

# Calculus

F 9 March 2012

RESET THE  
SESSION

SET THE  
PARTICIPANT  
LIST

PLUG IN THE  
RECEIVER

New topics (see diary)

Topics covered are in bounds

Boxed answers agree with  
TurningPoint answers

Points agree with  
TurningPoint points

Points total to 100

Cover the look ahead

QUIZ  
FOLLOWS

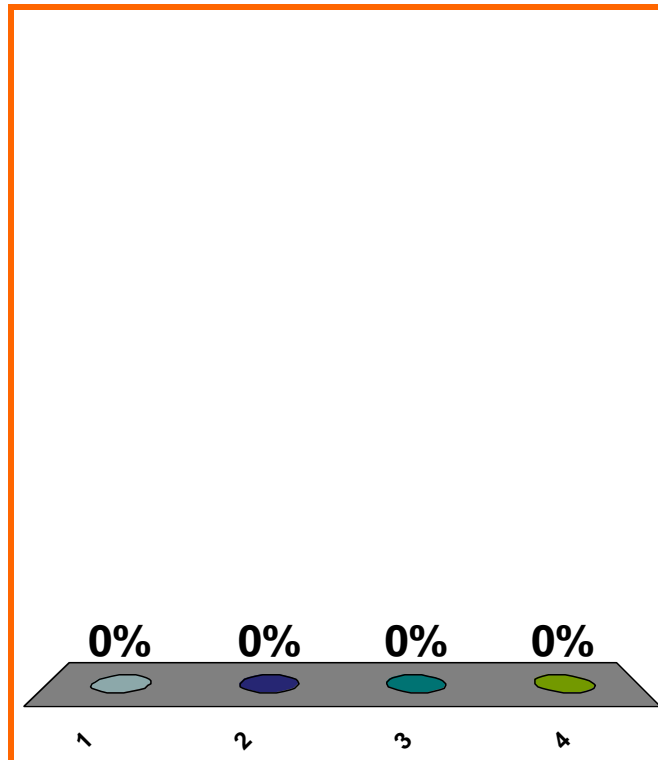
$$\frac{d}{dx} [\csc 4] = ??$$

(a) 0

(b)  $(\csc 4)(\cot 4)$

(c)  $-(\csc 4)(\cot 4)$

(d) none of the above



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

0 of 5

Topic 0310

10 pts

5

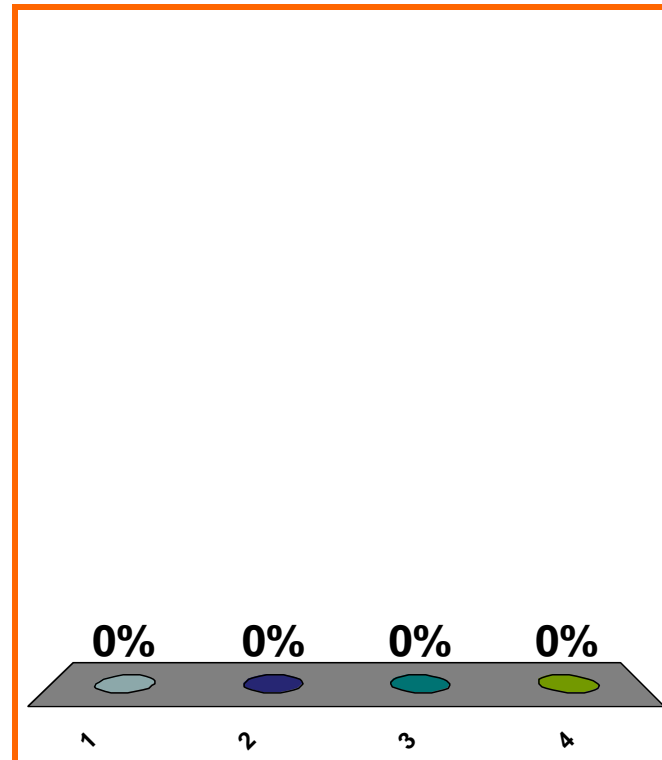
$$\frac{d}{dx} [e^{-2}x] = ??$$

(a) 0

(b)  $e^{-2}$

(c)  $-2e^{-3}x$

(d) none of the above



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

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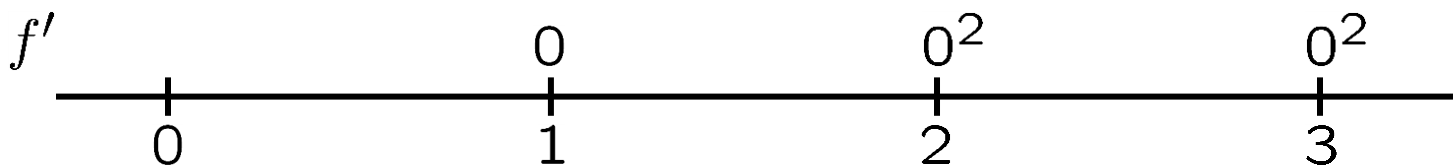
Topic 0310

10 pts

6

max interval of incr.

for  $f$ , if  $f'(x) = (x - 1)(x - 2)^2(x - 3)^2$ .

