Calculus
F 17 February 2012

RESET THE SESSION

SET THE PARTICIPANT LIST

PLUG IN THE RECEIVER

Look at an unused file

Cover the look ahead

Topics covered are in bounds

Boxed answers agree with TurningPoint answers

Points agree with TurningPoint points

Points total to 100

QUIZ
FOLLOWS

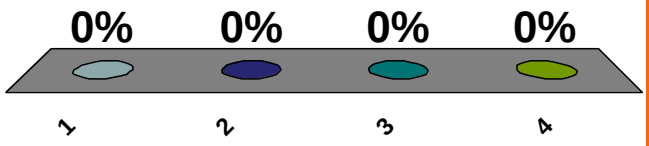
$f(1) = 200$
$f(3) = 800$
avg rate of change?

(a) $(200 - 800)/(1 - 3)$

(b) $(1 - 3)/(200 - 800)$

(c) $(800 - 200)/(1 - 3)$

(d) none of the above



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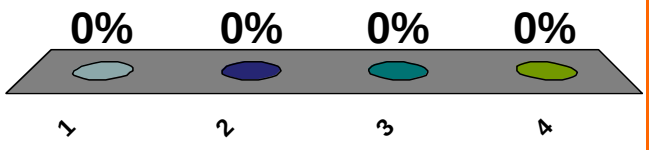
To get graph of $y + 1 = x^3$,
move graph of $y = x^3$ . . .

(a) right 1

(b) left 1

(c) down 1

(d) none of the above



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$$\ln(x+y) = ??$$

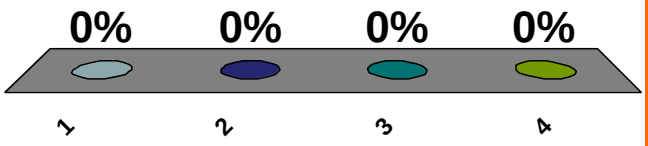
(a) $(\ln x) + (\ln y)$

(b) $(\ln x)(\ln y)$

(c) $(\ln x) - (\ln y)$

(d) none of the above

Correct ans: no simplification



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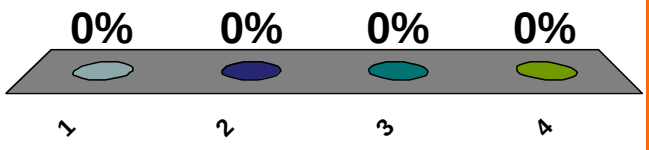
$$\sin(x+y) = ??$$

(a) $(\sin x) + (\sin y)$

(b) $(\cos x)(\cos y) - (\sin x)(\sin y)$

(c) $(\sin x)(\cos y) + (\cos x)(\sin y)$

(d) none of the above



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0 of 5

precalc

0 pts

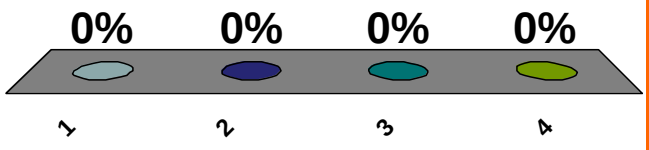
$$a(x+y)-(a+b)x$$

(a) $ay - bx$

(b) $ax + by$

(c) $ay + bx$

(d) none of the above



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precalc

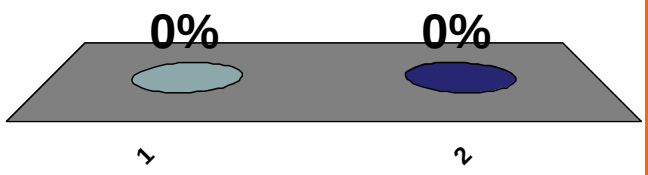
0 pts

T or F:

$$\forall x \in \mathbb{R}, \quad \ln(e^x) = x$$

(a) True

(b) False



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precalc

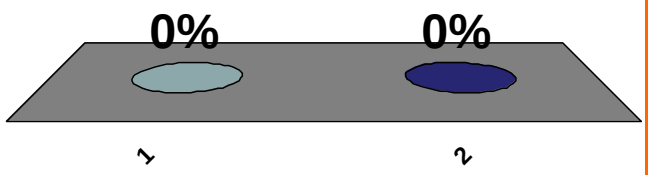
10 pts

T or F:

