

# Calculus

F 3 February 2012

RESET THE  
SESSION

SET THE  
PARTICIPANT  
LIST

PLUG IN THE  
RECEIVER

Boxed answers agree with  
TurningPoint answers

Points agree with  
TurningPoint points

Points total to 100

Topics covered are in bounds

QUIZ  
FOLLOWS

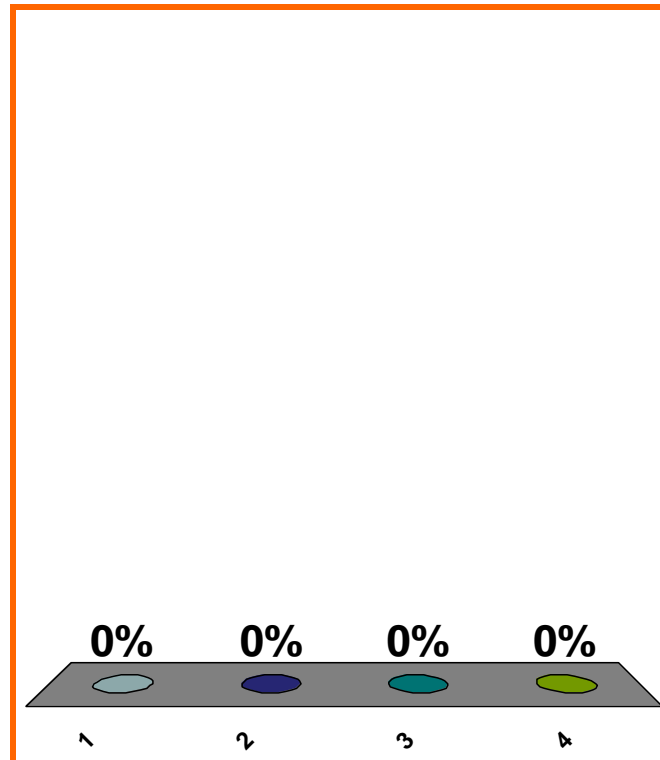
$$e^{\ln 7} = ??$$

(a) 7

(b) DNE

(c)  $e^{7/2}$

(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 0260

10 pts

5

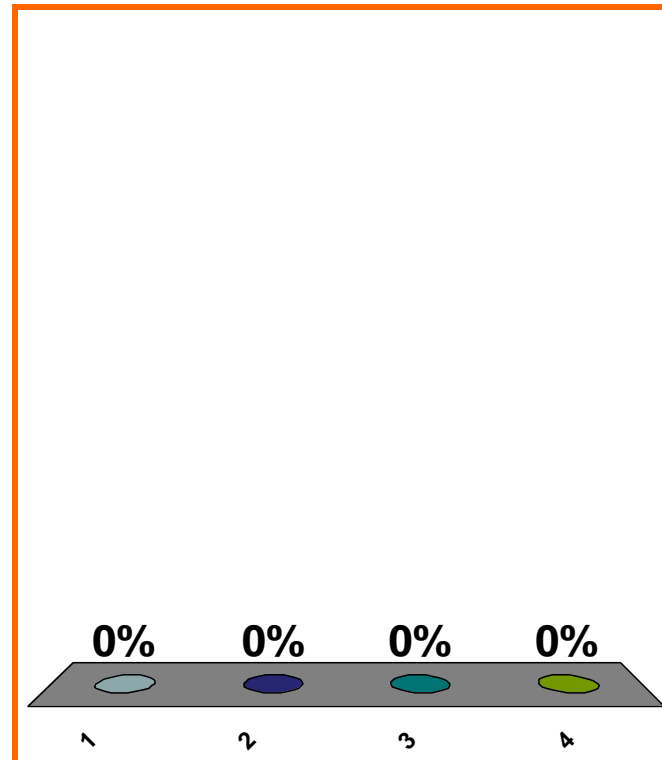
$$\lim_{x \rightarrow 0} \left[ \frac{3x^4 - x^3 + 2x}{7x^4 - x} \right] = ??$$

(a) 3/7

(b) -2

(c) 0

(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 0240

20 pts

6

from position 5 to position 9  
from time 3 to time 4

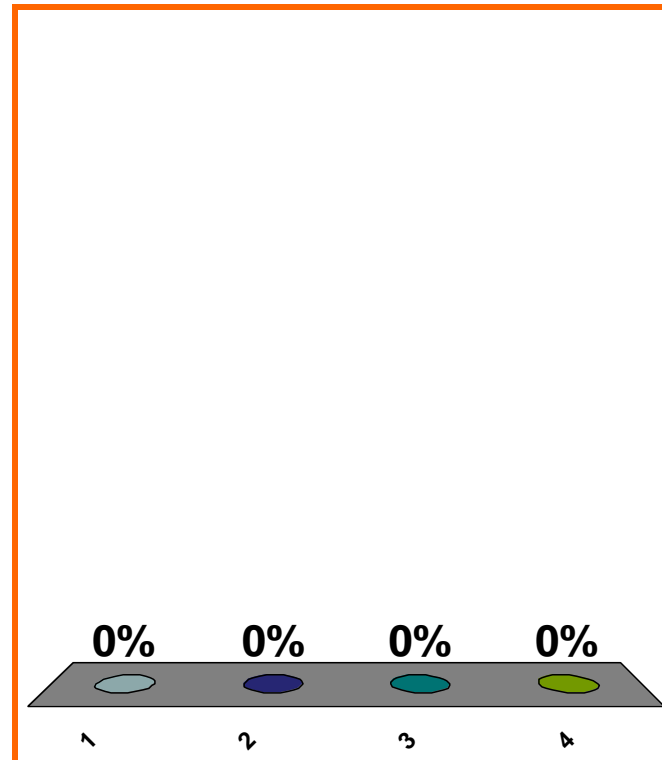
average velocity = ??

(a) 2

(b) 4

(c) 8

(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 0130

10 pts

7

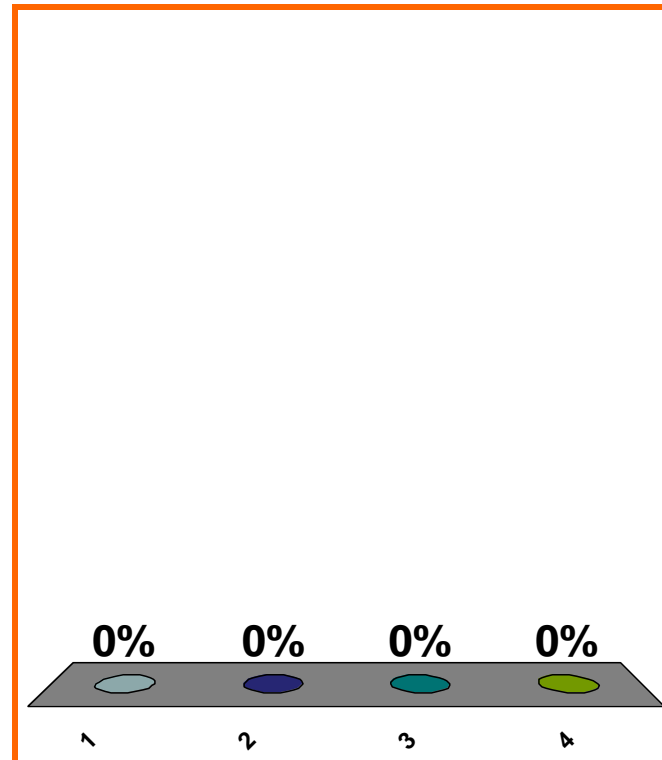
$$\lim_{x \rightarrow 0} \frac{3x^3 + 2x}{\sin x} = ??$$

(a) 2

(b) 0

(c) 3

(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 0140

0 pts

8



$$P(x) = (x - 3)^7(x^2 + x + 4)$$

$$Q(x) = (x - 3)^8(5x^9 + 9x - 7)$$

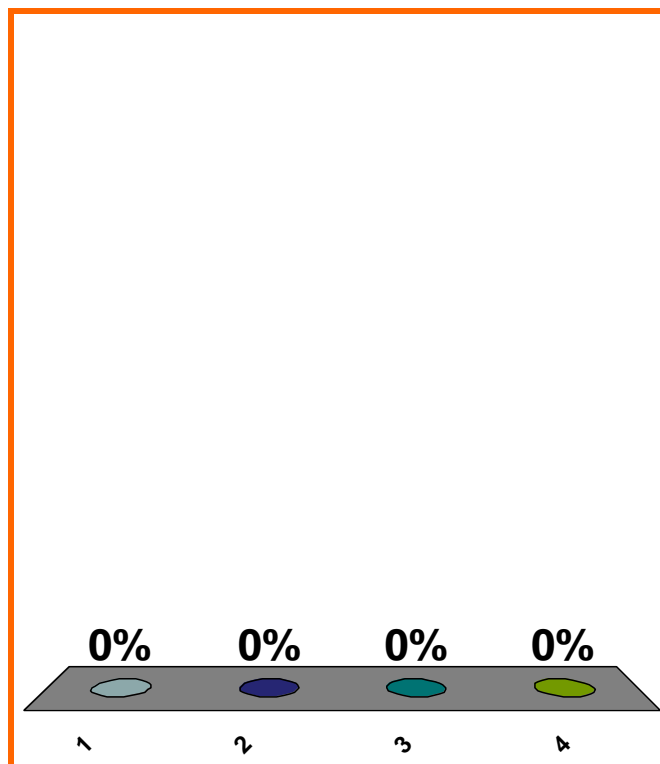
$$\lim_{x \rightarrow 3^-} \frac{P(x)}{Q(x)} = ??$$