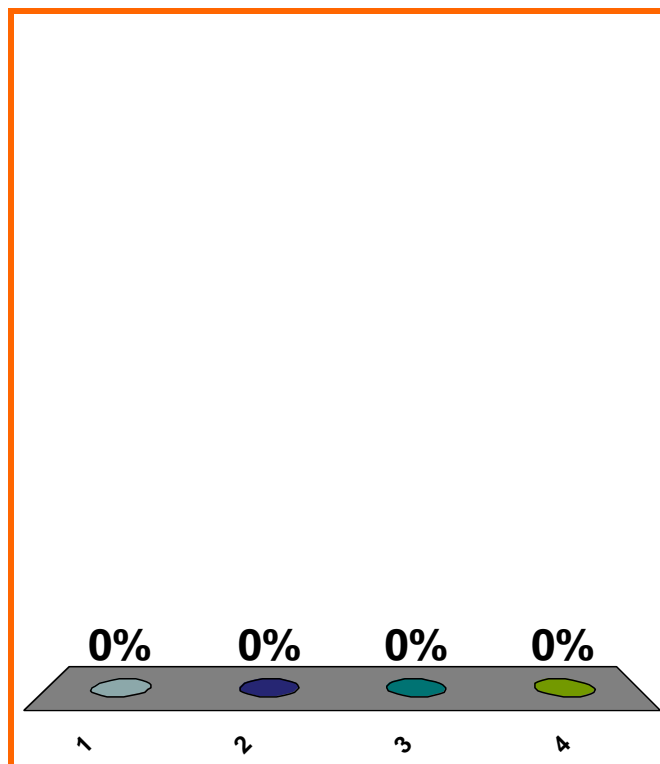


(a)  $[0, \infty)$

(b)  $[1, \infty)$

(c)  $[2, \infty)$

(d) none of the above



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
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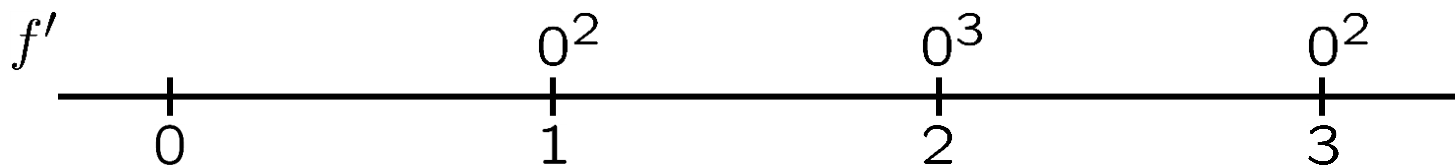
Topic 0470

0 pts

7

max intervals of incr.

for  $f$ , if  $f'(x) = (x - 1)^2(x - 2)^3(x - 3)^2$ .

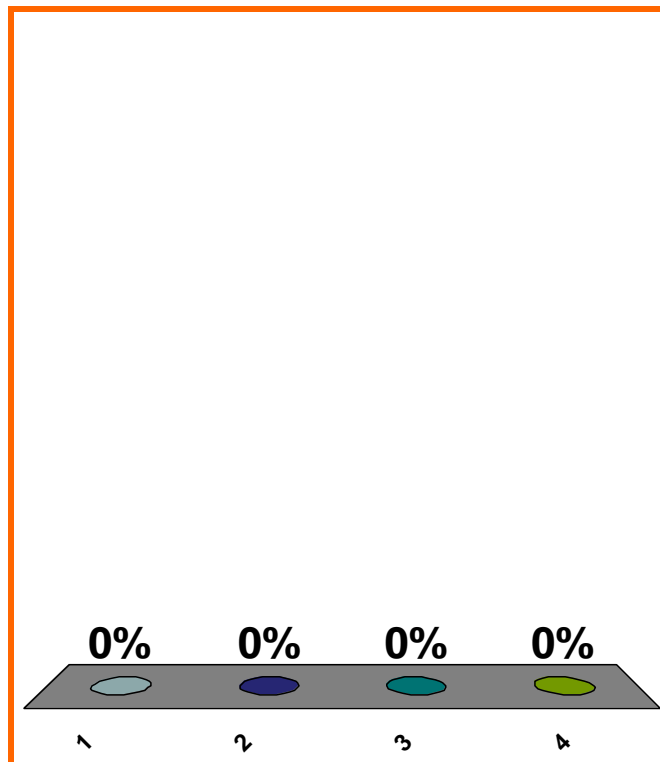


(a)  $[0, \infty)$

(b)  $[1, \infty)$

(c)  $[2, \infty)$

(d) none of the above



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
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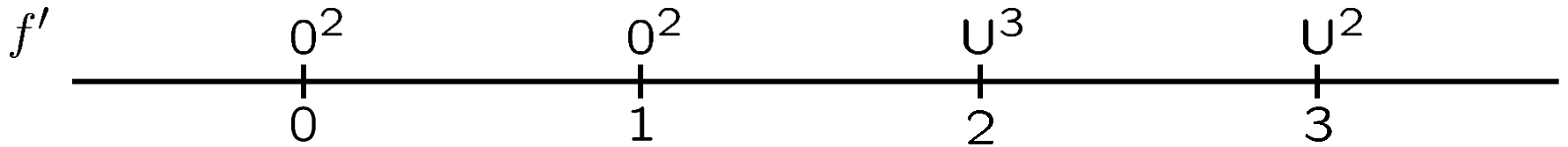
Topic 0470

10 pts



max intervals of incr

for  $f$ , if  $f'(x) = x^2(x-1)^2/(x-2)^3(x-3)^2$ .



