حل اختبار تدريبي الوحدة الرابعة الدرسين الثالث والرابع

التواصل الاجتماعي بحسب الصف الثاني عشر المتقدم

روابط مواد الصف الثاني عشر المتقدم على تلغرام

الرياضيات	اللغة الانجليزية	اللغة العربية	التربية الاسلامية

المزيد من الملفات بحسب الصف الثاني عشر المتقدم والمادة رياضيات في الفصل الثاني

حل اختبار تدريبي بالرياضيات 2023-2022

Chapter 4 -2023

Lessons: 4.3, 4.4 12A2

عمل: صالح فواز المطر

رابط الامتحان: الامتحان

لا تنسوا الاشتراك بالقناة: اشتراك

فيديو شرح هذا الملف: الفيديو

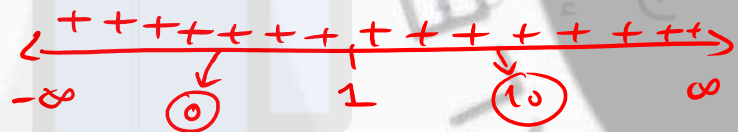Find the intervals were the function is increasing and decreasing and determine all local extrema for: * (1 Point)

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

○ *Increasing on* $(-\infty, 1)$, *Decreasing on* $(1, \infty)$, *No local extrema.*

○ *Decreasing on* $(-\infty, 1)$, *Increasing on* $(1, \infty)$, *No local extrema.*

✓ *Increasing on* $(-\infty, \infty)$, *No local extrema.*

○ *Decreasing on* $(-\infty, \infty)$, *No local extrema.*

$f'(x) = \dfrac{1}{3(x-1)^{\frac{2}{3}}}$

$f'(x) = 0 \Rightarrow \dfrac{1}{3(x-1)^{\frac{2}{3}}} = 0, \quad 1 = 0 \quad \text{no values}$

$f'(x) \text{ DNE} \Rightarrow 3(x-1)^{\frac{2}{3}} = 0 \Rightarrow x = 1$

$(-\infty, 1) \cup (1, \infty) \sim (-\infty, \infty) \text{ increasing}$

Find the absolute extrema of the function * (2 Points)

$f(x) = x^4 - 8x^2 + 2$ on $[-3, 1]$.

○ -5 is absolute min imum, 2 isabsolute max imum.

○ No absolute extrema

○ 11 is absolute min imum, -14 is absolute max imum

☑ 11 is absolute max imum, -14 isabsolute min imum

$f'(x) = 4x^3 - 16x$

$f'(x) = 0 \Rightarrow 4x(x^2 - 4) = 0$ Mode 5 4

$x = 0, x = 2, x = -2$

$\notin [-3, 1]$

$f'(x)$ DNE $\Rightarrow$ no values

$f(-3) = \boxed{11}$, abs max

$f(1) = -5$

$f(0) = 2$

$f(-2) = -14$, abs min

Find all critical numbers, if available use graphing technology to determine whether they represent local maximum, local minimum or neither for the function * (1 Point)
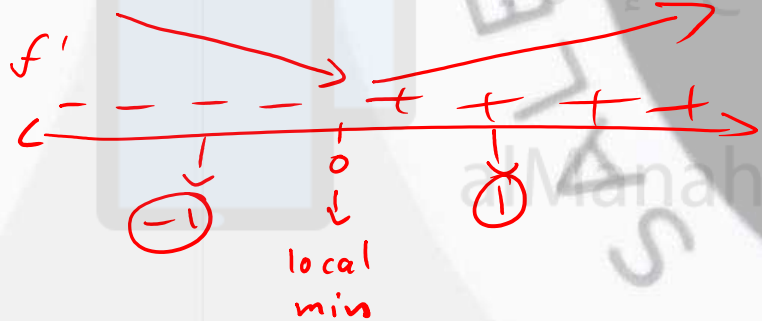
$f(x) = x^4 + 6x^2 - 2$