(a) 0

(b)  $\infty$

(c)  $-\infty$

(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

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Topic 0200

20 pts

9

$$\lim_{t \rightarrow 0} \left[ \frac{2t^5 + 8t^4}{t^2(\sin^2 t)} \right]$$

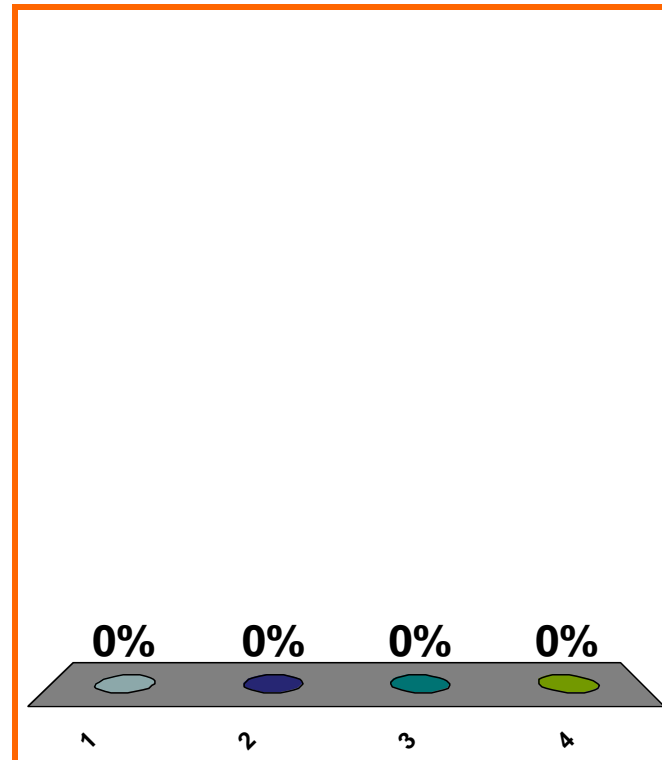
(a) 0

(b)  $\infty$

(c)  $-\infty$

(d) none of the above

Correct answer: 8



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

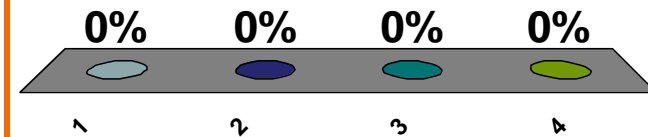
$$\lim_{x \rightarrow 2} f(x) = -\infty$$

(a)  $x \approx 2, x \neq 2 \Rightarrow f(x)$  very neg

(b)  $x \approx 2, x \neq 2 \Rightarrow f(x)$  very pos

(c)  $x \approx 2, x < 2 \Rightarrow f(x)$  very neg

(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 0150

10 pts

11

$$6x^5 + 7x^4 - 8x^3 \quad x \rightarrow 0 \quad ??$$

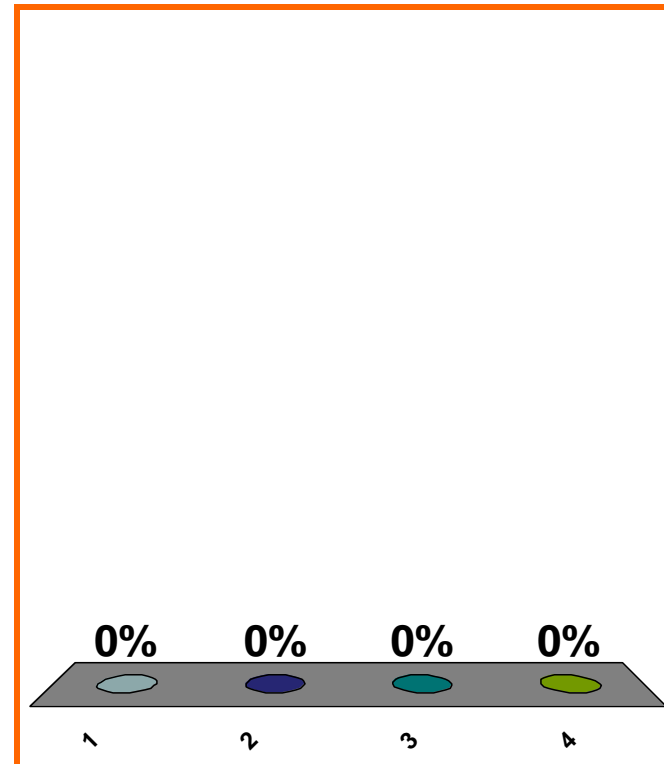
(a)  $6x^5$

(b)  $7x^4$

(c)  $8x^3$

(d) none of the above

Correct answer:  $-8x^3$



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
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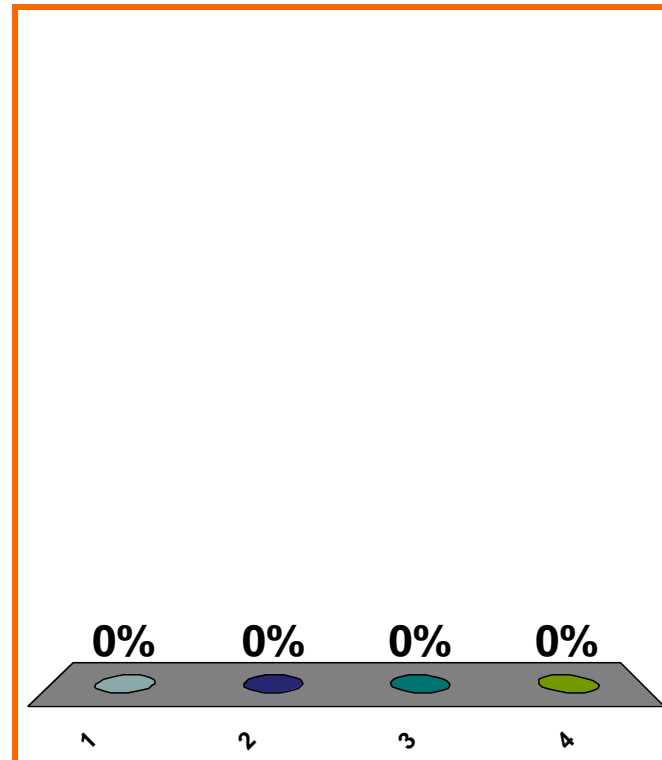
$$6x^5 + 7x^4 - 8x^3 \quad x \rightarrow \infty \quad ??$$

(a)  $6x^5$

(b)  $7x^4$

(c)  $-8x^3$

(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

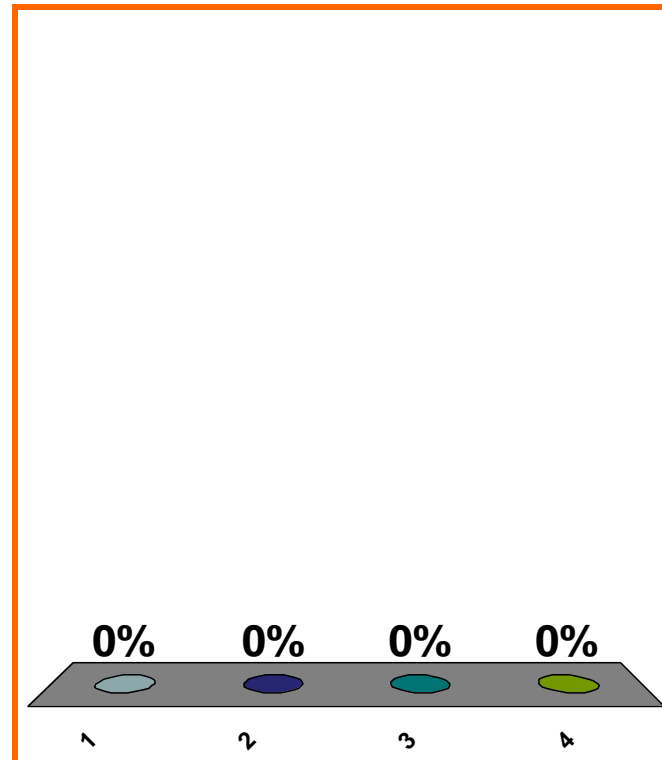
$$\lim_{x \rightarrow 0} \left[ \frac{6x^5 + 7x^4 - 8x^3}{7x^5 - 2x^4 + 9x^3} \right] = ??$$

(a) DNE

(b)  $-8/9$

(c)  $6/7$

(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 0240

10 pts

14

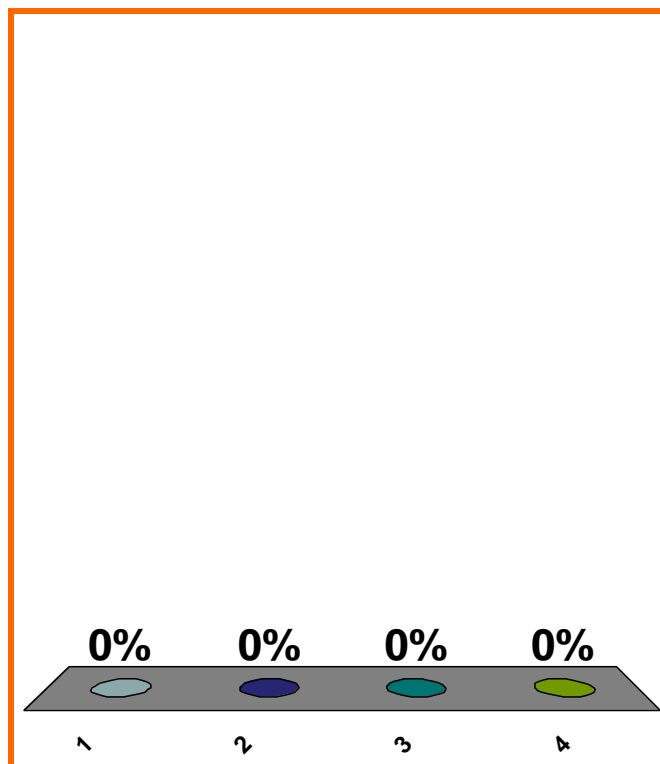
$$\lim_{x \rightarrow \infty} \left[ \frac{6x^5 + 7x^4 - 8x^3}{7x^5 - 2x^4 + 9x^3} \right] = ??$$