$$\forall x \in \mathbb{R}, \quad e^{\ln x} = x$$

(a) True

(b) False



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0 of 5

precalc

0 pts

$y = \sin x$

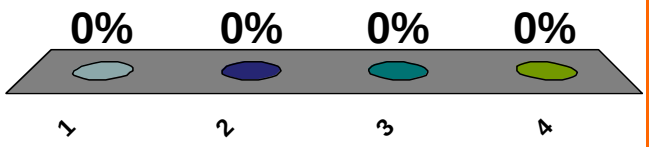
$\triangle y = ??$

(a) $[\sin(x + \triangle x)]$

(b) $[\sin(x + \triangle x)] - [\sin x]$

(c) $\dfrac{[\sin(x + \triangle x)] - [\sin x]}{\triangle x}$

(d) none of the above



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$$y = e^x$$

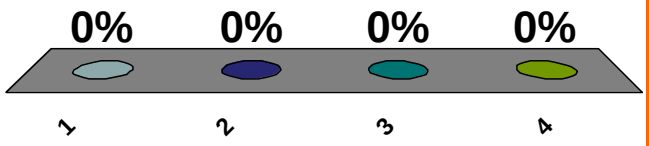
$$\triangle y = ??$$

(a) $e^{x+(\triangle x)} - e^x$

(b) $e^{x+(\triangle x)}$

(c) $\left(e^{x+(\triangle x)} - e^x\right)/(\triangle x)$

(d) none of the above



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$$y = e^s$$

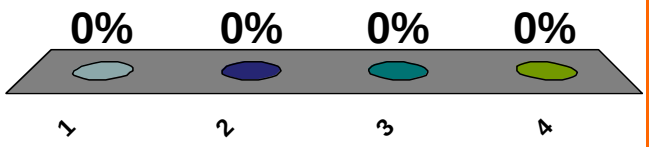
$$\triangle y = ??$$

(a) $e^{s+(\triangle s)} - e^s$

(b) $e^{s+(\triangle s)}$

(c) $\left(e^{s+(\triangle s)} - e^s\right)/(\triangle s)$

(d) none of the above



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$$z = e^t + 4t^3$$

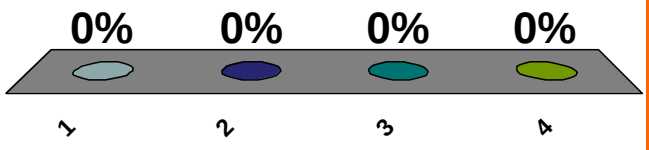
$$\triangle z = ??$$

(a) $\left[e^{t+(\triangle t)} + 4(t + (\triangle t))^3\right] + \left[e^t + 4t^3\right]$

(b) $\left[e^{t+(\triangle t)} + 4(t + (\triangle t))^3\right] - \left[e^t + 4t^3\right]$

(c) $\left[e^{t+(\triangle t)} - 4(t + (\triangle t))^3\right] + \left[e^t - 4t^3\right]$

(d) none of the above



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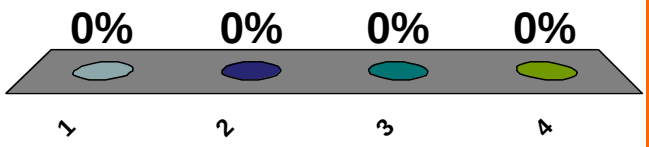
$$\lim_{x \to -\infty} \left[\frac{100x^3 + 2x - 1}{x^2 + 1} \right] = ??$$

(a) ∞

(b) $-\infty$

(c) 100

(d) none of the above



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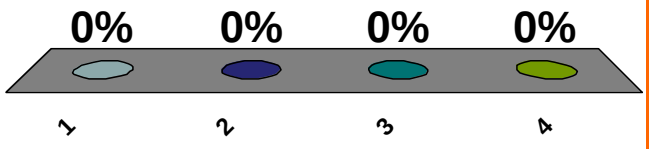
$$\lim_{x \to -\infty} \left[\frac{6x^9 + 7x^4 - 8x^3}{7x^5 - 2x^4 + 9x^3} \right] = ??$$

(a) 0

(b) ∞

(c) $-\infty$

(d) none of the above



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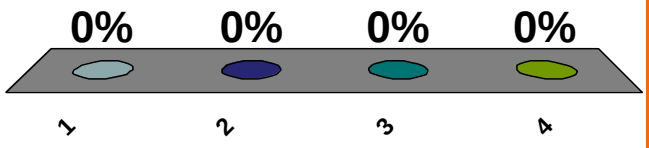
$$\lim_{x \to 5+} \left(\frac{3x^3 - 2x + 8}{x - 5} \right)$$