(a)  $[0, \infty)$

NOTE:  
 $f(2)$  and  $f(3)$   
DNE

(b)  $[1, \infty)$

(c)  $[2, \infty)$

(d) none of the above

Correct:  $(2, 3)$  and  $(3, \infty)$

A large empty rectangular box with an orange border. At the bottom of the box, there is a horizontal bar with four colored ovals (light blue, dark blue, teal, and light green) and the text "0%" above each oval. Below the bar are small arrows pointing left and right.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

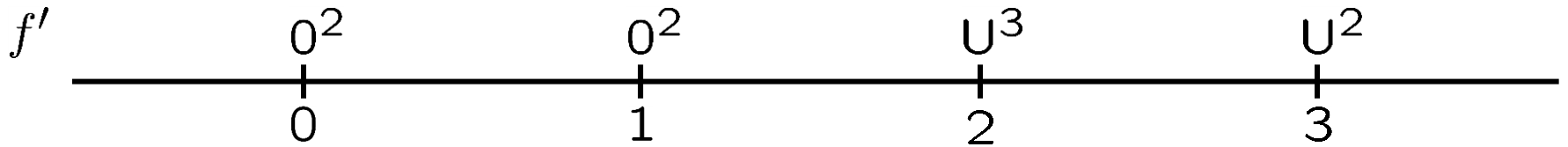
0 of 5

Topic 0470

0 pts

max intervals of incr

for  $f$ , if  $f'(x) = x^2(x-1)^2/(x-2)^3(x-3)^2$ .



(a)  $[0, \infty)$

NOTE:  
 $f(2)$  and  $f(3)$   
DNE

(b)  $[1, \infty)$

(c)  $[2, \infty)$

(d) none of the above

Correct:  $(2, 3)$  and  $(3, \infty)$

A large empty rectangular box with an orange border. At the bottom of the box is a score bar with four segments, each containing a blue oval and the text "0%". Below the score bar are small navigation icons: a left arrow, a right arrow, a refresh icon, and a close icon.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

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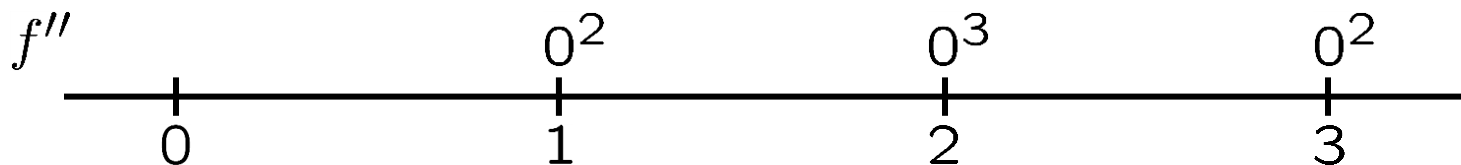
Topic 0470

10 pts

10

max intervals of cc dn

for  $f$ , if  $f''(x) = -e^{-x}(x-1)^2(x-2)^3(x-3)^2$ .