(a) DNE

(b)  $-8/9$

(c)  $6/7$

(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 0240

10 pts

15

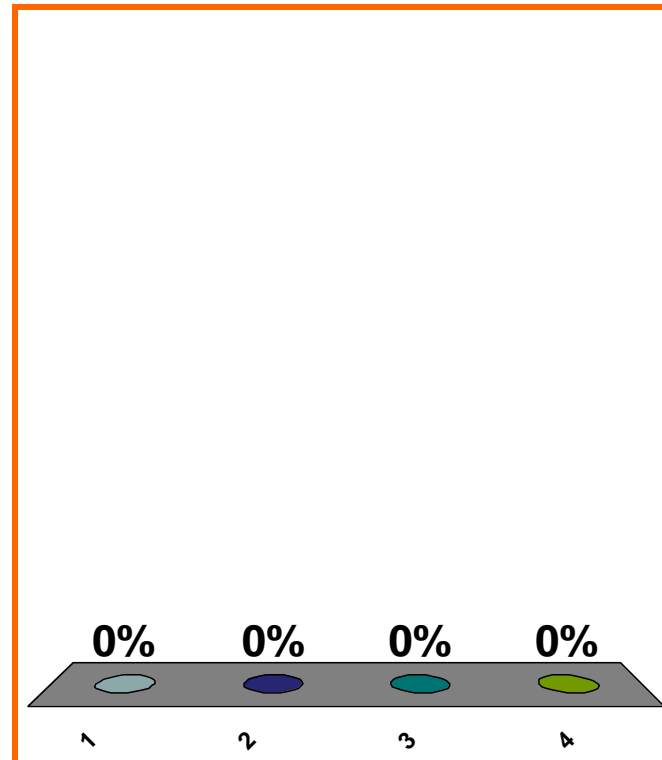
$$\sin x \underset{x \rightarrow 0}{\sim} ??$$

(a)  $x$

(b)  $\cos x$

(c)  $-\cos x$

(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 0230

0 pts

16



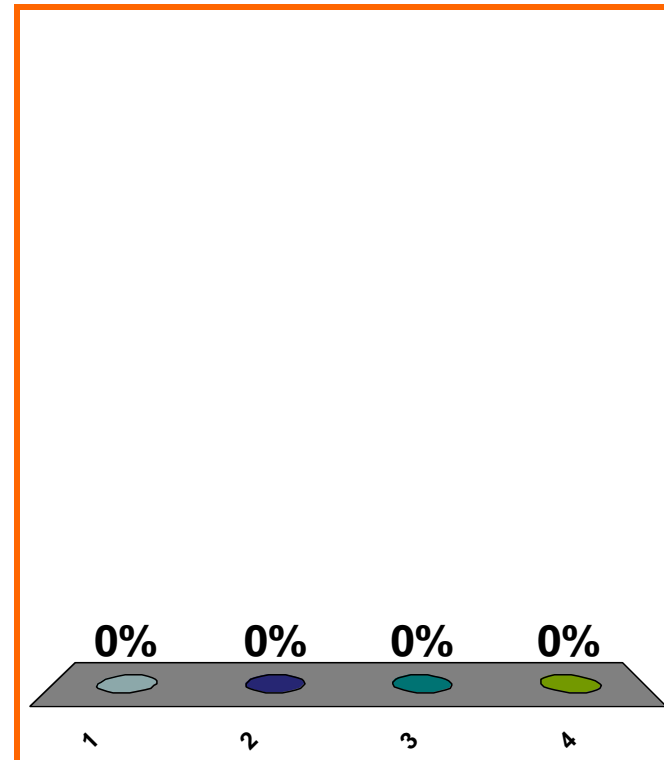
$$3x^3 + 2x \underset{x \rightarrow 0}{\sim} ??$$

(a)  $3x^3$

(b) 0

(c)  $2x$

(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

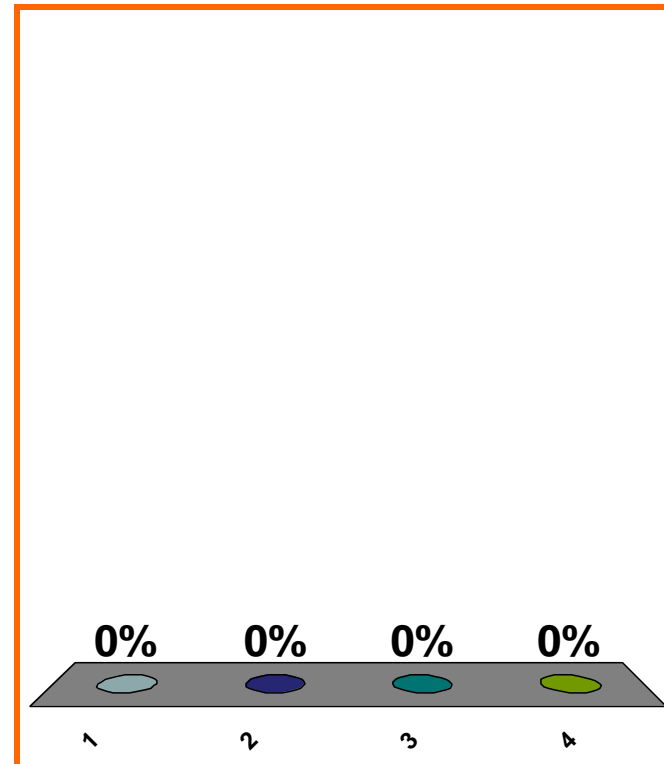
$$\lim_{x \rightarrow 0} \frac{3x^3 + 2x}{\sin x} = ??$$

(a) 0

(b) 2

(c) 3

(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

graph of  $e^x$  and of  $\ln x$

continuity vs. continuity on interval

**LOOK AHEAD**

$(d/dt)(\text{expr of } u)$ , *etc.*

eq'n of a tangent line

From graph of  $f$  to domain of  $f'$

especially: from graph of  $\ln$  to domain of  $\ln'$

especially: from graph of  $x^{3/2}$  to domain  
of its derivative

continuity vs. continuity on interval

logarithmic derivatives

$$\lim_{h \rightarrow 0} \frac{|h|}{h}$$

$$\lim_{x \rightarrow \infty} \left[ \frac{100x^3 + 2x - 1}{x^4 - x^3 + x^2 + 1} \right] = ??$$

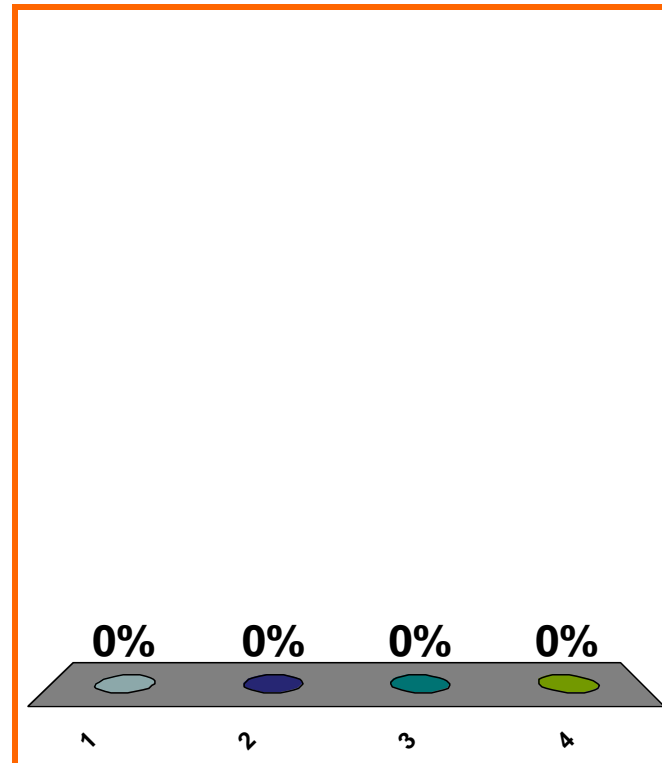
(a)  $\infty$

(b)  $-\infty$

(c) 100

(d) none of the above

Correct answer: 0



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 0250

0 pts

20

$$\lim_{x \rightarrow -\infty} \left[ \frac{100x^3 + 2x - 1}{x^4 - x^3 + x^2 + 1} \right] = ??$$

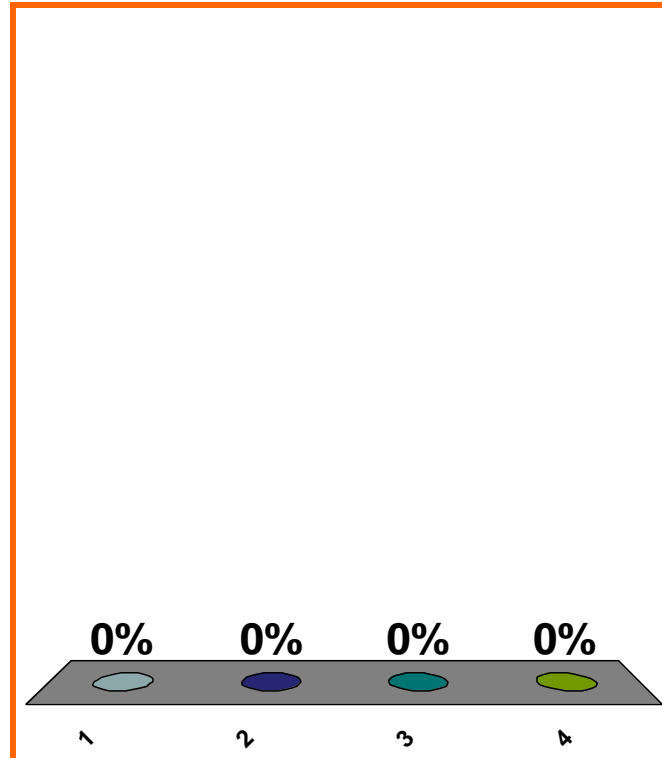
(a)  $\infty$

(b)  $-\infty$

(c) 100

(d) none of the above

Correct answer: 0



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

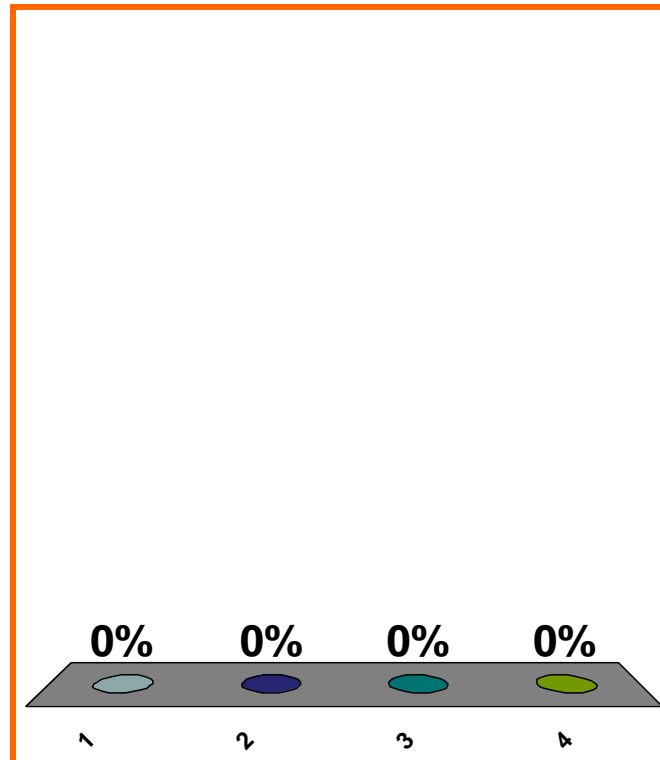
$$\lim_{x \rightarrow -\infty} \left[ \frac{100x^3 + 2x - 1}{x^3 + x^2 + 1} \right] = ??$$