○ $x = 0, x = 1$ *are critical numbers, at* $x = $ *zero local* min *imum, at* $x = 1$ *local* max *imum*

○ *No critical numbers*

○ $x = 0$ *is critical number, at* $x = $ *zero local* max *imum*

☑ $x = 0$ *is critical number, at* $x = $ *zero local* min *imum*

$f'(x) = 4x^3 + 12x$

$f'(x) = 0 \implies 4x(x^2 + 3) = 0$

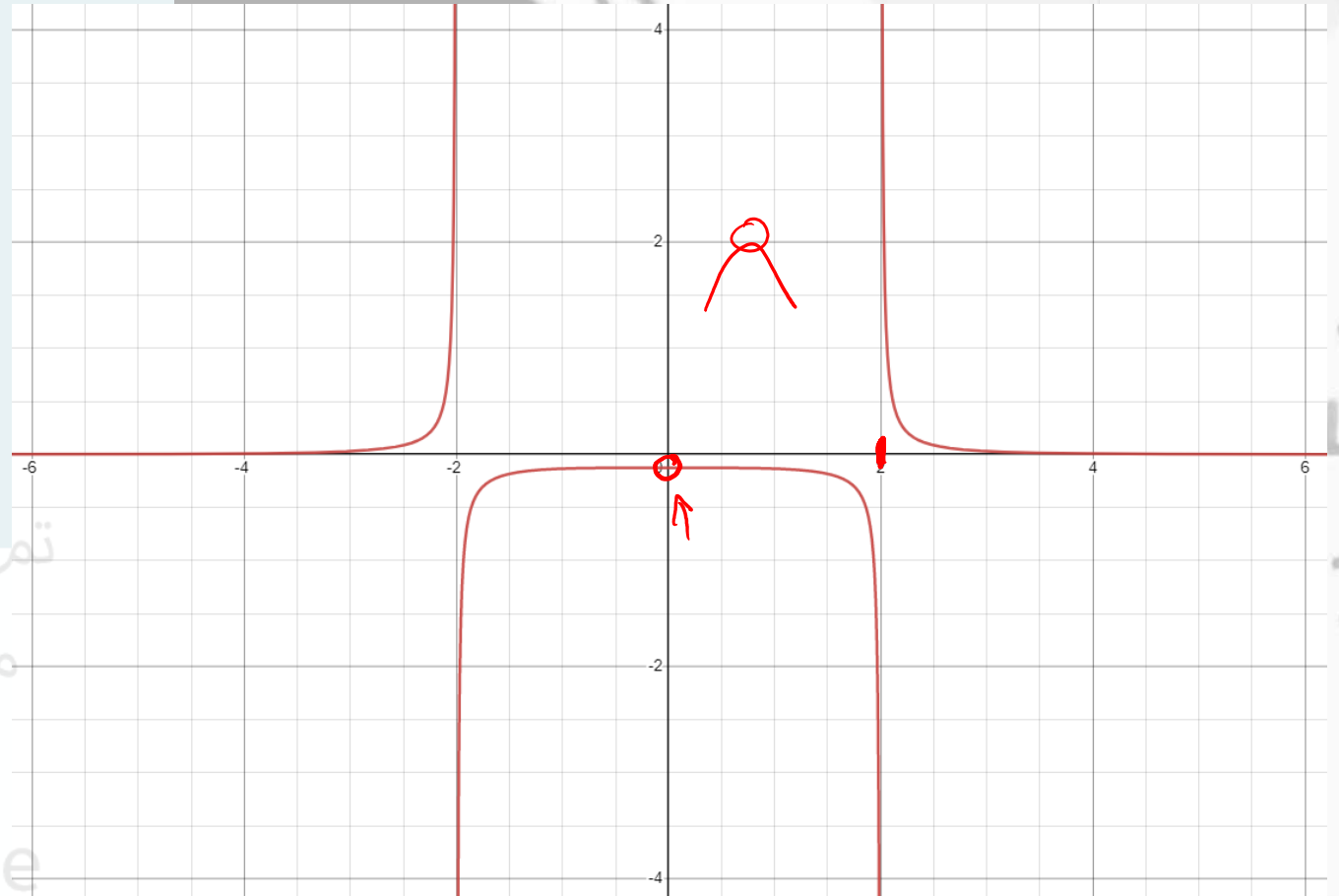$\boxed{x = 0}$

$f'(x) \text{ DNE} \implies \text{no values}$

local
min

4

Use the graph of f to locate the absolute extrema if they exist * (1 Point)