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

(b) $-\infty$

(c) ∞

(d) none of the above



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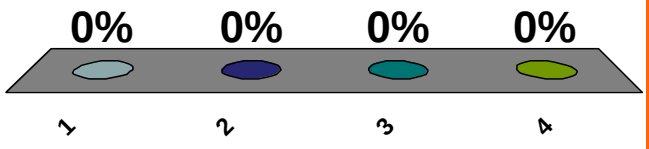
$$\lim_{x \to 5^-} \left(\frac{3x^3 - 2x + 8}{x - 5} \right)$$

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

(b) $-\infty$

(c) ∞

(d) none of the above



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0 of 5

Topic 0250

0 pts

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

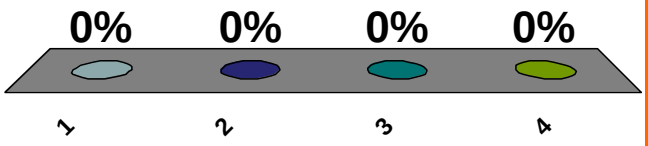
(a) $(3)(5^3) - (2)(5) + 8$

(b) $-\infty$

(c) ∞

(d) none of the above

Correct answer: DNE



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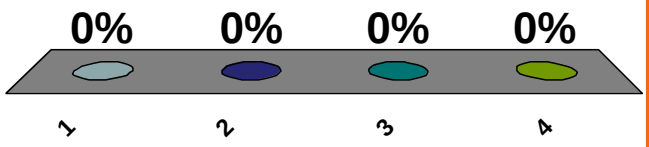
$$\lim_{t \to 0^+} \left[\frac{\sqrt{4t^6 + 9t^4}}{t(\sin t)} \right] = ??$$

(a) DNE

(b) ∞

(c) 3

(d) none of the above



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$$x - \sin x \underset{x \to 0}{\sim} x^3/6$$

$$\lim_{x \to 0} \left[\frac{x^3 + x^4}{x - \sin x} \right] = ??$$

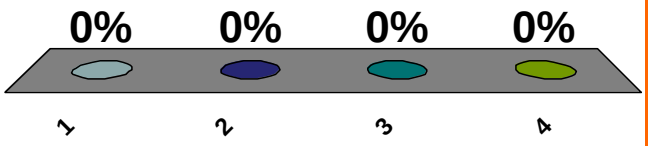
(a) DNE

(b) $-1/6$

(c) $1/6$

(d) none of the above

Correct answer: 6



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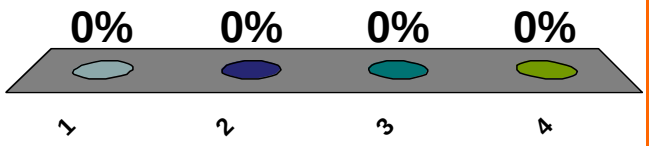
$$\lim_{x \to -\infty} \left[\frac{\sqrt{x^2+1}}{3x} \right] = ??$$

(a) $-1/3$

(b) $1/3$

(c) DNE

(d) none of the above



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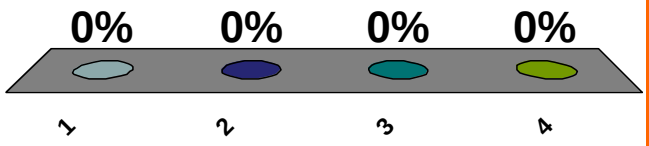
(a) $x \approx 2 \quad \Rightarrow \quad f(x)$ very neg

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

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

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

(d) none of the above



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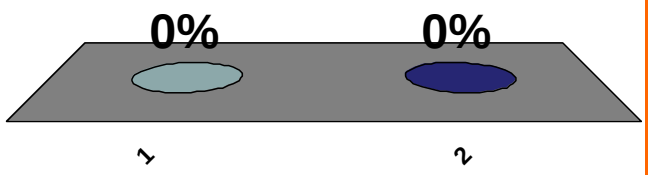
T or F:

f incr. on $(2,3)$

$\Rightarrow$ $f' > 0$ on $(2,3)$

(a) True

(b) False



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$f(x) = x^6/6, \quad f'(x) = x^5$

