2$
  c) $f'(x) = -12x^2 - \dfrac{1}{x} + 2x$
  d) $f'(x) = -7x^2 - \dfrac{1}{x}$

$$f'(x) = -12x^2 - \frac{1}{x} + 2$$

(CH 3 / 3)

ا/ ايمن غنيم

- the second derivative of $f(x) = -3x^4 + 2x^2 - x - 10$ is

  a) $f''(x) = -36x^2 - 4$ ✓

  b) $f''(x) = -36x^2 + 4$

  c) $f''(x) = -36x^2 + 4x$

  d) $f''(x) = -36x^2 - 4x$

$$f'(x) = -12x^3 - 4x - 1$$
$$f''(x) = -36x^2 - 4$$

- The first derivative of the function $f(x) = (x^2 - 3x + 1)^3$ is

  a) $f(x) = (x^2 - 3x + 1)^2$

  b) $f(x) = 3.(x^2 - 3x + 1)^2$

  c) $f(x) = (2x - 3)(x^2 - 3x + 1)^2$

  d) $f(x) = 3(2x - 3)(x^2 - 3x + 1)^2$ ✓

$$f'(x) = 3(x^2 - 3x + 1)^2 \cdot (2x - 3)$$

- Let $f(x) = -3x^3 + 9x + 3$

  1- The first derivative of the function f is $\quad f'(x) = -9x^2 + 9$

  a) $f'(x) = -3x^2 + 9x$

  b) $f'(x) = -9x^2 + 9x + 3$

  a) $f'(x) = -9x^2 + 9$ ✓

  d) $f'(x) = -9x^2 + 3$

  2- The second derivative of the function f is $\quad f''(x) = -18x$

  a) $f''(x) = -6x + 9$

  b) $f''(x) = -18x + 9$

  a) $f''(x) = -18x$ ✓

  d) $f''(x) = -18x - 9$

  3- The critical points are $\quad f'(x) = 0$

  $-9x^2 + 9 = 0$ (mood ⑤ ③)

  $x = 1 \; , \; x = -1$ | -9 | 0 | 9 |

  a) $M_1 = (1, -1)$ and $M_2 = (2, 3)$

  b) $M_1 = (1, 9)$ and $M_2 = (-1, -3)$ ✓

  c) $M_1 = (1, -1)$ and $M_2 = (0, 3)$

  d) $M_1 = (0, 3)$ and $M_2 = (-1, -3)$

  4- The inflection points are $\quad f''(x) = 0$

  a) $M_3 = (-1, -3)$

  b) $M_3 = (1, -1)$

  c) $M_3 = (0, 3)$ ✓

  d) $M_3 = (2, 3)$

$$-18x = 0$$
$$\boxed{x = 0}$$

CH 3/4

ا / أيمن غنيم

Scanned with CamScanner

- Let $f(x) = -x^3 - \dfrac{3}{2}x^2 + 2$

  $f'(x) = 0$

  $f'(x) = -3x^2 - 3x$ (mood ⑤.③)

-3	-3	0

  1- the graph of the function y = f(x) has <u>critical</u> point (s) at
  - a) x = 0 and x = -1 ✓
  - c) x = 1/2
  - b) x = -1
  - d) x = 0 and x = 1

  3- The <u>critical points</u> are
  - a) $M_1 = (1,-1)$ and $M_2 = (2,3)$
  - c) $M_1 = (1,-1)$ and $M_2 = (0,3)$
  - b) $M_1 = (1,9)$ and $M_2 = (-1,-3)$
  - d) $M_1 = (0,3)$ and $M_2 = (-1,-3)$ ✓

  $f''(x) = 0$

  $f''(x) = -6x - 3$

  $-6x - 3 = 0$

  1- the graph of the function y = f(x) has an <u>inflection</u> point (s) at
  - a) x = 0 and x = -1
  - d) x = 1/2 ✓
  - b) x = -1
  - d) x = 0 and x = 1

  $x = -\dfrac{1}{2}$

  4- The inflection points are
  - a) $M_3 = \left(-\dfrac{1}{2}, -3\right)$ ✓
  - c) $M_3 = (0,3)$
  - b) $M_3 = (1,-1)$
  - d) $M_3 = (2,3)$

  CH 3 5

  ٠٥٠١٢٧١٥١٦

  ا / أيمن غنيم

Homework Unit One (3)

السؤال: الإشتقاق بالدّاله

$\boxed{SHF}$ $\boxed{\text{س}^*}$

18) The revenue (in thousands of dollars) from producing x units of an item is modeled by $\boxed{R(x) = 5x - 0.0005x^2}$. Find the marginal revenue at $\boxed{x = 1000.}$

A) $4.50 B) $10,300.00 ✓C) $4.00 D) $104.00

---

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

$C(x) = 0.0004x^3 - 0.012x^2 + 100x + 10,000$
$R(x) = 350x$

A) $C'(x) = 0.0012x^2 - 0.024x + 100$
 $R'(x) = 350$
 $P'(x) = 0.0012x^2 - 0.024x - 250$