$f(x) = \dfrac{2}{x^4 - 16}$ on interval $(0, 2)$

handwritten annotations: f(0) DNE; [0, 2)

○ 0 *is absolute* min *imum*

○ 0 *is absolute* max *imum*

○ 2 *is absolute* min *imum*

✓ No absolute extrema

Find the intervals were the function is increasing and decreasing and determine all local extrema for: * (2 Points)
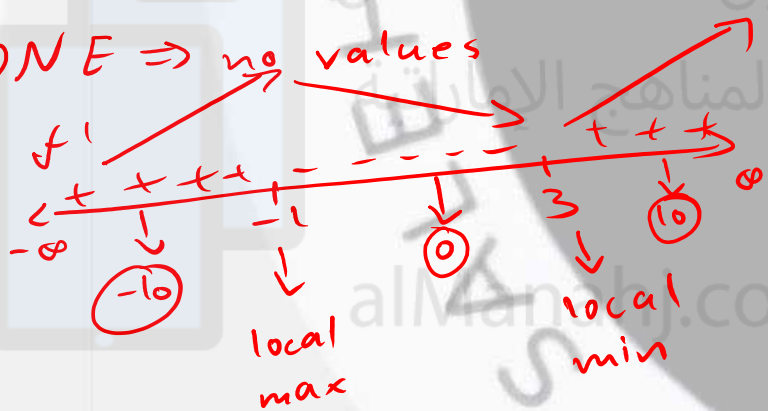
$f(x) = x^3 - 3x^2 - 9x + 1.$

✓ Increasing on $(-\infty, -1) \cup (3, \infty)$, Decreasing on $(-1, 3)$. -26 local minimum at $x = 3$, 6 local max imum at $x = -1$

◯ Decreasing on $(-\infty, -1) \cup (3, \infty)$, Increasing on $(-1, 3)$. -26 local min imum at $x = 3$, 6 local max imum at $x = 0$

◯ Increasing on $(-\infty, -1) \cup (3, \infty)$, Decreasing on $(-1, 3)$. -26 local max imum at $x = 3$, 6 local min imum at $x = -1$

◯ Increasing on $(-\infty, -1) \cup (3, \infty)$, Decreasing on $(-1, 3)$ -3 local min imum, 3 local max imum

$f'(x) = 3x^2 - 6x - 9$

$f'(x) = 0 \implies 3x^2 - 6x - 9 = 0$

$\boxed{x = 3} \;,\; \boxed{x = -1}$

$f'(x) \, ONE \implies$ no values

$f(3) = -26 \quad min$

$f(-1) = 6 \quad max$

local max

local min

$(-\infty, -1) \cup (3, \infty)$ increasing

$(-1, 3)$ decreasing

6

Find the absolute extrema of the function: * (2 Points)

$f(x) = \frac{4x^2}{3} - 4x + 1$ on $[-3, 1]$

☑ -23 is absolute min *imum*, $\frac{11}{3}$ is absolute max *imum*.

○ No absolute extrema

○ -23 is absolute max *imum*, $\frac{11}{3}$ is absolute min *imum*.

○ $-\frac{5}{3}$ is absolute min *imum*, $\frac{11}{3}$ is absolute max *imum*.