(a)  $\infty$

(b)  $-\infty$

(c) 100

(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

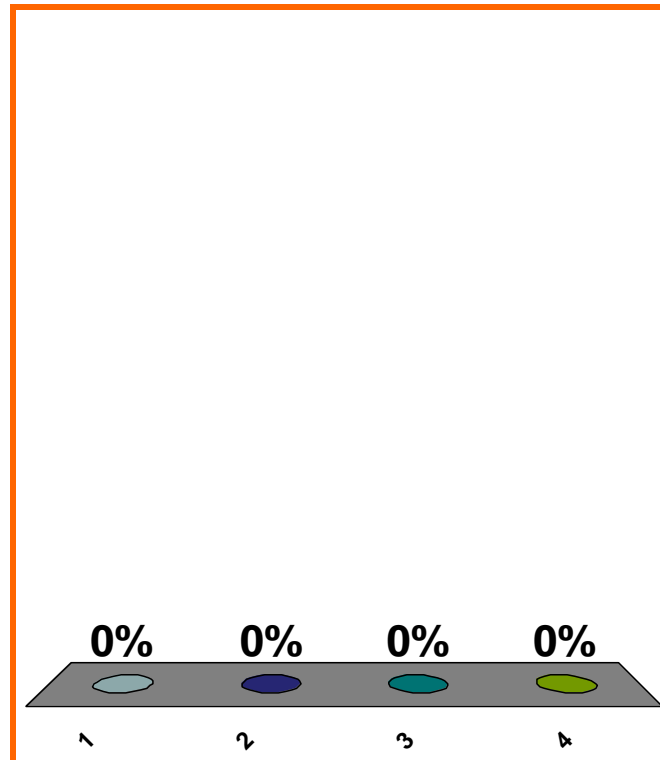
$$\lim_{x \rightarrow \infty} \left[ \frac{100x^3 + 2x - 1}{x^3 + x^2 + 1} \right] = ??$$

(a)  $\infty$

(b)  $-\infty$

(c) 100

(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

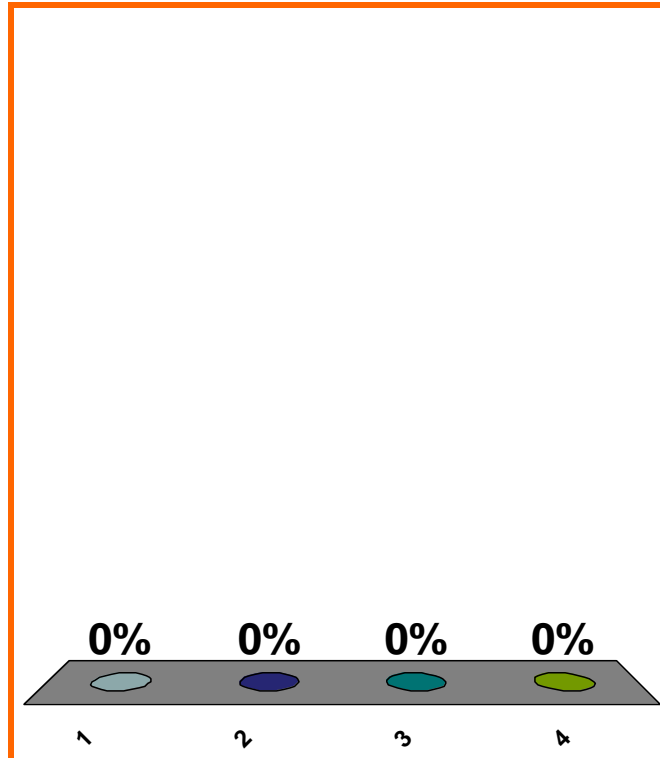
$$\lim_{x \rightarrow \infty} \left[ \frac{100x^3 + 2x - 1}{x^2 + 1} \right] = ??$$

(a)  $\infty$

(b)  $-\infty$

(c) 100

(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



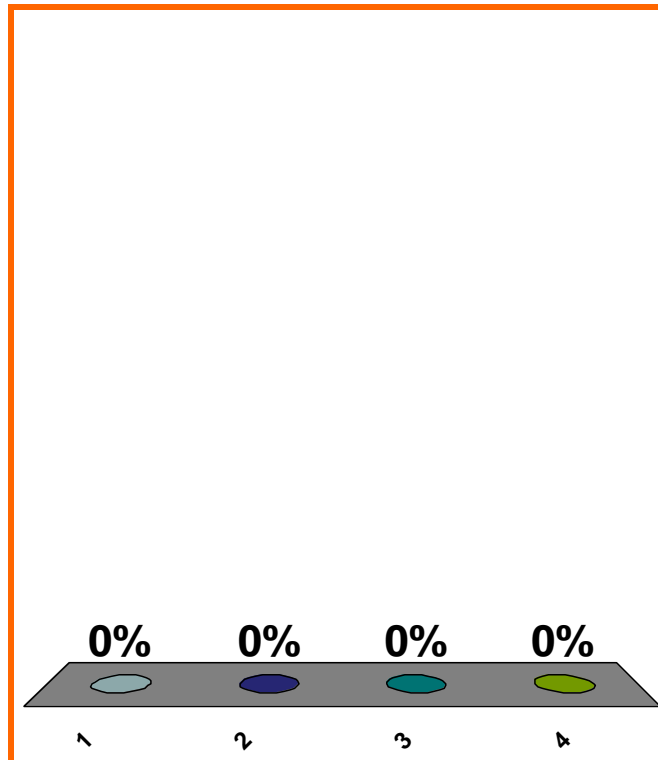
$$\lim_{x \rightarrow -\infty} \left[ \frac{100x^3 + 2x - 1}{x^2 + 1} \right] = ??$$

(a)  $\infty$

(b)  $-\infty$

(c) 100

(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 0250

0 pts

25

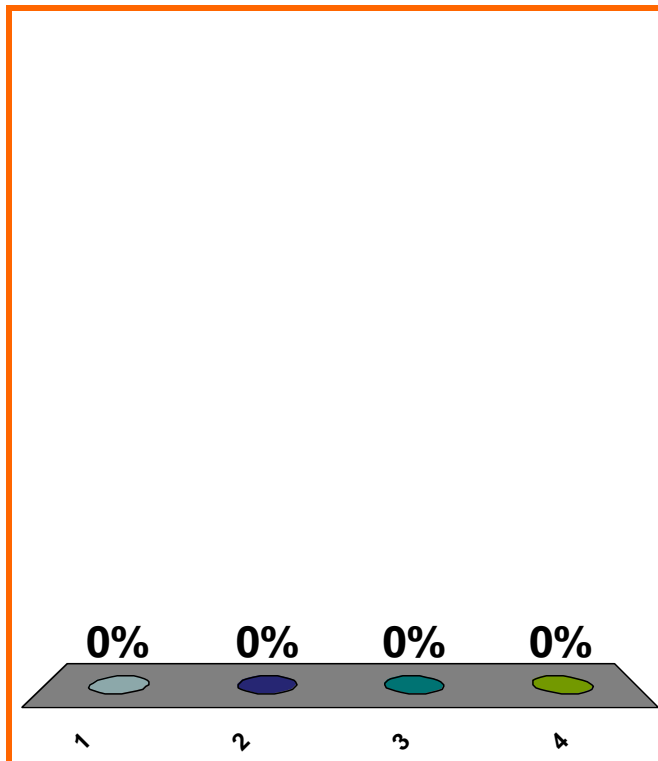
$$\lim_{x \rightarrow -\infty} \left[ \frac{100x^3 + 2x - 1}{x + 1} \right] = ??$$

(a)  $\infty$

(b)  $-\infty$

(c) 100

(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

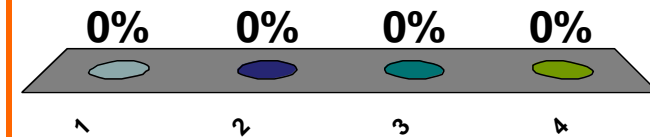
$$\lim_{x \rightarrow \infty} \left[ \frac{100x^3 + 2x - 1}{x + 1} \right] = ??$$

(a)  $\infty$

(b)  $-\infty$

(c) 100

(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 0250

0 pts

27

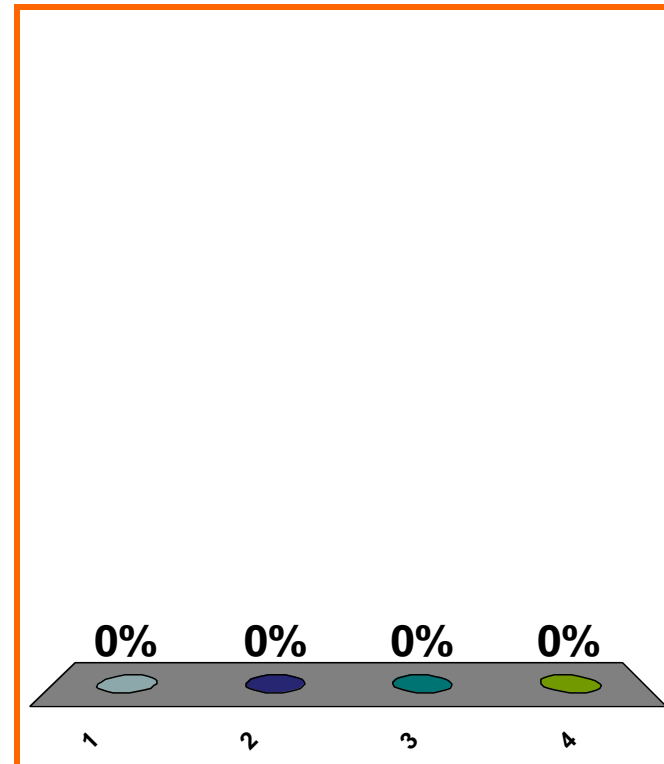
$$\ln(1 + (3/n)) \quad n \rightarrow \infty \quad ??$$