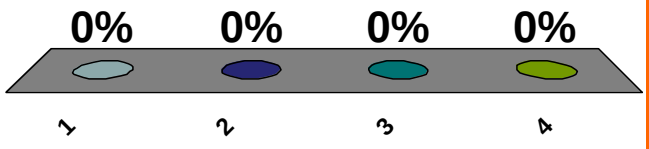
slope of tan. line at $(2\ ,\ 2^6/6)$

(a) $2^6/6$

(b) $(2^6/6)^5$

(c) 2^5

(d) none of the above



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$$\frac{d}{dx}\left[7^{1/2}\right] = ??$$

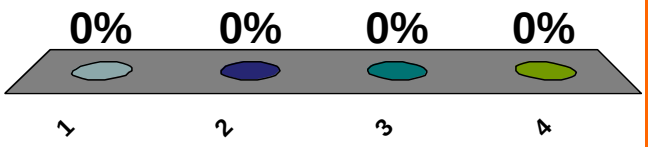
(a) DNE

(b) $[1/2]\left[7^{-1/2}\right]$

(c) $7^{1/2}(\ln 7)$

(d) none of the above

Correct answer: 0



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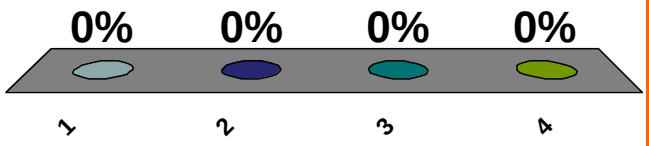
$$\frac{d}{dx}\left[x^{1/2}\right] = ??$$

(a) DNE

(b) [1/2] $\left[x^{-1/2}\right]$

(c) $x^{1/2}(\ln x)$

(d) none of the above



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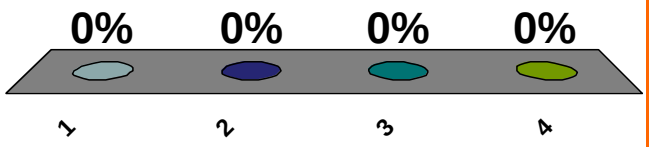
$$\frac{d}{dx}\left[(x^2)(\sin x)\right] = ??$$

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

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

(c) $(2x)(\cos x)$

(d) none of the above



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0 of 5

Topic 0360

10 pts

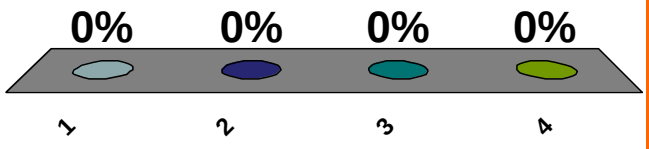
$$\frac{d}{dx}\left[\frac{\sin x}{x}\right] = ??$$

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

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

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

(d) none of the above



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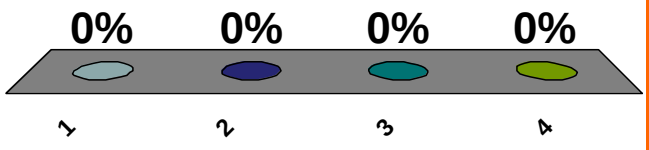
$$\frac{d}{dx}\left[3\sin x + 4\cos x\right] = \text{??}$$

(a) $(0)(\cos x) + (0)(-\sin x)$

(b) $3\cos x + 4\sin x$

(c) $3\cos x - 4\sin x$

(d) none of the above



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$$\frac{d}{dx}\left[x \sin x + 4 \cos x\right] = \text{??}$$

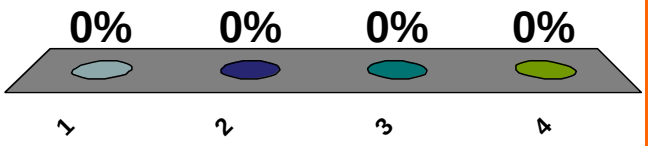
(a) $(1)(\cos x) + (0)(-\sin x)$

(b) $x \cos x + 4 \sin x$

(c) $x \cos x - 4 \sin x$

(d) none of the above

Correct: $\sin x + x \cos x - 4 \sin x$



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LOOK AHEAD

principle of logarithmic differentiation

$(d/dx)(2^x)$, $(d/dx)(x^{\cos x})$

$(d/dx)(\sqrt[3]{x})$, $(d/dx)(\log_2(x))$

derivs of arcsin, arccos

derivs of arctan, arccot

antideriv of x^3 w.r.t. x

(indef) integral of x^3 w.r.t. x

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

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

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

$x^2/x = x$?