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

$f'(x) = 0 \Rightarrow 4x^2 - 4 = 0$

$x = 1, x = -1$

$f'(x) \, DNE \Rightarrow no \, values$

$f(-3) = -23 \quad \underline{abs \, min}$
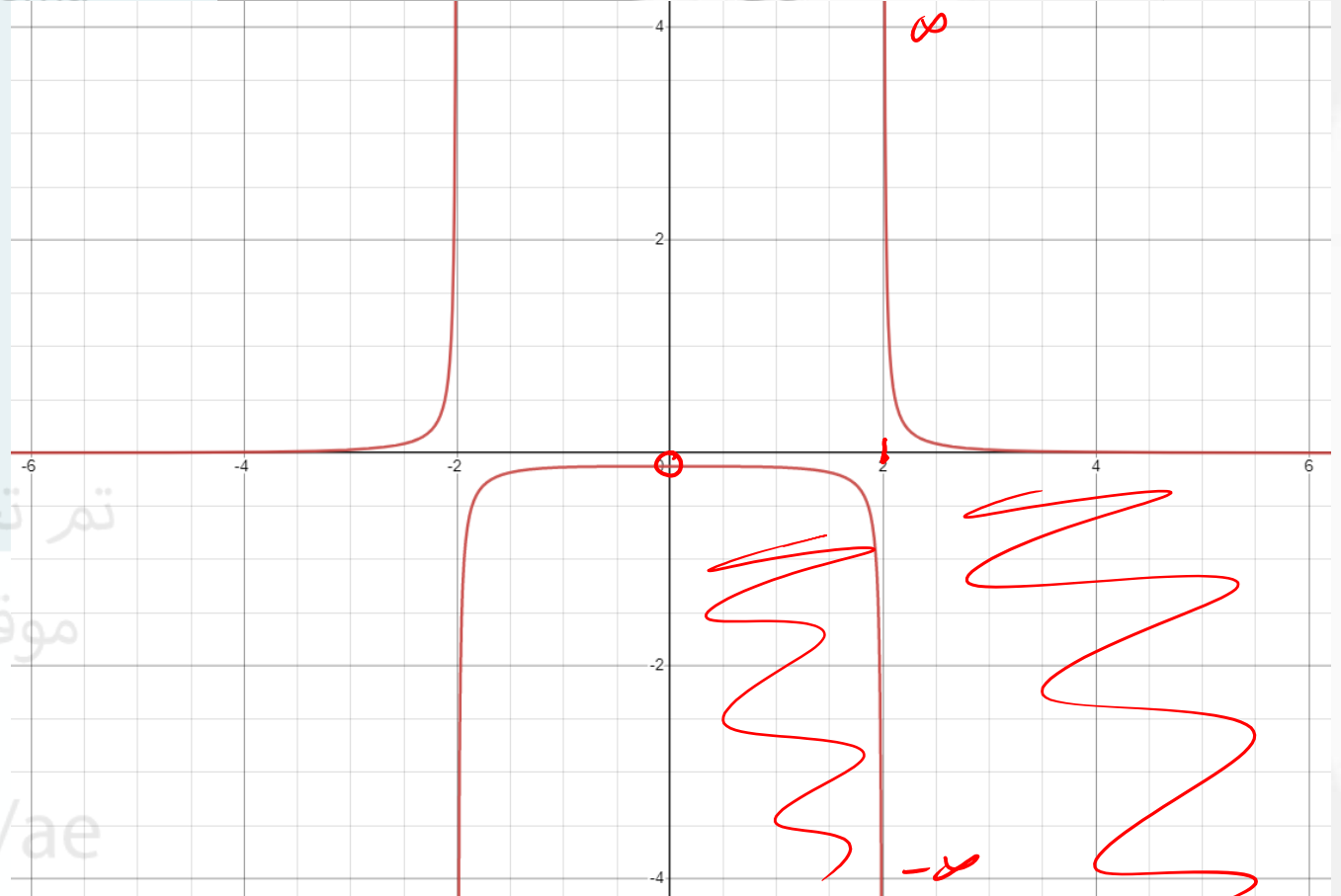
$f(1) = -1.6 = -\frac{5}{3}$