(a)  $1/n^2$

(b) 1

(c)  $3/n$

(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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LOOK AHEAD  
Topic 0420

0 pts

$$\ln(1 + 5x) \quad x \sim 0 \quad ??$$

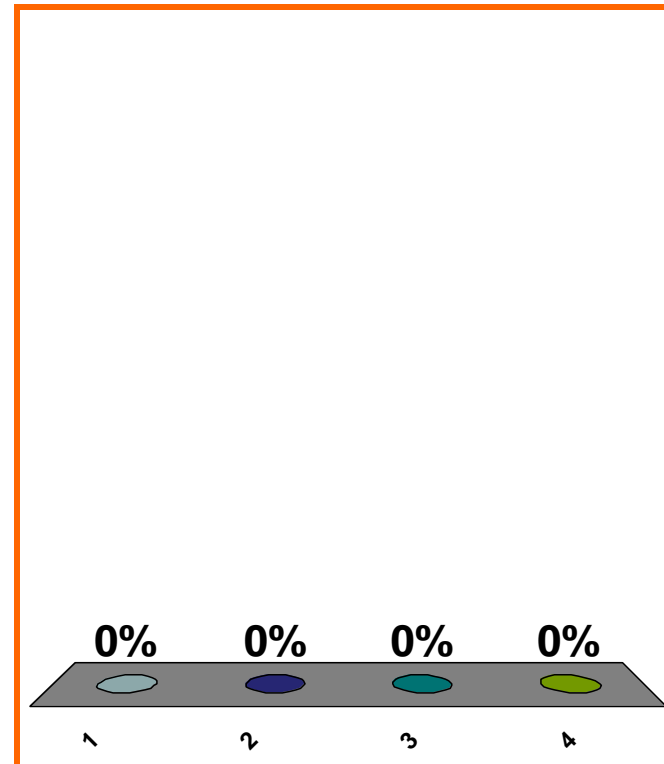
$x \rightarrow 0$

(a)  $4x^2$

(b)  $5x$

(c) 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

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LOOK AHEAD  
Topic 0420

0 pts

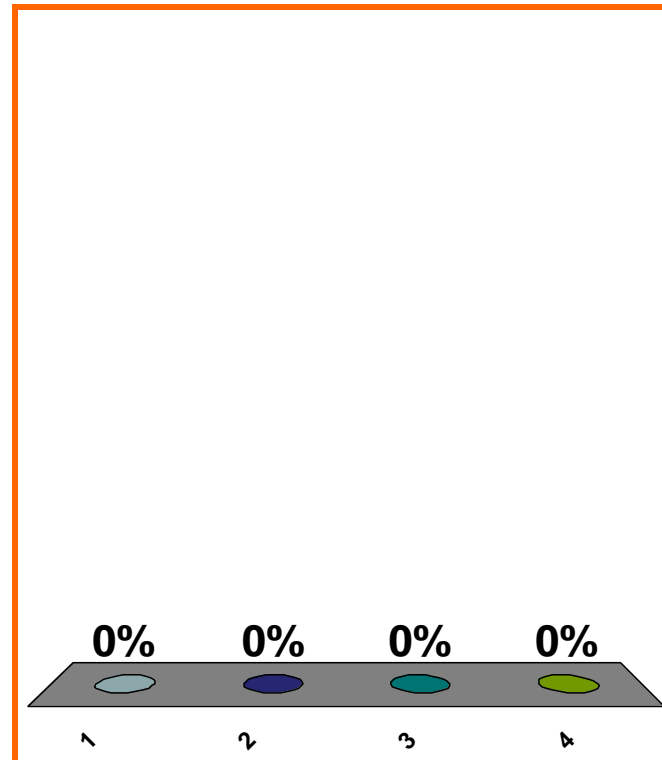
$$\ln(1 + 5x + 4x^2) \quad x \xrightarrow{\sim} 0 \quad ??$$

(a)  $4x^2$

(b)  $5x$

(c) 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

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LOOK AHEAD  
Topic 0420

0 pts

30

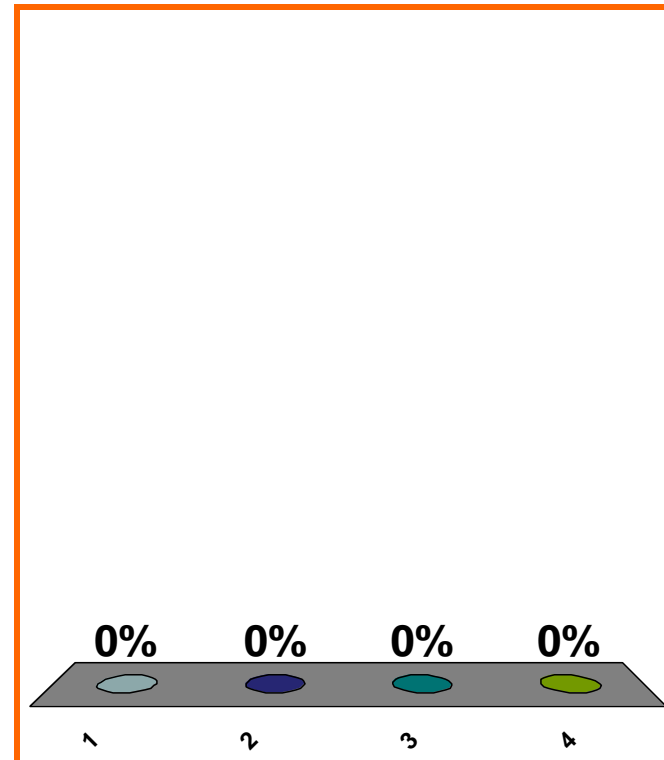
To get graph of  $y + 1 = x^3$ ,  
move graph of  $y = x^3$  ...

(a) right 1

(b) left 1

(c) down 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

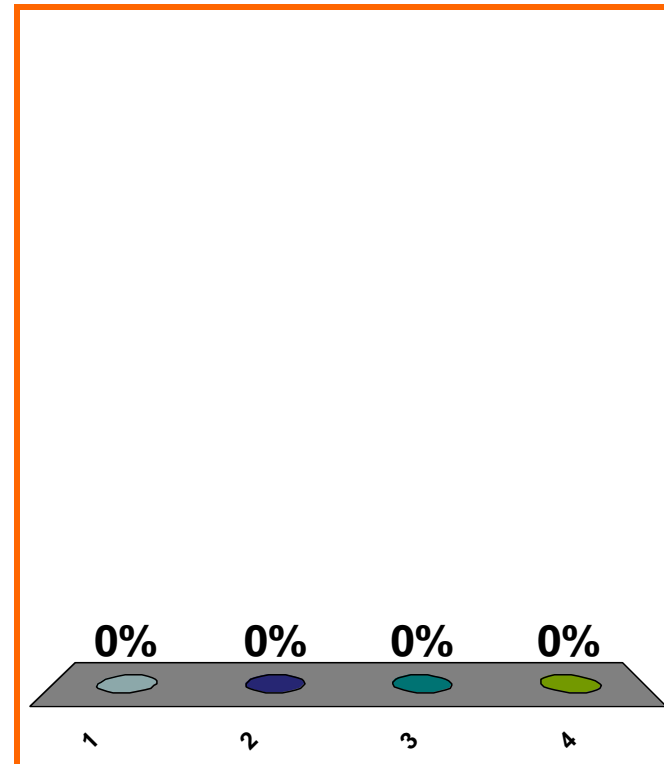
To get graph of  $y^2 = \sin(x + \pi)$ ,  
move graph of  $y^2 = \sin(x)$  ...

(a) right  $\pi$

(b) left  $\pi$

(c) down  $\pi$

(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



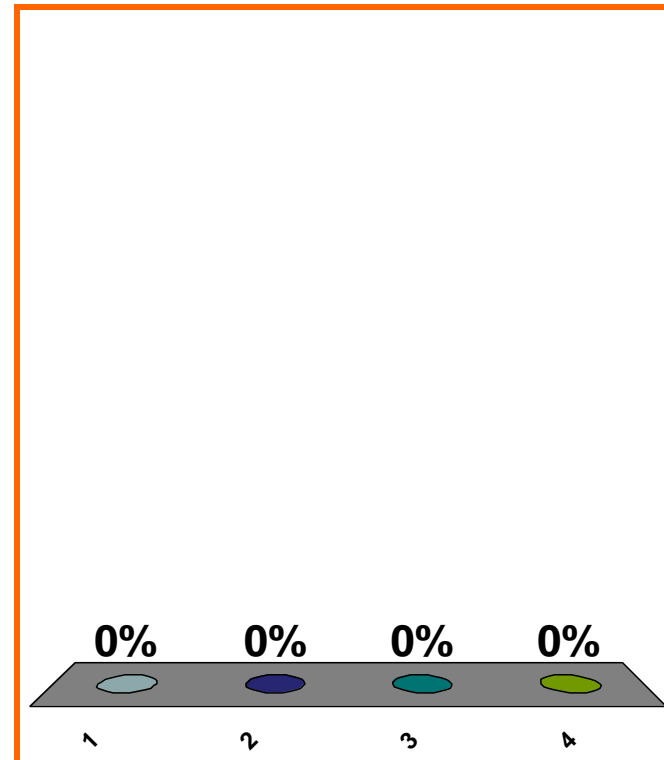
To get graph of  $y^2 = \sin(x - \pi)$ ,  
move graph of  $y^2 = \sin(x)$  ...