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

position $= 2t^3 + 5t^2$

velocity at $t = 3$?

LOOK AHEAD

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

logarithmic derivatives

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

$(d/dx)(x^2)$ from the def'n $\lim_{\triangle x \to 0} \frac{\triangle y}{\triangle x}$

intervals of increase/decrease

intervals of concave up/concave down

graph derivative from graph of function

- asymptotics: polynomial
- asymptotics: $\sin x$, $\ln(1 + \cdots)$
- asymptotics: $+$, $-$, $\times$, $\div$, $(\bullet)^n$

LOOK AHEAD

- (d/dt)(expr of u), *etc.*
- logarithmic derivatives
- $(d/dt)(10^t)$
- $(d/dt)(\log_{10}(t))$

summary: power rule, trig diff, $\ln'$, $\exp'$

summary: prod rule, quot rule, chain rule

LOOK AHEAD

$$\sin h \underset{h \to 0}{\simeq} h$$

$$\cos h \underset{h \to 0}{\simeq} 1$$

$$(\cos h) - 1 \underset{h \to 0}{\simeq} -h^2/2$$

$(d/dx)(\sin x)$ from the def'n

(d/dt)(expr of u), *etc.*
logarithmic derivatives
$(d/dt)(10^t)$
$(d/dt)(\log_{10}(t))$

summary: power rule, trig diff, ln′, exp′
summary: prod rule, quot rule, chain rule

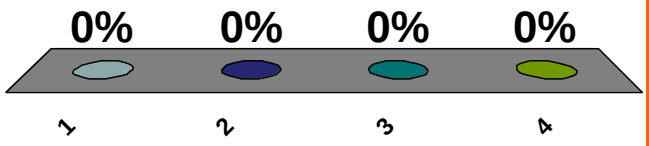
$f(1) = 200$
$f(3) = 800$
avg rate of change?

(a) $(800 - 200)/(3 - 1)$

(b) $(3 - 1)/(800 - 200)$

(c) $(200 - 800)/(3 - 1)$

(d) none of the above



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0 of 5

Topic 0270

0 pts

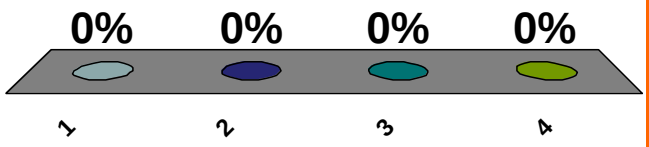
To get graph of $y^2 = \sin(x + \pi)$,
move graph of $y^2 = \sin(x)$ . . .

(a) right π

(b) left π

(c) down π

(d) none of the above



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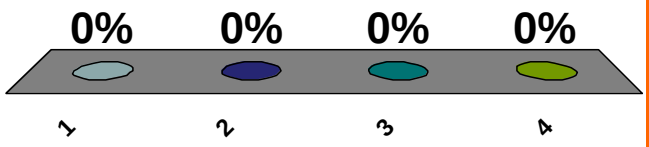
To get graph of $y^2 = \sin(x - \pi)$,
move graph of $y^2 = \sin(x)$ . . .

(a) right π

(b) left π

(c) down π

(d) none of the above



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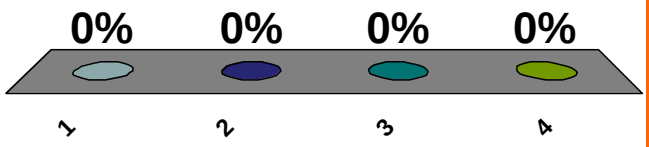
To get graph of $(y+\pi)^2 = \sin(x)$, move graph of $y^2 = \sin(x)$ . . .