$f(-1) = 3.6 = \frac{11}{3} \quad \underline{abs \, max}$

7

Use the graph of f to locate the absolute extrema if they exist * (1 Point)

$f(x) = \dfrac{2}{x^4-16}$ on interval $(0,2) \cup (2,\infty)$

○ 0 *is absolute* min *imum*

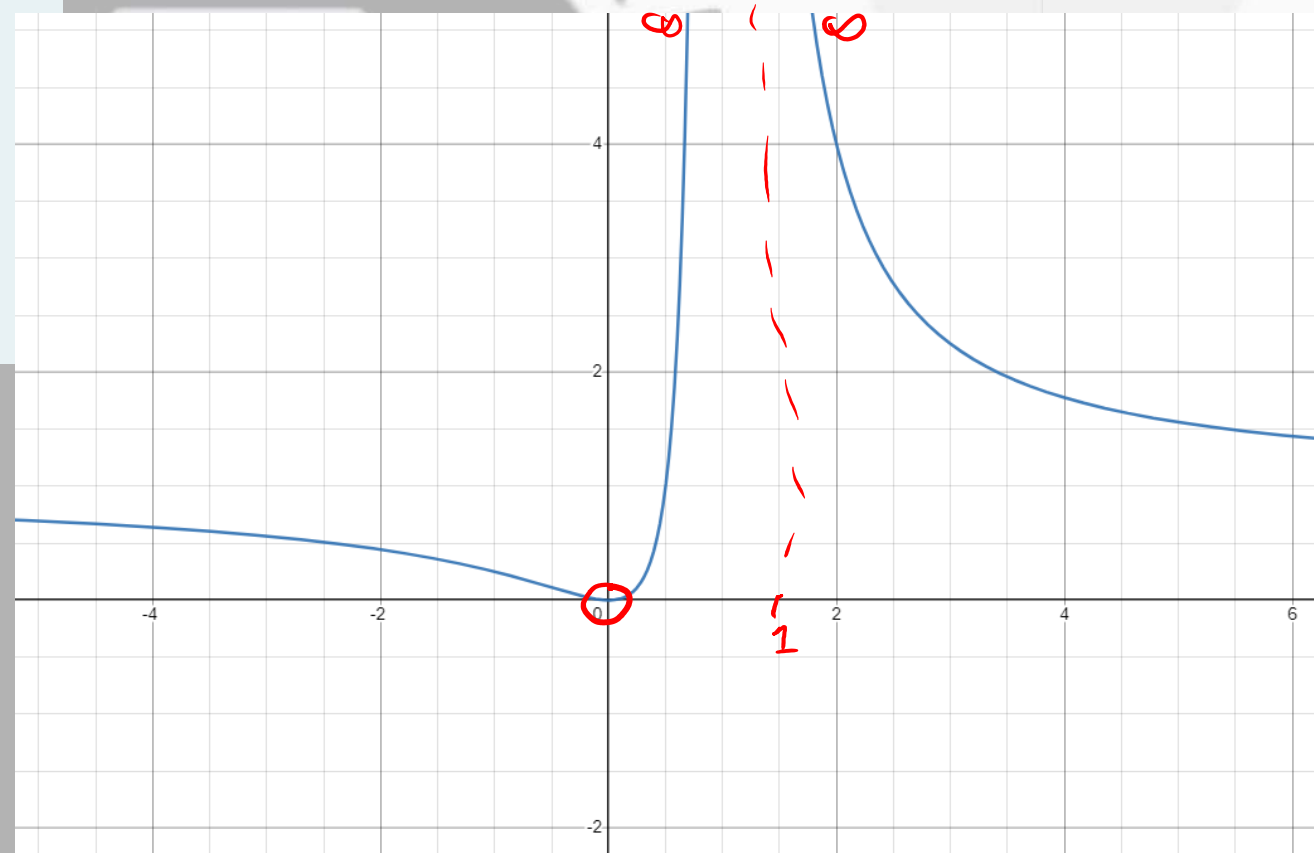○ 0 *is absolute* max *imum*

○ 2 *is absolute* min *imum*

◉ No absolute extrema

8

Use the graph of f to locate the absolute extrema if they exist * (1 Point)