(a) right  $\pi$

(b) left  $\pi$

(c) down  $\pi$

(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

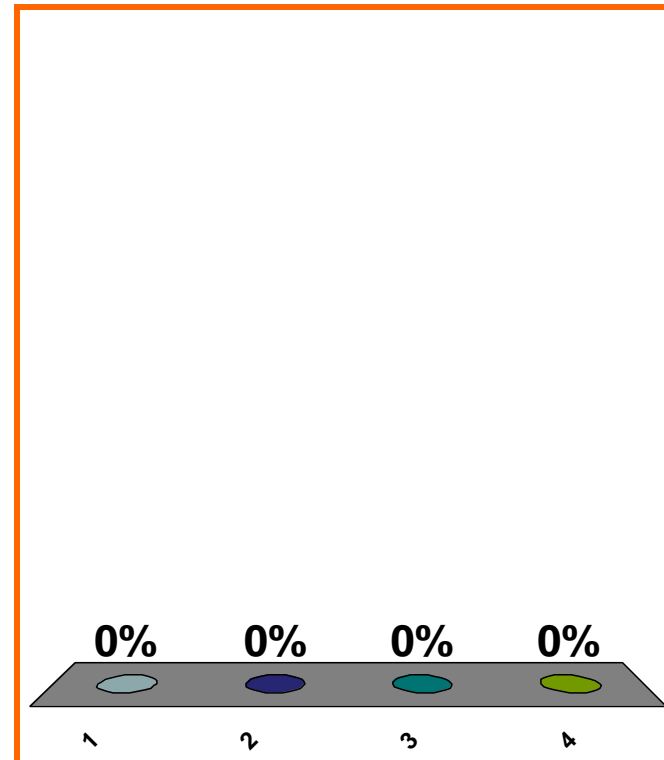
To get graph of  $(y + \pi)^2 = \sin(x)$ ,  
move graph of  $y^2 = \sin(x)$  ...