(a) right π

(b) left π

(c) down π

(d) none of the above



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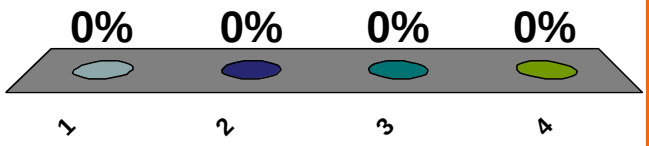
$\sin(\pi/3) = ??$

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

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

(c) $1/2$

(d) none of the above



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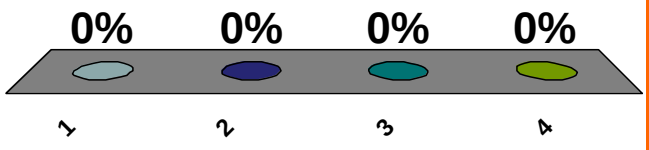
$\arcsin(\sqrt{3}/2) = ??$

(a) $\pi/3$

(b) $\pi/4$

(c) $\pi/6$

(d) none of the above



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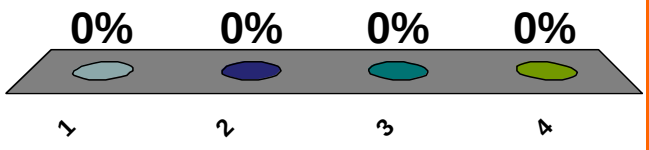
$\sin(3\pi/4) = ??$

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

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

(c) $1/2$

(d) none of the above



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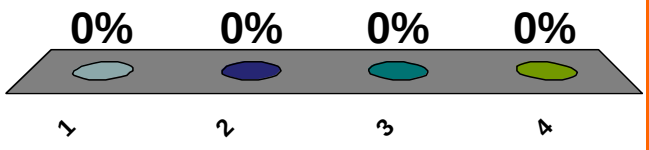
$\arcsin(\sqrt{2}/2) = ??$