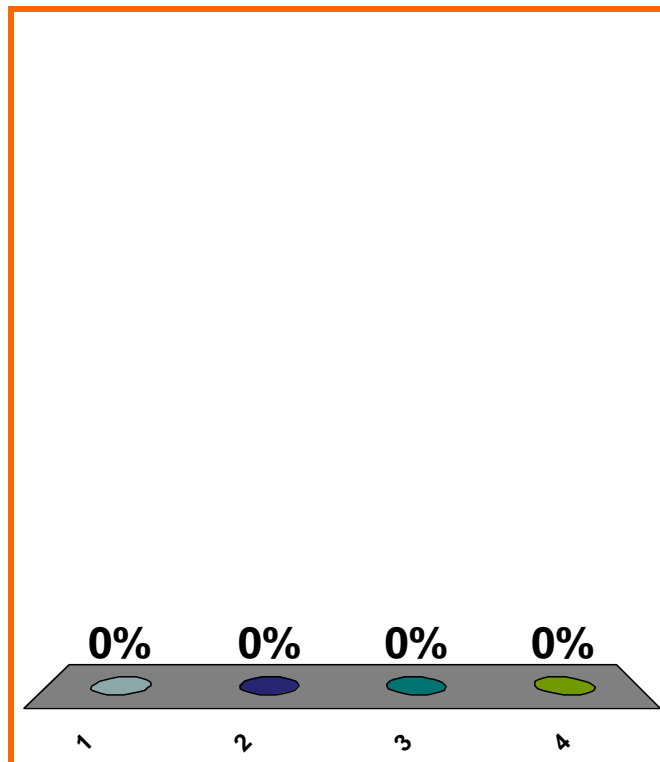


(a)  $[0, \infty)$

(b)  $[1, \infty)$

(c)  $[2, \infty)$

(d) none of the above



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

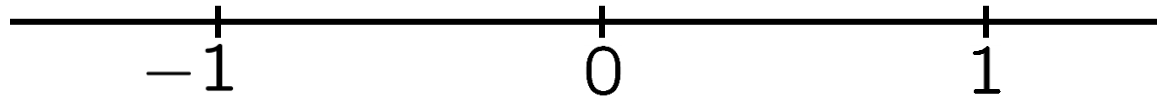
0 of 5

Topic 0470

10 pts

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

max intvl cc up

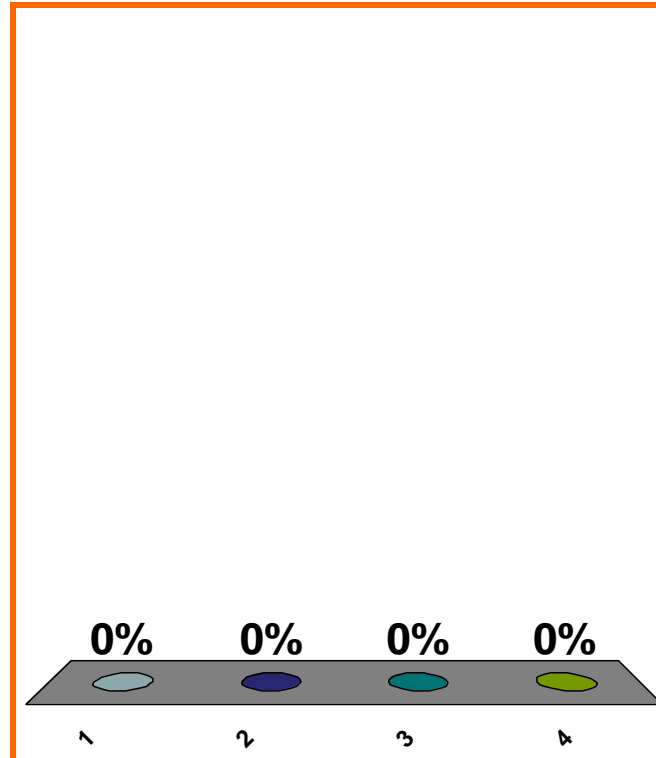


(a)  $[-1, 0]$

(b)  $[0, \infty)$

(c)  $[-1, 1]$

(d) none of the above



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

0 of 5

Topic 0470

0 pts

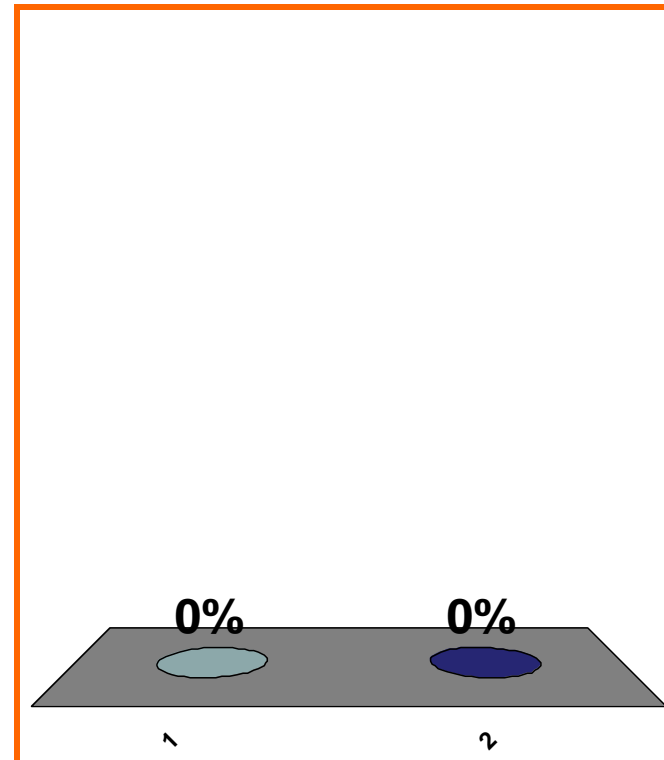
12

T or F:

Any local max is  
a global max.

(a) True

(b) False



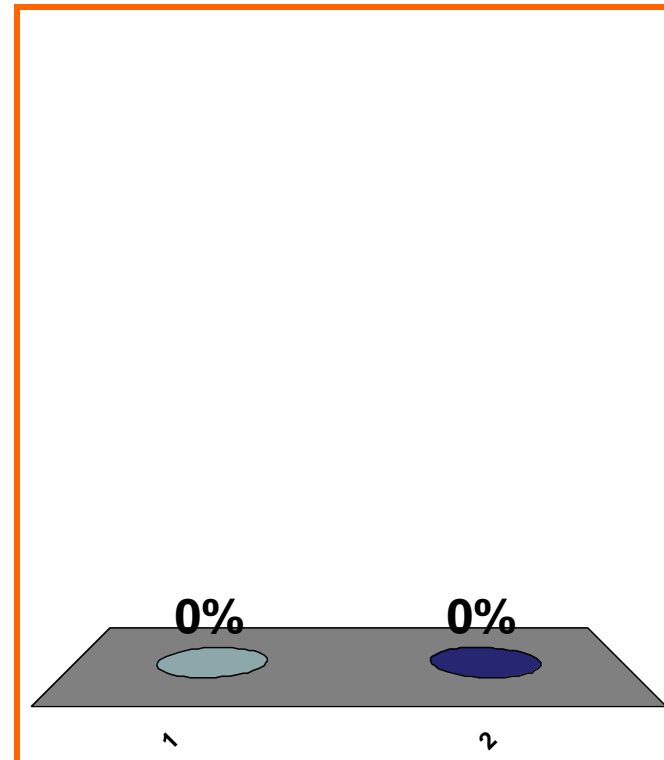
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21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

T or F:

Any global max is a local max.

(a) True

(b) False



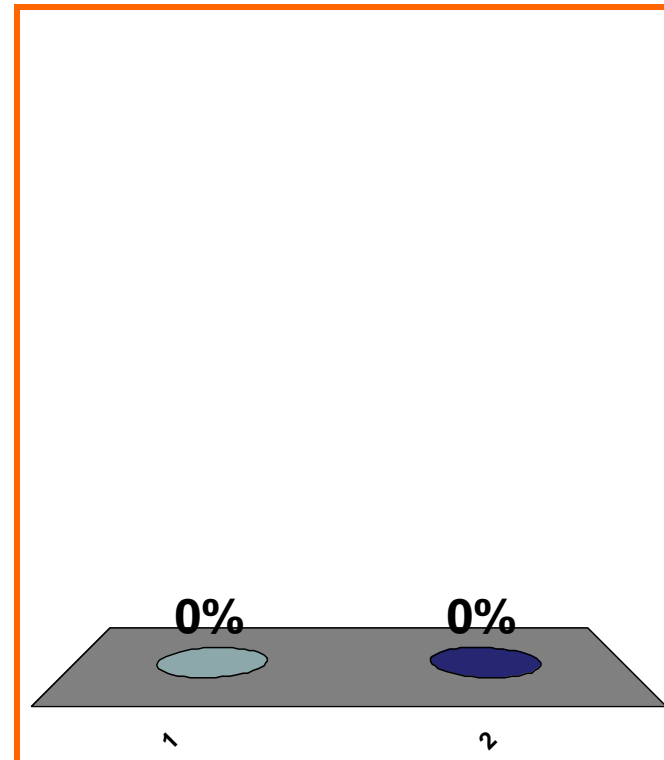
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T or F:

At **any** critical number is  
a local max or a local min.