(a) right  $\pi$

(b) left  $\pi$

(c) down  $\pi$

(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

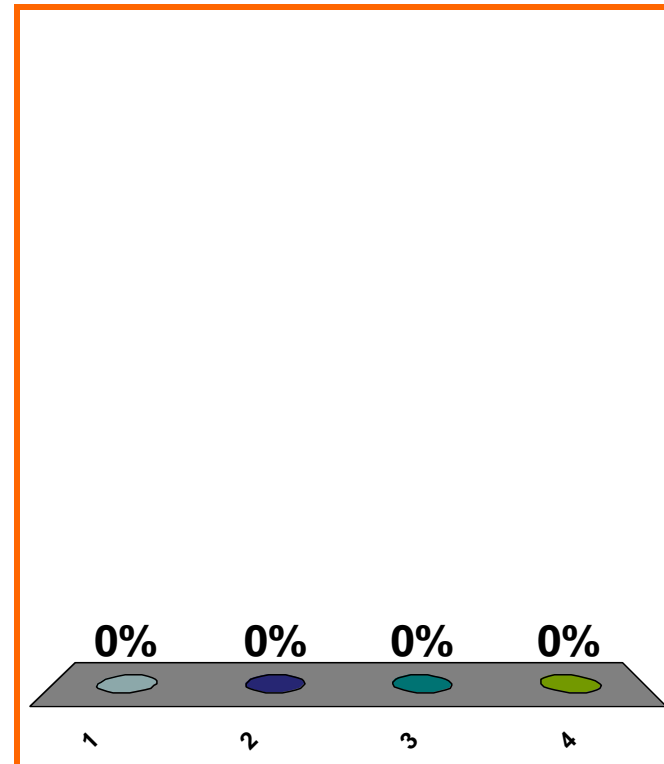
$$\sin(\pi/3) = ??$$

(a)  $\sqrt{2}/2$

(b)  $\sqrt{3}/2$

(c)  $1/2$

(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

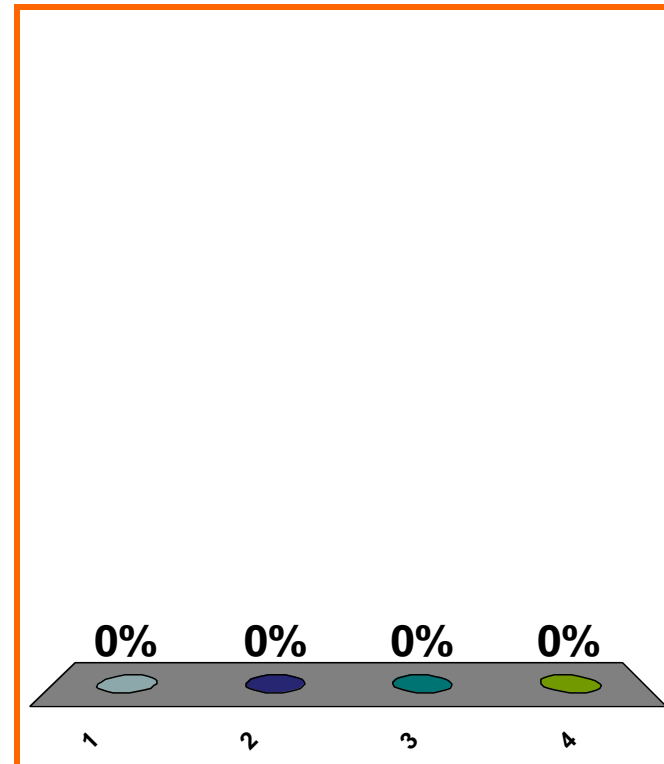
$$\arcsin(\sqrt{3}/2) = ??$$

(a)  $\pi/3$

(b)  $\pi/4$

(c)  $\pi/6$

(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 0110

0 pts

36

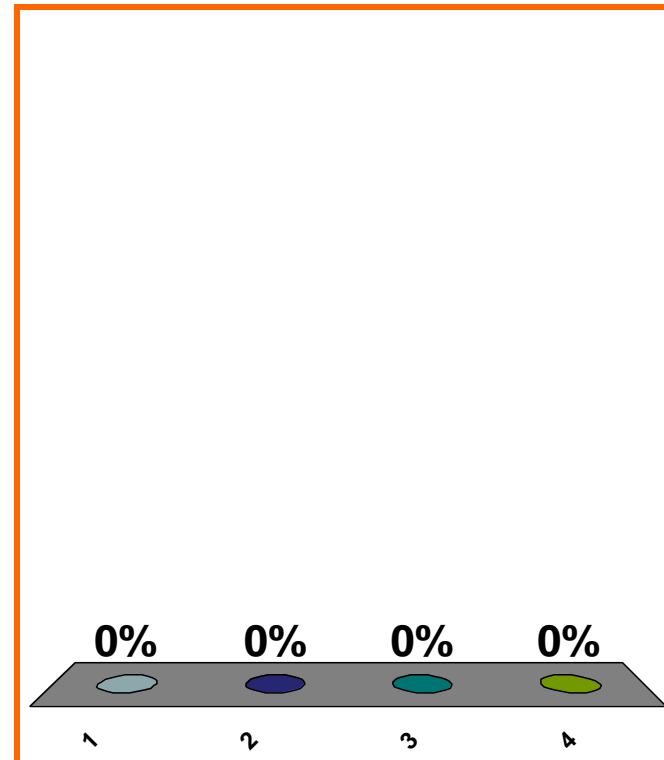
$$\sin(3\pi/4) = ??$$

(a)  $\sqrt{2}/2$

(b)  $-\sqrt{2}/2$

(c)  $1/2$

(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

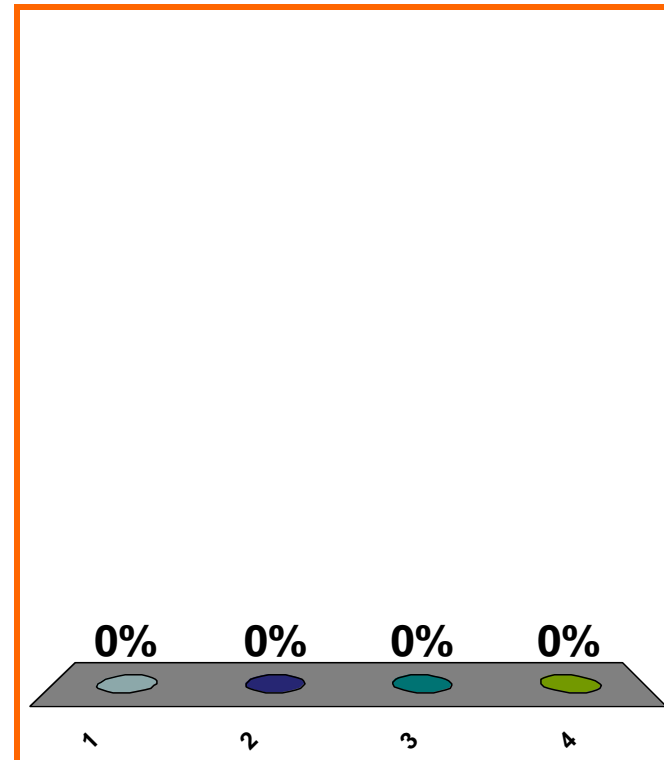
$$\arcsin(\sqrt{2}/2) = ??$$

(a)  $\pi/3$

(b)  $\pi/4$

(c)  $\pi/6$

(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 0110

0 pts

38

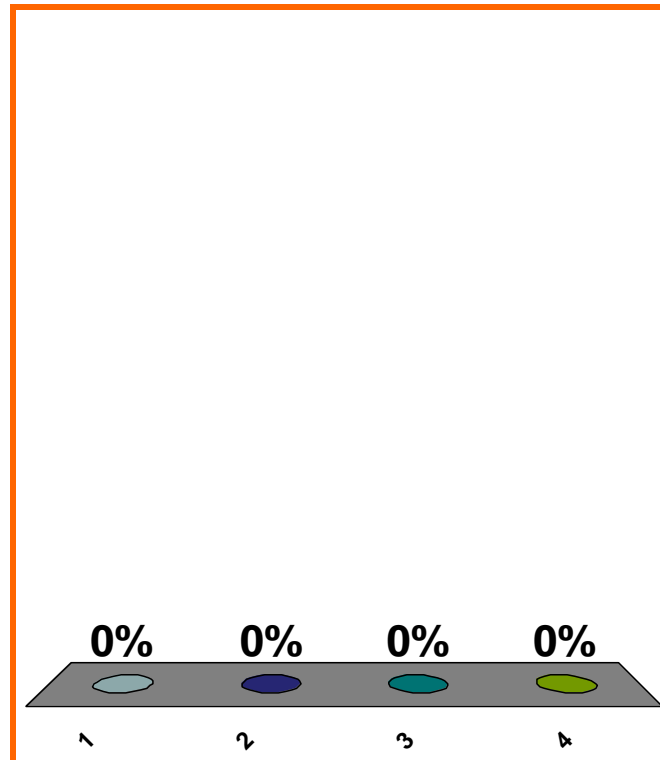
$$\frac{d}{dx} [(x^2)(\sin x)] = ??$$

(a)  $(2x)(\cos x)$

(b)  $(2x)(-\cos x)$

(c)  $(2x)(\sin x) + (x^2)(\cos x)$

(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

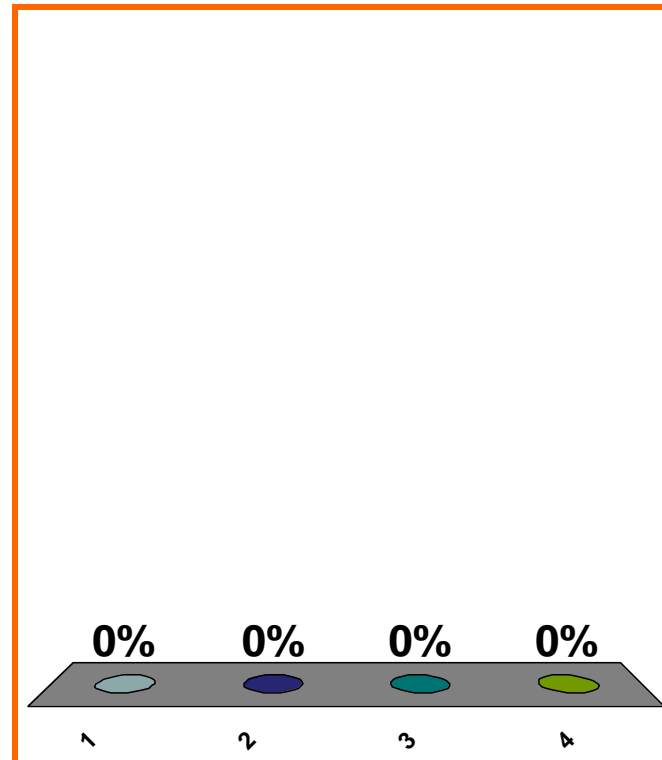
$$\frac{d}{dx} \left[ \frac{\sin x}{x} \right] = ??$$

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

(b)  $\frac{(\sin x)(1) - (x)(\cos x)}{x^2}$

(c)  $\frac{(x)(\cos x) - (\sin x)(1)}{x^2}$

(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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LOOK AHEAD  
Topic 0350

0 pts

40



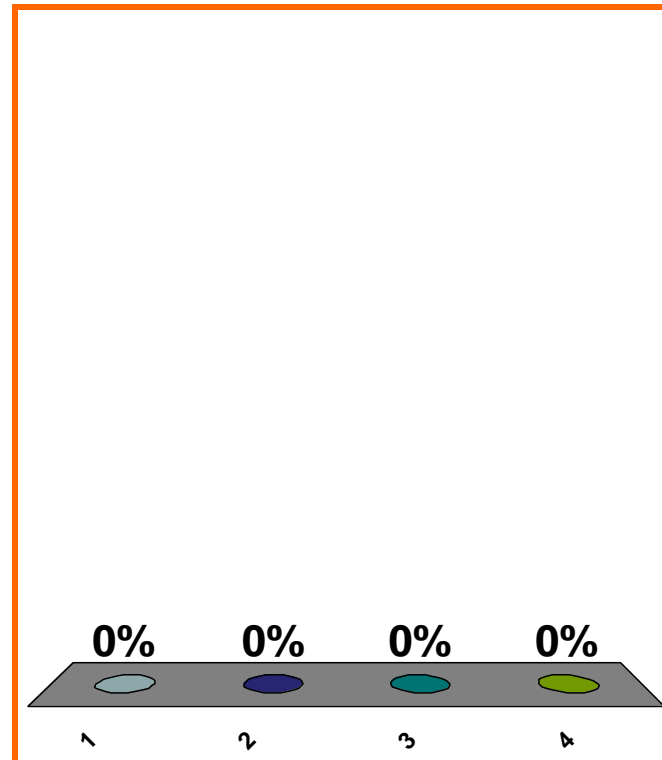
$$\lim_{x \rightarrow 5} (3x^3 - 2x + 8)$$

(a)  $(3)(5^3) - (2)(5) + 8$

(b)  $-\infty$

(c)  $\infty$

(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

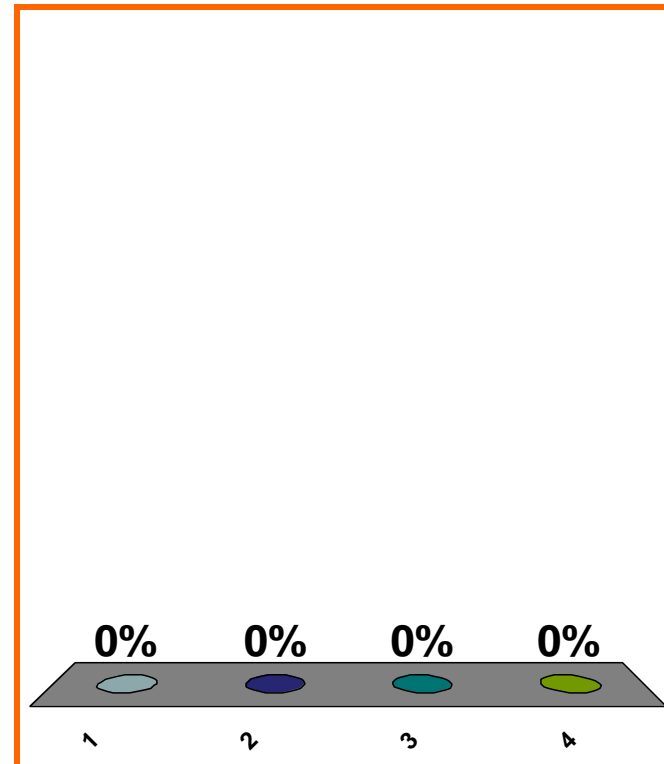
$$\lim_{x \rightarrow 5} \left( \frac{3x^3 - 2x + 8}{x - 4} \right)$$

(a)  $(3)(5^3) - (2)(5) + 8$

(b)  $-\infty$

(c)  $\infty$

(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

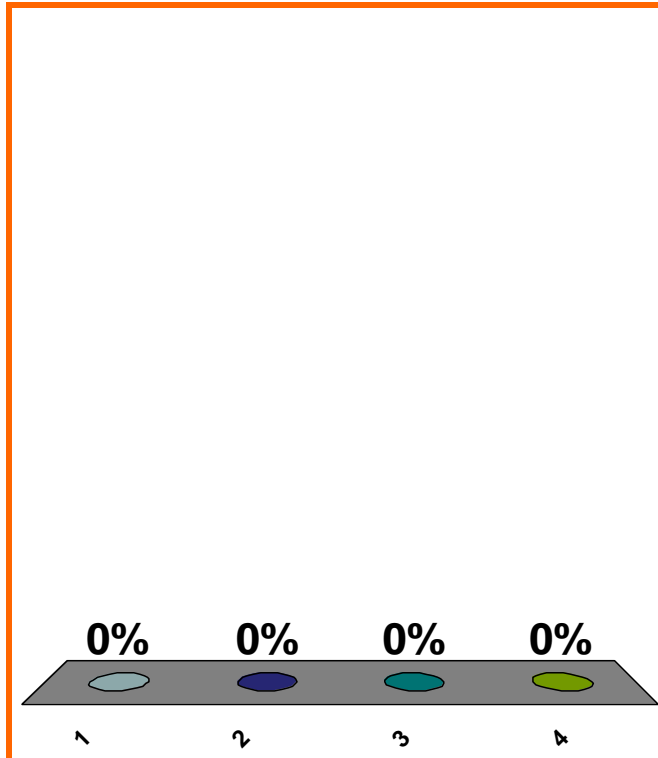
$$\lim_{x \rightarrow 5^+} \left( \frac{3x^3 - 2x + 8}{x - 5} \right)$$

(a)  $(3)(5^3) - (2)(5) + 8$

(b)  $-\infty$

(c)  $\infty$

(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

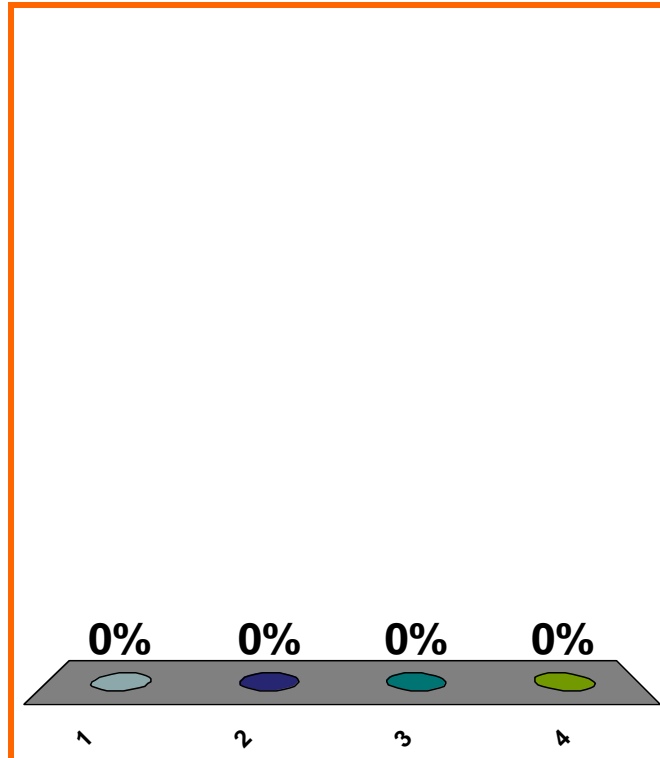
$$\lim_{x \rightarrow 5^-} \left( \frac{3x^3 - 2x + 8}{x - 5} \right)$$

(a)  $(3)(5^3) - (2)(5) + 8$

(b)  $-\infty$

(c)  $\infty$

(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

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LOOK AHEAD  
Topic 0250

0 pts

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$$\lim_{x \rightarrow 5} \left( \frac{3x^3 - 2x + 8}{x - 5} \right)$$