(a) $\pi/3$

(b) $\pi/4$

(c) $\pi/6$

(d) none of the above



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OLD

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

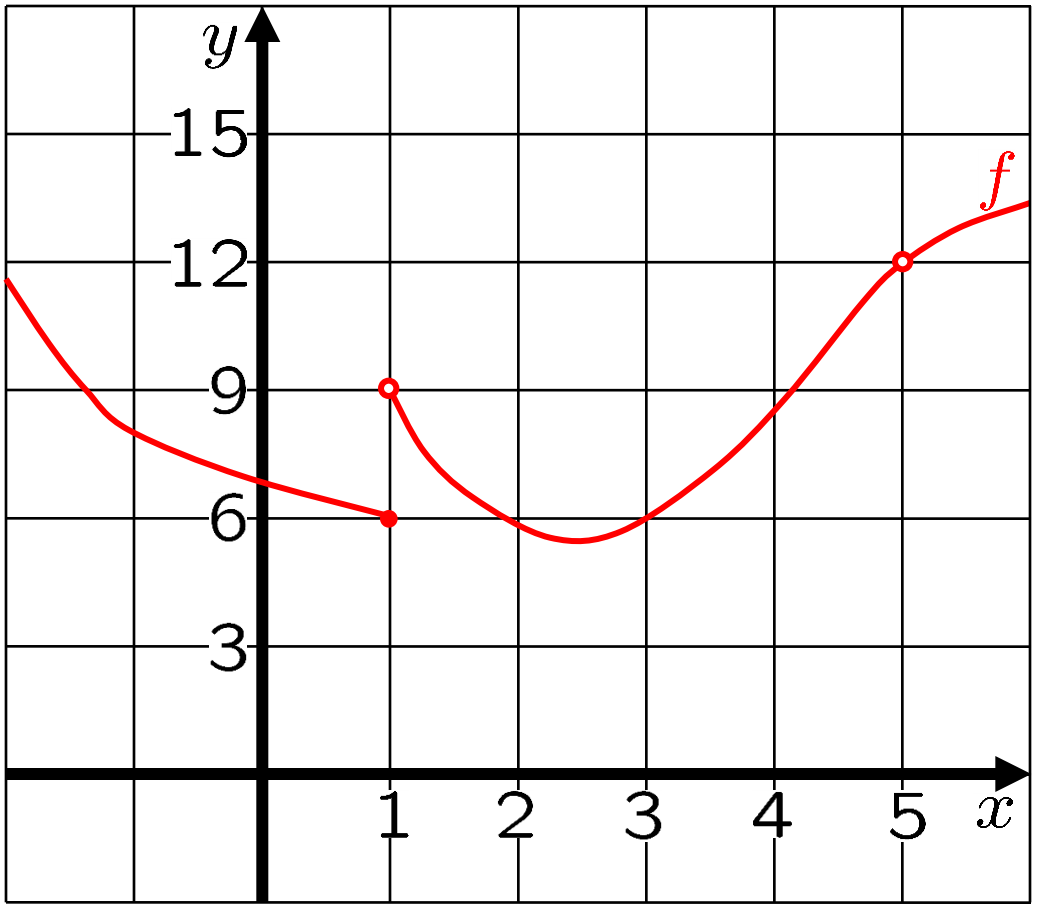
(a) $\lim_{x \to 1^-} f(x)$

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

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

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

(e) $f(5)$



OLD

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

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

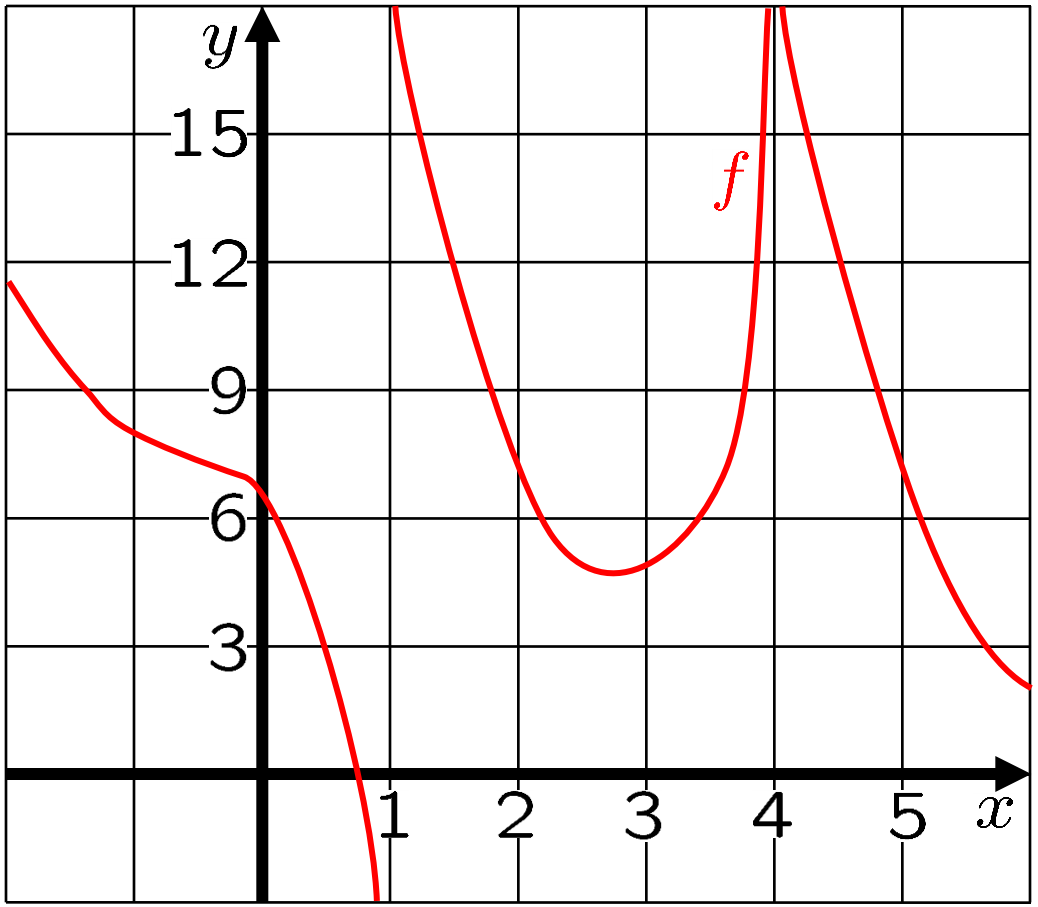
(b) $\lim_{x \to 1^+} f(x)$

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

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

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

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



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

OLD

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

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

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

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

0170-5. a. Compute $\lim_{x \to 1^-} \dfrac{2x+3}{x-1}$,

OLD

or explain why the limit does not exist.

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

or explain why the limit does not exist.

c. Compute $\lim_{x \to 1} \dfrac{2x+3}{x-1}$,

or explain why the limit does not exist.

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

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

$$\lim_{\triangle x \to 0} \frac{(5+\triangle x)^3 - 5^3}{\triangle x}$$

LOOK AHEAD

differentiate polynomials

differentiate all 6 trig functions

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

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

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

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

derivative of ln

product, quotient, chain rules

SAVE THE SESSION DATA

RETURN TO PRESENTATION