(a) True

(b) False



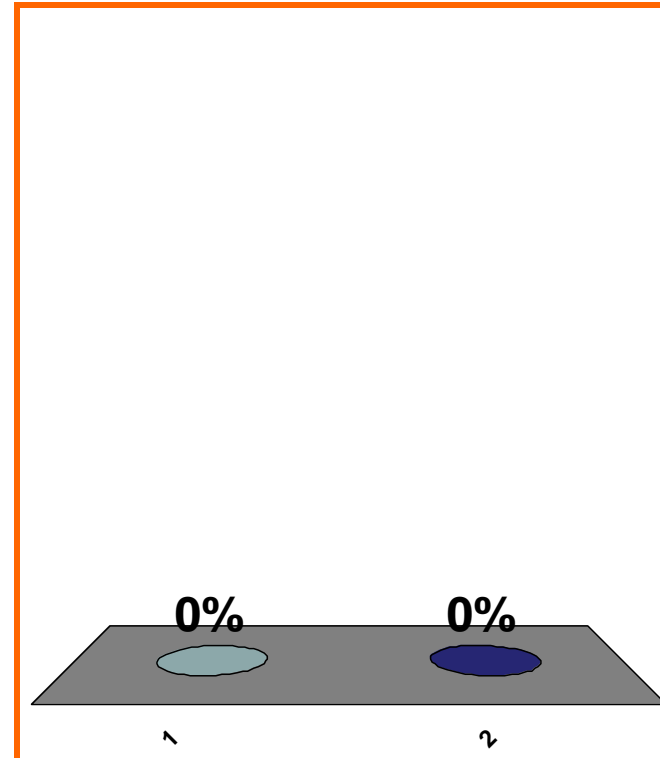
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21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

T or F:

Any local max or local min is at a critical number.

(a) True

(b) False



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

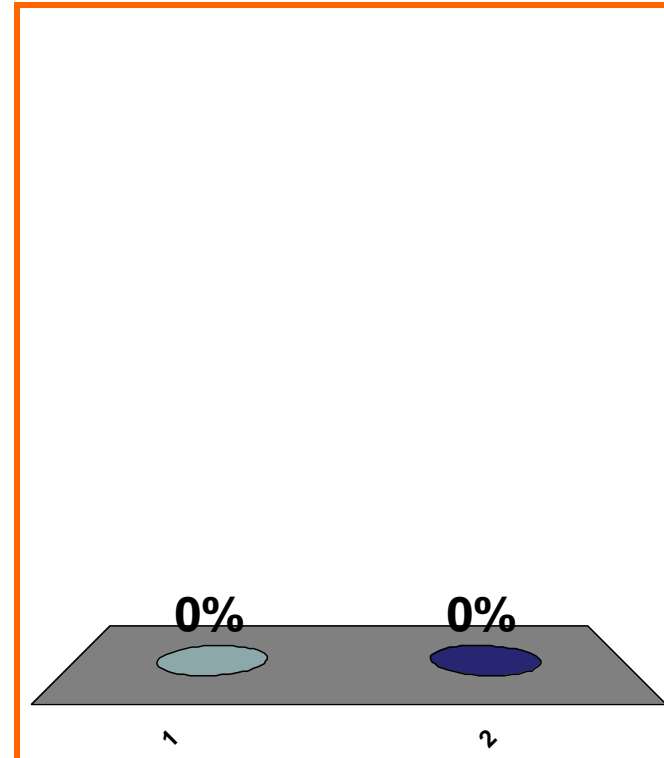


T or F:

Any global max or global min is at a critical number.

(a) True

(b) False



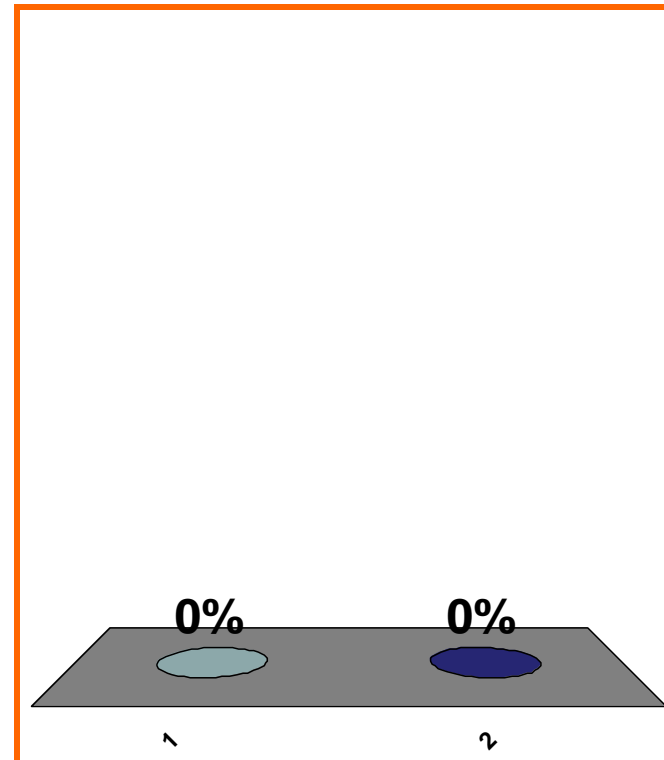
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T or F:

If  $f' < 0$  on  $I$ ,  
then  $f$  is decreasing on  $I$ .