B) $C'(x) = 0.0012x^2 + 0.024x + 100$
 $R'(x) = 350$
 $P'(x) = 0.0012x^2 + 0.024x + 250$

✓C) $C'(x) = 0.0012x^2 - 0.024x + 100$
 $R'(x) = 350$
 $P'(x) = -0.0012x^2 + 0.024x + 250$

$$c'(x) = 0.0012\, x^2 + 0.024\, x + 100$$

$$R'(x) = 350$$

$$P = R(x) - C(x)$$

---

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

$3e^x - 6$

A) $3xe^{x-1} - 6$ B) $3e^x - 6x$ ✓C) $3e^x - 6$ D) $3e^x - 4$

---

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

$\underline{365}$ الدّاله

A) $f'(x) = 60x^3 + 75x^2 - 25x + 5$ B) $f'(x) = 80x^3 - 25x^2 + 75x + 5$
C) $f'(x) = 20x^3 + 25x^2 - 75x + 5$ ✓D) $f'(x) = 80x^3 - 75x^2 + 10x + 5$

---

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

$\underline{-0.01333}$ الدّاله

A) $-\dfrac{3}{9x - 3}$ ✓B) $-\dfrac{3}{(9x - 3)^2}$ C) $\dfrac{18x - 3}{(9x - 3)^2}$ D) $-\dfrac{3x}{(9x - 3)^2}$

---

25) Find f'(x) for $f(x) = x^6 + 3e^x$

$6x^5 + 3e^x$

A) $6x^5 + e^x$ B) $6x + 3e^x$ C) $6x^5 + 3xe^{x-1}$ D) $6x^5 + 3e^x$

---

30) Dalco Manufacturing estimates that its weekly profit, P, in hundreds of dollars, can be approximated by the formula $\boxed{P = -3x^2 + 6x + 10}$ 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)

✓A) 1000 units; $1300 B) 1000 units; $600

C) 3000 units; $100 D) 2000 units; $1100

$P' = -6x + 6$
$-6x + 6 = 0$
$-6x = -6$
$\boxed{x = 1}$

$P(1) = -3(1)^2 + 6 + 10 = 13$ أ/ أيمن غنيم

$\boxed{6}$ ٠٠١٢٧١٠١٦

---

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

✓A) $8e^x + \dfrac{12}{x}$ B) $8e^x + \dfrac{12}{x^2}$ C) $8e^x + \dfrac{12}{x^3}$ D) $8e^x + \dfrac{4}{x^2}$

ثابت التَكامل

$$* \int 5\, dx = 5x + C$$

$$* \int x^3\, dx = \frac{x^4}{4} + C \quad (\text{أزدد الأس (١) وأقسم على الأس الجديد})$$

$$* \int e^x\, dx = e^x + C$$

$$* \int \frac{1}{x}\, dx = \ln|x| + C$$

* ———————— * ———————— *

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

الأس

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

* ———————— * ———————— *

(Ex) $\int_{1}^{2} (3x^2 - 8x + 10)\, dx$ التَّحليل

$\boxed{\int_{a}^{b}}$

الأس ↓

$\boxed{5}$

* ———————— * ———————— *

(Ex) $\int (8e^x - \frac{7}{x} + 5)\, dx = 8e^x - 7\ln|x| + 5x + C$

$$\boxed{Ex} \quad \int (3x+2)^5 \, dx$$

اذا ↓

$$\frac{(3x+2)^6}{3(6)} + c = \frac{1}{18}(3x+2)^6 + c$$

$$\int (ax+b)^n \, dx = \frac{(ax+b)^{n+1}}{a \cdot (n+1)} + c \qquad \text{(قاعدة رنظري)}$$

٢ قوســـــ أسـ c (-1)

$$\boxed{Ex} \quad \int (3x+2)^{-1} \, dx = \frac{1}{3} \cdot \ln|3x+2| + c$$

$$\int (ax+b)^{-1} \, dx = \frac{1}{a} \ln|ax+b| + c \qquad \text{قاعدة نظري}$$

٣ الدالـ الأسيـ (e)

$$\boxed{Ex} \quad \int e^{2x+5} \, dx = \frac{1}{2} e^{2x+5} + c$$

$$\boxed{Ex} \quad \int e^{3-4x} \, dx = \frac{1}{-4} e^{3-4x} + c$$

$$\int e^{ax+b} \, dx = \frac{1}{a} \cdot e^{ax+b} + c \qquad \text{قاعدة نظريه}$$

$$\int_0^b 9x^8 \, dx = \left[\frac{9 \otimes^9}{9} \right]_0^b = b^9 - o^9 = b^9$$

$$\boxed{CH4 \, 2}$$