$f(x) = \frac{x^2}{(x-1)^2}$ on interval $(-\infty, 1) \cup (1, \infty)$

○ 0.1 *is absolute* min *imum*, 1000 *absolute* max *imum*

○ −1 *is absolute* min *imum, no absolute* max *imum*

○ *no absolute* max *imum, zero is absolute* min *imum*

○ *No absolute extrema*

Find all critical numbers and determine whether they represent local maximum, local minimum or neither for the function: * (2 Points)

$f(x) = x^2 - 3x - 4$

✔ ⊘ $x = 1.5$, at $x = 1.5$ local min *imum*

○ $x = 1.5$, at $x = 1.5$ local max *imum*

○ $x = -1$, at $x = -1$ local min *imum*

○ $x = 4$, at $x = 4$ local min *imum*

$f'(x) = 2x - 3$

$f'(x) = 0 \Rightarrow 2x - 3 = 0$

$x = \dfrac{3}{2} = 1.5$

$f'(x) \; DNE \Rightarrow no \; values$

1.5

local

min

Find all critical numbers and determine whether they represent local maximum, local minimum or neither for the function: * (1 Point)
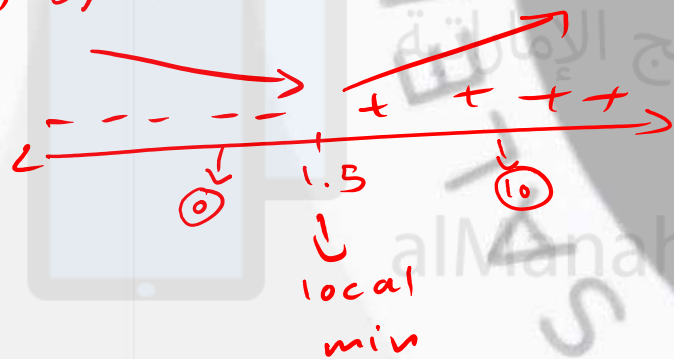
$f(x) = x^3 - 3x + 1$

○ $x = 1, x = -1$ are critical numbers, at $x = -1$ local minimum, at $x = 1$ local max imum

☑ $x = 1, x = -1$ are critical numbers, at $x = -1$ local max imum, at $x = 1$ local min imum

○ $x = -1$ is critical number, at $x = -1$ local min imum

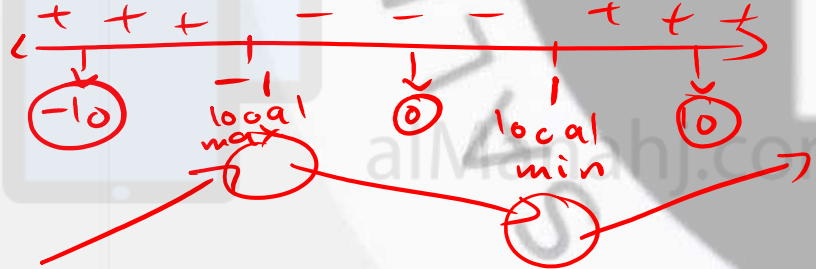○ $x = 1$ is critical number, at $x = 1$ local min imum

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

$f'(x) = 0 \Rightarrow 3x^2 - 3 = 0$

$x = 1, x = -1$

$f'(x)$ DNE $\Rightarrow$ no values

Find all critical numbers, if available use graphing technology to determine whether they represent local maximum, local minimum or neither for the function: * (2 Points)

$$f(x) = \begin{cases} \dfrac{x^2 + 2x - 1}{x^2 - 4x + 3} & , \ x \leq 0 \\ & x \geq 0 \end{cases}$$

x = 0 won't be local max

① Domain f(x) ℝ

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

② Continuity ℝ\{0}

critical number

✓ −1, 0, 2 *are Critical numbers, at x* = 0 *local* max *imum, at x* = −1, *x* = 2 *local* min *imum.*