(a) True

(b) False



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

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Topic 0460

10 pts

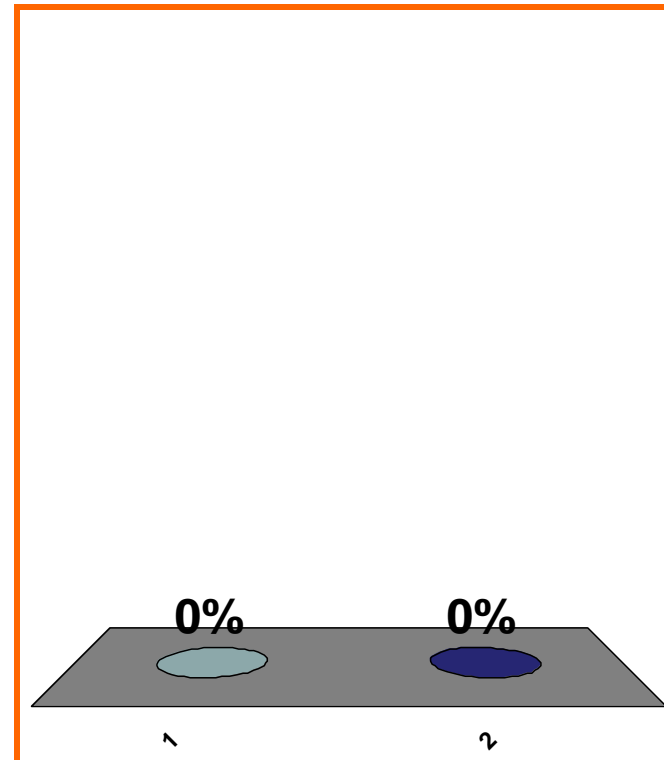
18

T or F:

If  $f$  is decreasing on  $I$ ,  
then  $f' < 0$  on  $I$ .

(a) True

(b) False



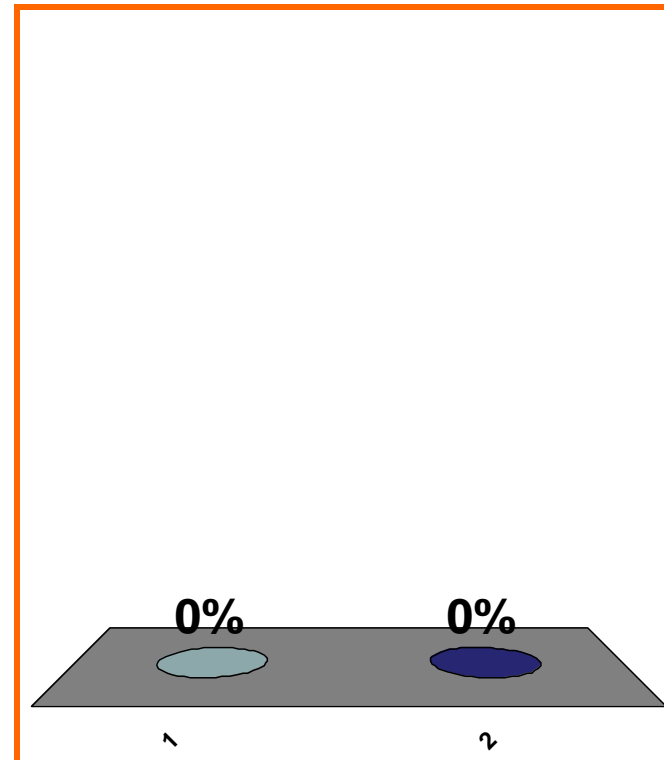
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21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

T or F:

If  $f$  is cc down on  $I$ ,  
then  $f'' < 0$  on  $I$ .

(a) True

(b) False



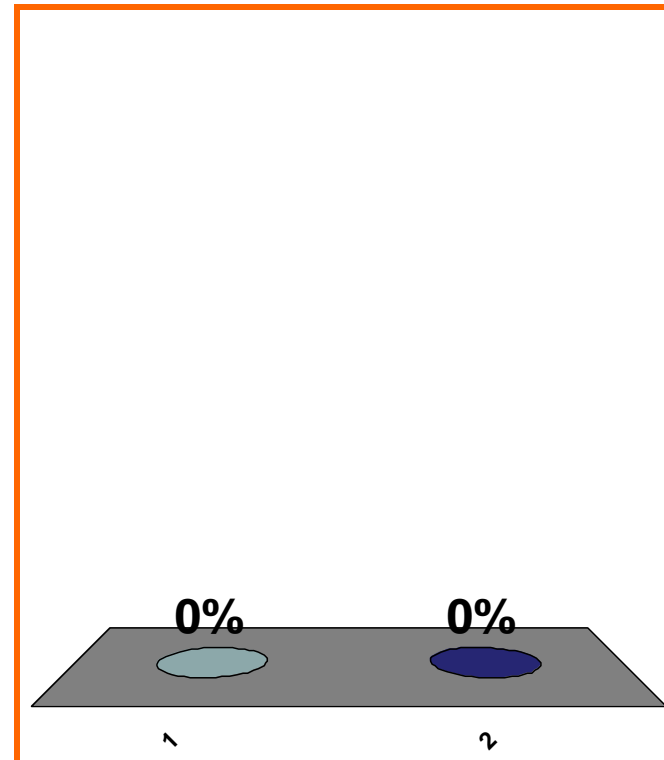
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T or F:

If  $f'' < 0$  on  $I$ ,  
then  $f$  is cc down on  $I$ .