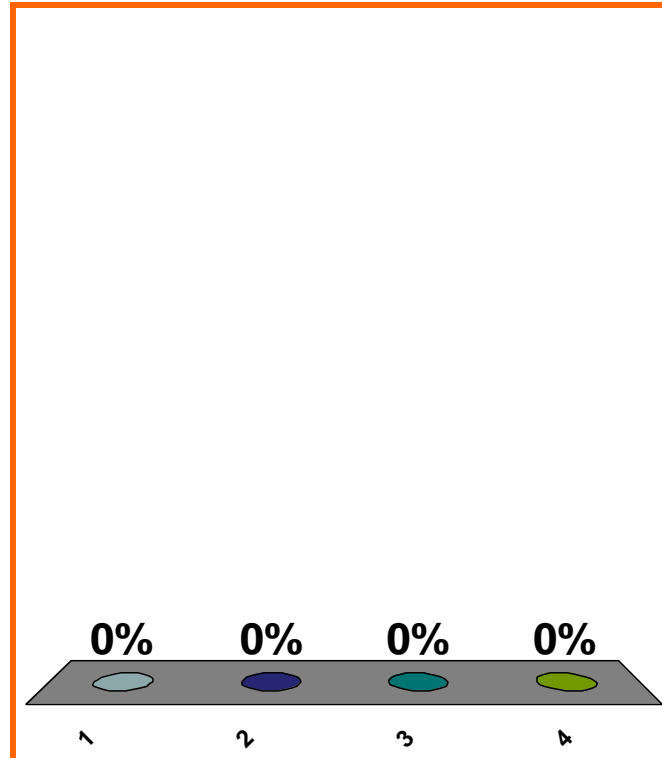
(a)  $(3)(5^3) - (2)(5) + 8$

(b)  $-\infty$

(c)  $\infty$

(d) none of the above

Correct answer: DNE



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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LOOK AHEAD  
Topic 0250

0 pts

45

0170-1. Use the graph of  $f$  given below to find the value of each quantity, if it exists.

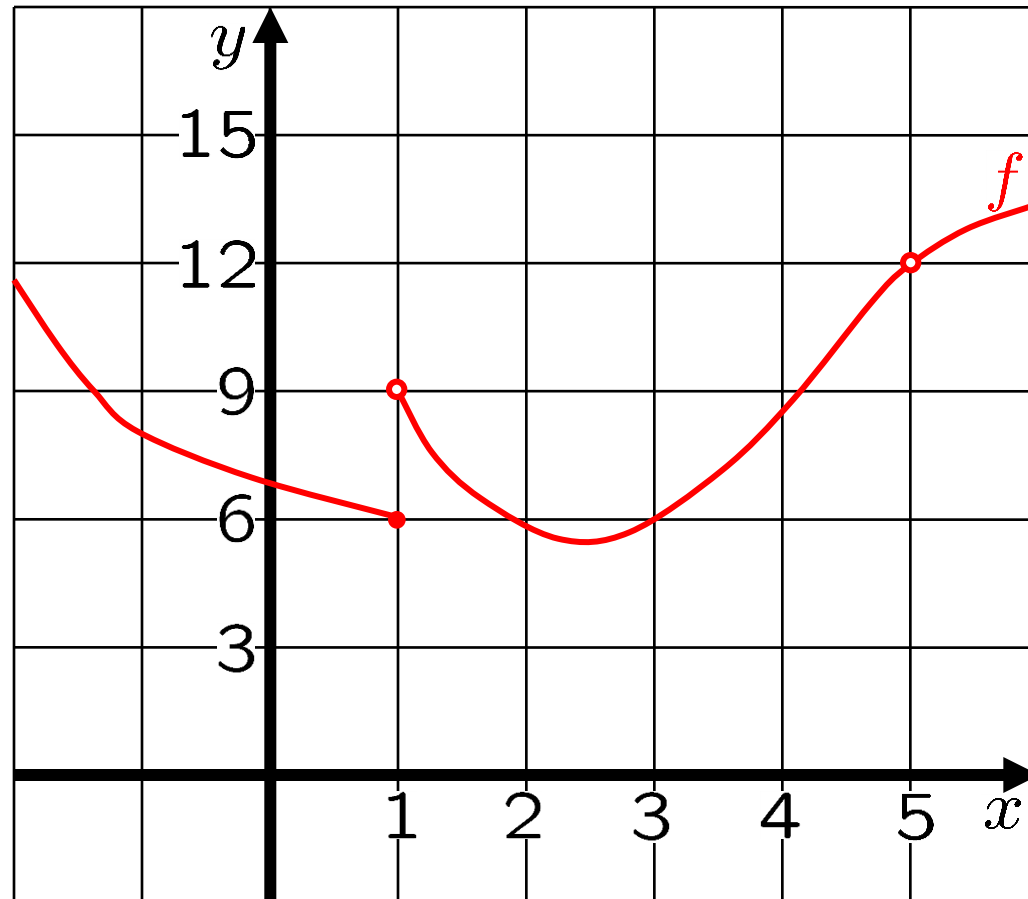
(a)  $\lim_{x \rightarrow 1^-} f(x)$

(b)  $\lim_{x \rightarrow 1^+} f(x)$

(c)  $\lim_{x \rightarrow 1} f(x)$

(d)  $\lim_{x \rightarrow 5} f(x)$

(e)  $f(5)$



0170-2. Use the graph of  $f$  given below to find the value of each quantity, if it exists.

(a)  $\lim_{x \rightarrow 1^-} f(x)$

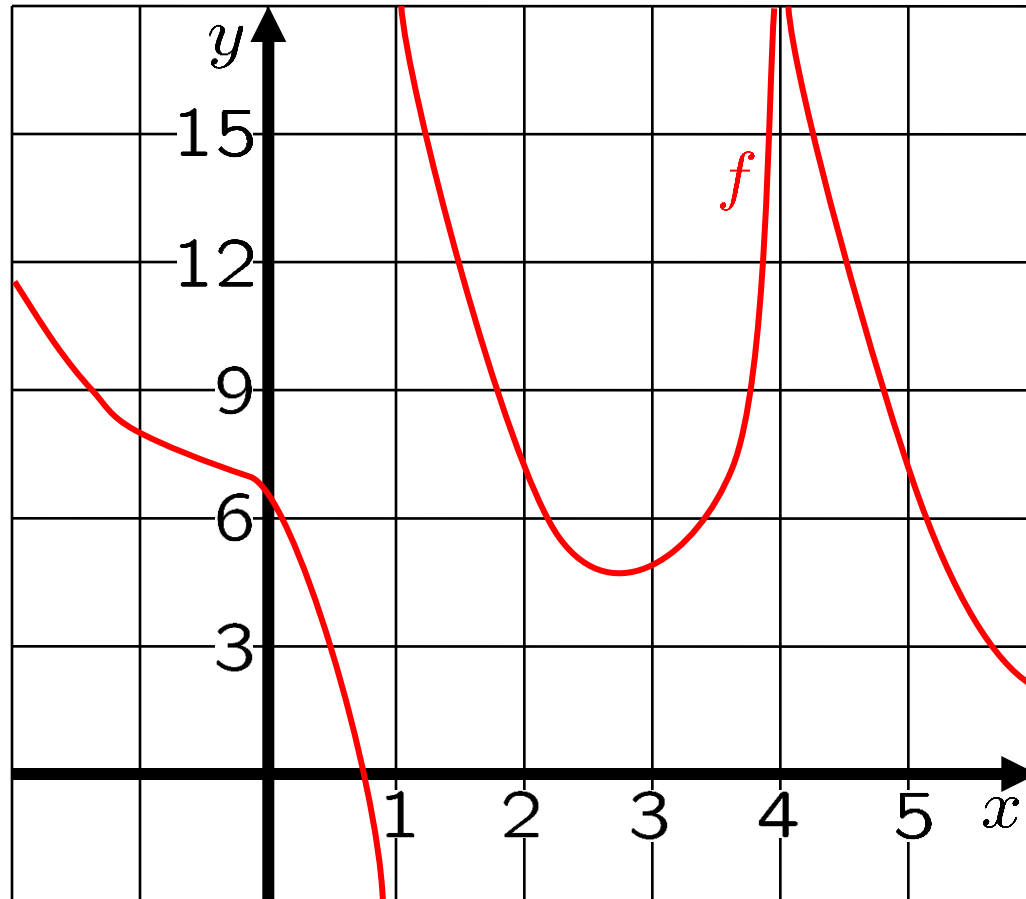
(b)  $\lim_{x \rightarrow 1^+} f(x)$

(c)  $\lim_{x \rightarrow 1} f(x)$

(d)  $\lim_{x \rightarrow 4^-} f(x)$

(e)  $\lim_{x \rightarrow 4^+} f(x)$

(f)  $\lim_{x \rightarrow 4} f(x)$



0170-3. Show a graph of a function  $h$  s.t.

OLD

$$\lim_{x \rightarrow 2^-} h(x) = 7, \quad \lim_{x \rightarrow 2^+} h(x) = 6, \quad h(2) = 5,$$

$$\lim_{x \rightarrow 3} h(x) = -\infty,$$

$$\lim_{x \rightarrow 4^-} h(x) = \infty, \quad \lim_{x \rightarrow 4^+} h(x) = -\infty,$$

$$\lim_{x \rightarrow -\infty} h(x) = -3 \quad \text{and} \quad \lim_{x \rightarrow \infty} h(x) = 1.$$



0170-5.  
OLD

a. Compute  $\lim_{x \rightarrow 1^-} \frac{2x + 3}{x - 1}$ ,

or explain why the limit  
does not exist.

b. Compute  $\lim_{x \rightarrow 1^+} \frac{2x + 3}{x - 1}$ ,

or explain why the limit  
does not exist.

c. Compute  $\lim_{x \rightarrow 1} \frac{2x + 3}{x - 1}$ ,

or explain why the limit  
does not exist.

tangent slopes for  $y = x^3$ , esp. at  $x = 5$ .

$$\lim_{h \rightarrow 0} \frac{(5 + h)^3 - 5^3}{h}$$

$$\lim_{\Delta x \rightarrow 0} \frac{(5 + \Delta x)^3 - 5^3}{\Delta x}$$

## LOOK AHEAD

differentiate polynomials

differentiate all 6 trig functions

$$\lim_{x \rightarrow 0} [\sin(1/x)]$$

$$\lim_{x \rightarrow 0} [x(\sin(1/x))]$$

$$\lim_{x \rightarrow 0} \left[ \frac{2x^3 + x^2}{8x^5 + 3x^4 - 7x^3} \right]$$

$f'(3)$ , when  $f(x) = 1/x$

derivative of ln

product, quotient, chain rules

SAVE THE  
SESSION  
DATA

RETURN TO  
PRESENTATION