○ *No critical numbers*

○ −1, 0, 2 *are Critical numbers, at x* = 0 *local* min *imum, at x* = −1, *x* = 2*local* max *imum.*

○ −1, 0 *are Critical numbers, at x* = 0 *local* min *imum, at x* = −1, *local* max *imum.*

$$f'(x) = \begin{cases} 2x + 2 & , \ x < 0 \\ 2x - 4 & , \ x > 0 \end{cases}$$

$f'(x) = 0 \ , \ 2x + 2 = 0$

$x = -1$

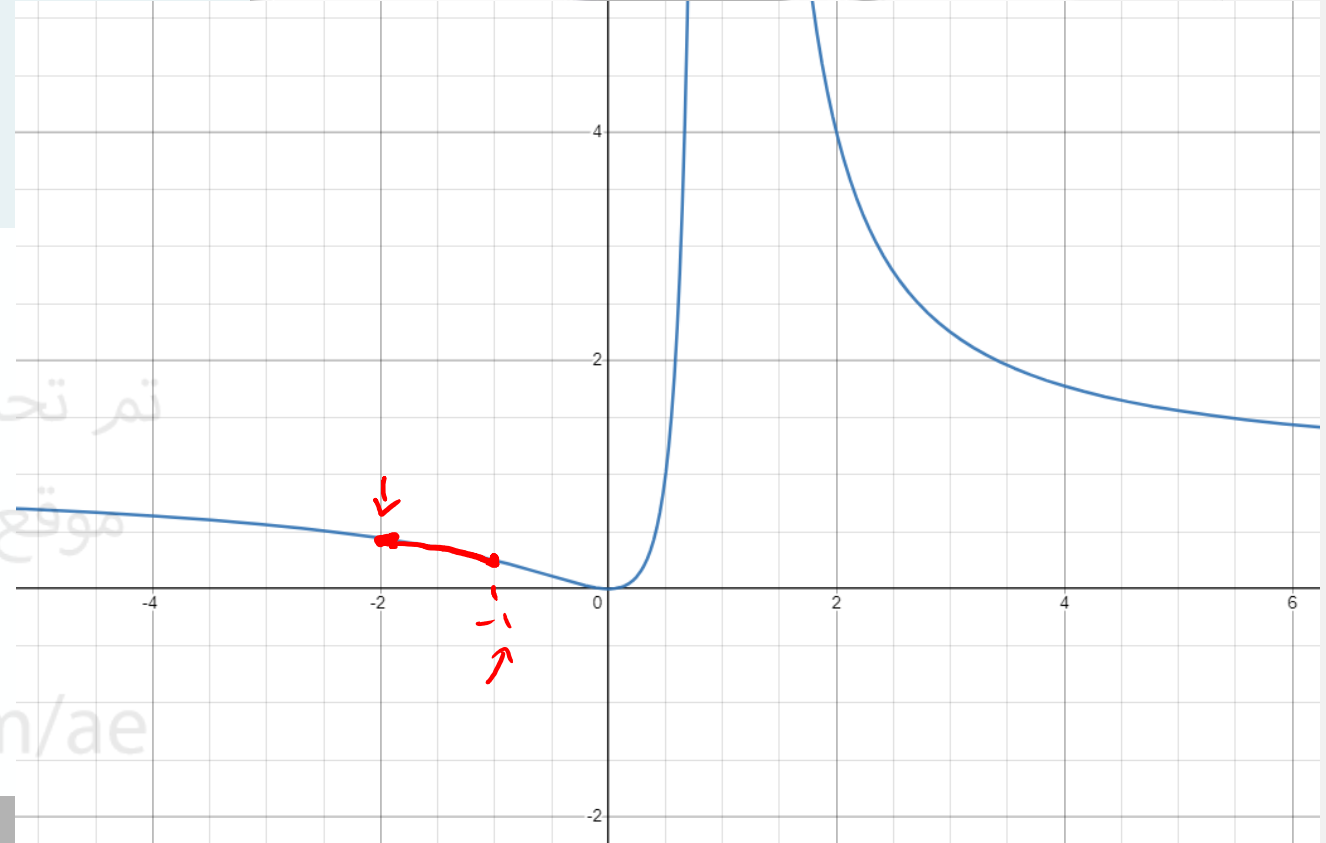$f'(x) = 0 \ , \ 2x - 4 = 0$

$x = 2$

$f'(x) \ DNE \Rightarrow x = 0$

$x < 0$
$2x + 2$

$x > 0$
$2x - 4$

f'

-10 local min
-0.5

0.5 local min
10
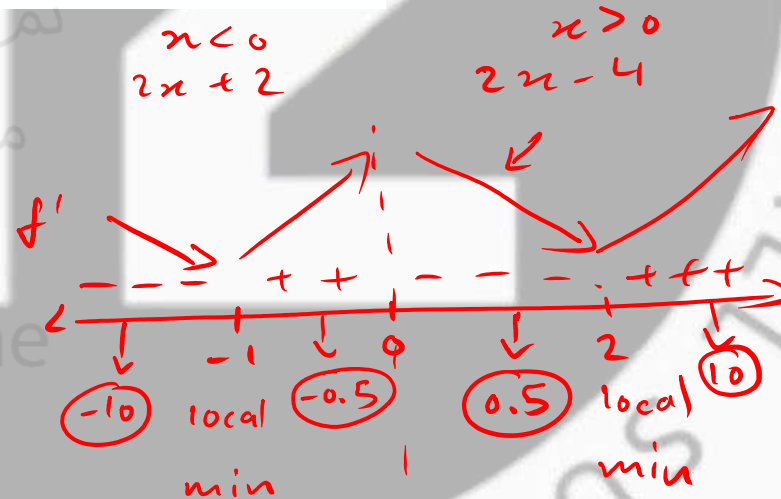
$\lim_{x \to 0^+} f(x) = 3$ local max

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

12

Use the graph of f to locate the absolute extrema
if they exist * (1 Point)

$f(x) = \frac{x^2}{(x-1)^2}$ on interval $[-2, -1]$

✓ $\frac{1}{4}$ is absolute min imum, $\frac{4}{9}$ absolute max imum

0.25

○ $\frac{4}{9}$ isabsolute min imum, $\frac{1}{4}$ is absolute max imum

0.44   0.25

○ no absolute max imum, $\frac{1}{4}$ is absolute min imum