(a) True

(b) False



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

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Topic 0460

10 pts

21

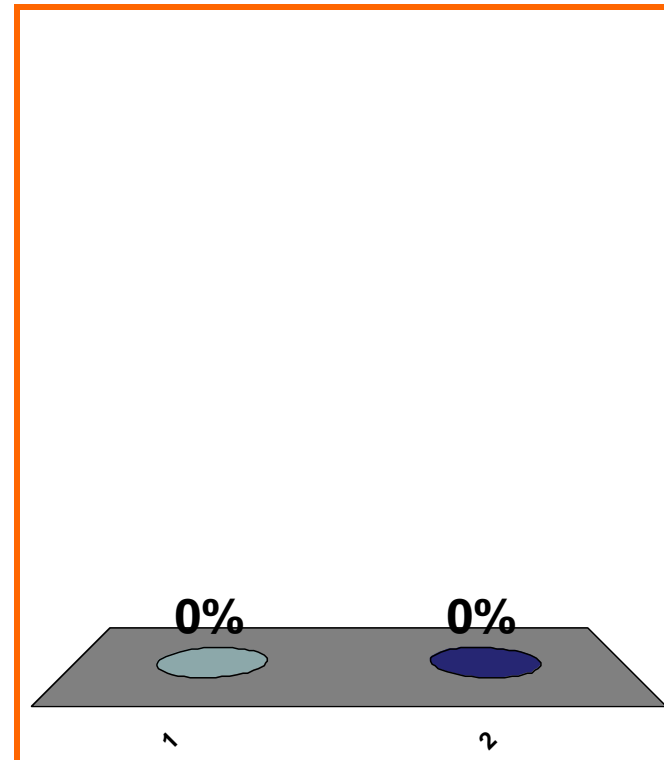
T or F:

$$f'(2) = 0, \quad f''(2) < 0$$

$\Rightarrow$   $f$  has a local max at 2

(a) True

(b) False



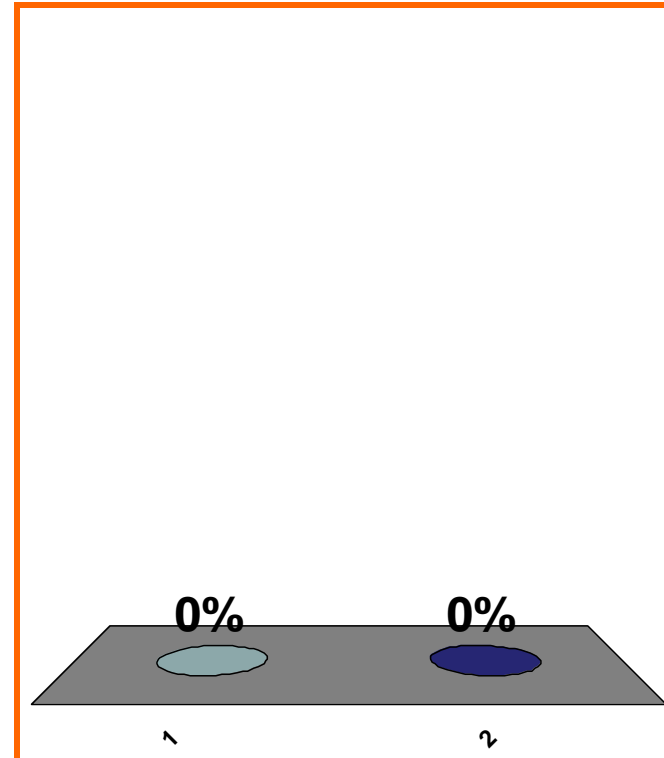
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

T or F:

If  $f'' > 0$  on  $I$ ,  
then  $f$  is cc dn on  $I$ .

(a) True

(b) False



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

$$g = f^{-1}$$

$$f(6) = 9, f'(6) = 1/4$$

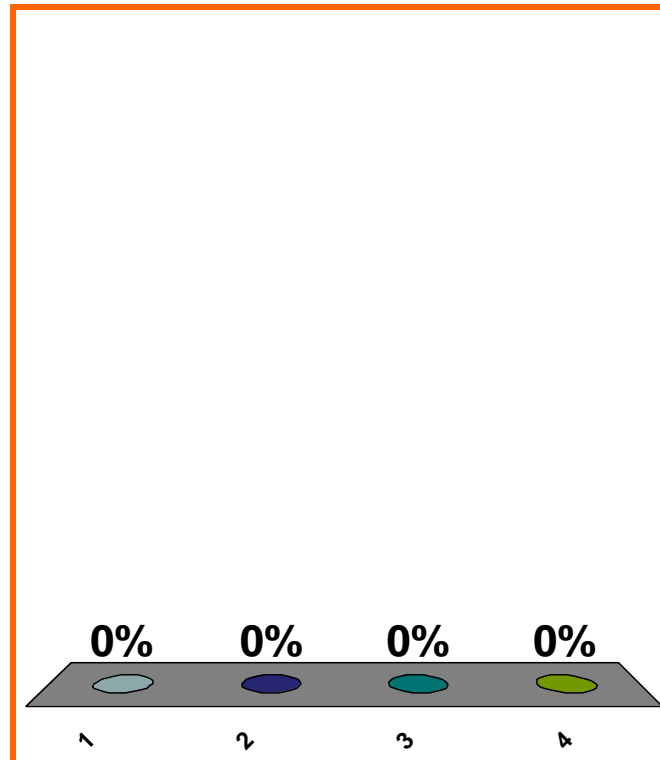
$$g'(6) = ??$$

(a) 1/2

(b) 4

(c) not enough information

(d) none of the above



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40



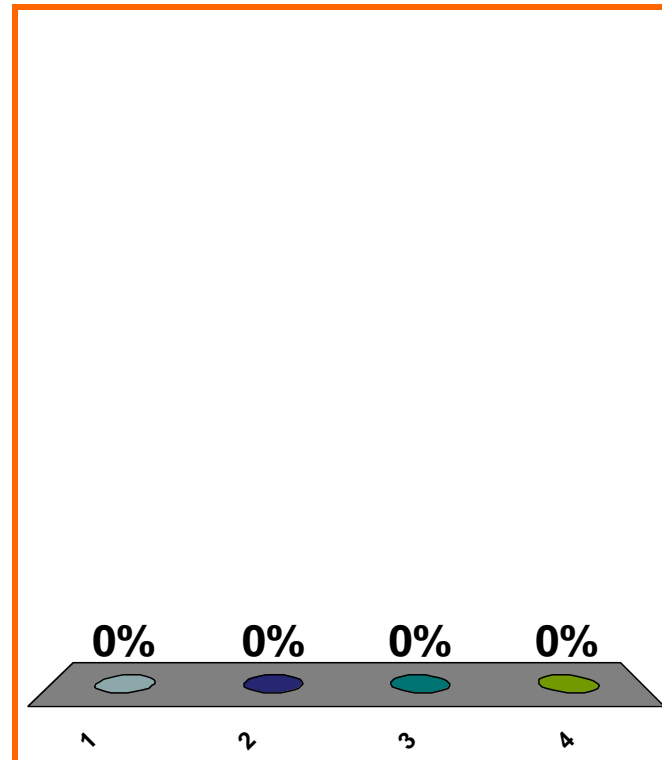
$$\lim_{x \rightarrow \infty} \left[ \frac{\sin x}{x} \right] \stackrel{\text{L'H}}{=} \lim_{x \rightarrow \infty} [??]$$

(a)  $\frac{-\cos x}{1}$

(b)  $\frac{\cos x}{1}$

(c) L'Hôpital does **not** apply.

(d) **none** of the above



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
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Topic 0410

10 pts

25

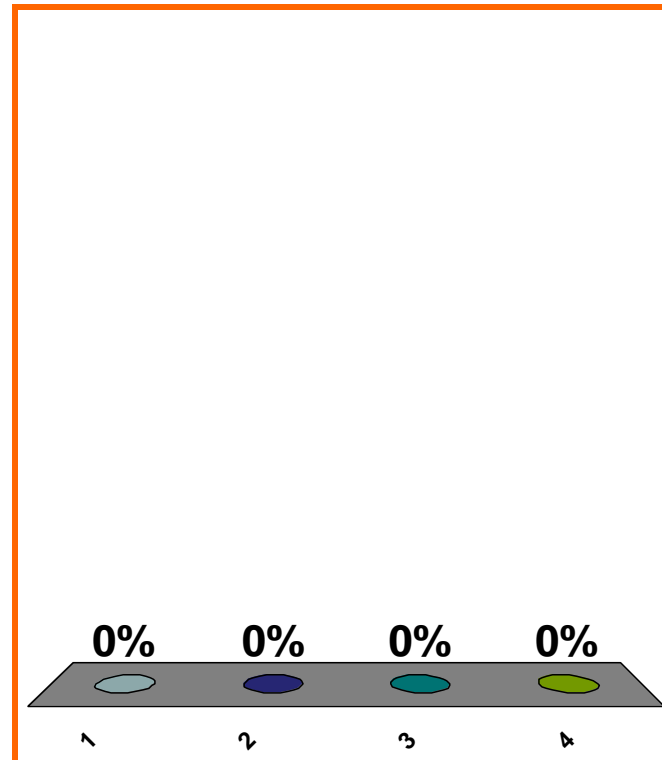
$$\lim_{x \rightarrow 0} \frac{e^x - x - 1}{x^4}$$

(a) 0

$$(b) \lim_{x \rightarrow 0} \frac{e^x - 1}{4x^3}$$

(c) DNE

(d) none of the above



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

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Topic 0410

0 pts

26

# LOOK AHEAD

$$\sum_{j=1}^n j^q$$

$$\int \frac{1}{\text{quadratic}} dx$$

definite integrals

$$\int_0^{\pi} \sin^2 \theta d\theta$$

$$\frac{d}{dx} \left[ \int_1^x t^3 dt \right]$$

$$\Delta \left[ \sum_{j=1}^n j^3 dt \right]$$

# LOOK BACK

derivs w.r.t.  $t$  of exprs of  $r$ ,  $x$ ,  $w$ , etc.

# CURRENT (implicit diff. & IFT)

derivs of arcsin, arccos

derivs of arctan, arccot

$$f(x) = x^7 + x$$

$$g = f^{-1}$$

Find  $g(2)$  and  $g'(2)$ .

$$f(x) = 2x \quad \Rightarrow \quad f(s+t) = (f(s)) + (f(t))??$$

$$f(x) = 3x \quad \Rightarrow \quad f(s+t) = (f(s)) + (f(t))??$$

$$f(x) = 4x+1 \quad \Rightarrow \quad f(s+t) = (f(s)) + (f(t))??$$

limit of quotient = quotient of limits ?

$$e^{\ln x} = x \quad ?$$

$$\ln e^x = x \quad ?$$

$$x^2/x = x \quad ?$$

$$x/x^2 = 1/x \quad ?$$

$$\text{position} = 2t^3 + 5t^2$$

$$\text{velocity at } t = 3 \quad ?$$

# LOOK AHEAD

$$y = (2x^2 - x + 1)(\cos(3x))$$

$\Delta y, dy,$

eq'n of tangent line at  $(0, 1),$   
linearization at  $x = 0$

SAVE THE  
SESSION  
DATA

RETURN TO  
PRESENTATION