○ No absolute extrema

13

Find all critical numbers, if available use graphing technology to determine whether they represent local maximum, local minimum or neither for the function * (1 Point)

$f(x) = \frac{x^2-x+4}{x-1}$

$x - 1 = 0 \qquad x = 1$

① Domain $R \setminus \{1\}$

② Cont. $R \setminus \{1\}$

○ $-1, 3$ are Critical numbers, at $x = 3$ local max imum, at $x = -1$ local min imum.

○ No critical numbers

☑ $-1, 3$ are Critical numbers, at $x = 3$ local min imum, at $x = -1$ local max imum. ✔

○ $-1, 3$ are Critical numbers, at $x = 3$ local min imum, at $x = -1$ local max imum.

$f'(x) = \dfrac{(x-1)(2x-1) - (x^2-x+4)}{(x-1)^2} = \dfrac{2x^2 - x - 2x + 1 - x^2 + x - 4}{(x-1)^2}$

$f'(x) = \dfrac{x^2 - 2x - 3}{(x-1)^2}$

$f'(x) = 0 \Rightarrow x^2 - 2x - 3 = 0$

$\boxed{x = 3}, \boxed{x = -1}$

$f'(x)$ DNE $\Rightarrow x = 1$ Rejected since it's not in the domain

$+ \; + \; +1 \quad ---- \quad + \; + \; +$

-1 local max 0 ② 3 local min

1