Calculus
W 4 April 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

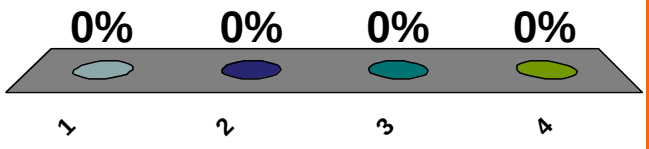
nth rt endpt Riem. sum for $\int_1^2 e^x\,dx$

(a) $\sum_{j=1}^{n} \left[\frac{1}{n}\right] \left[e^{1+(j/n)}\right]$

(b) $\sum_{j=1}^{n} \left[\frac{1}{n}\right] \left[e^{1+(j/n)-(1/n)}\right]$

(c) $\sum_{j=1}^{n} \left[\frac{1}{n}\right] \left[e^{1+(j/n)-(1/(2n))}\right]$

(d) none of the above



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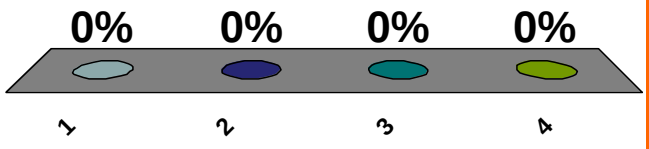

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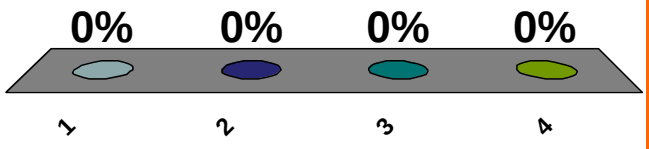

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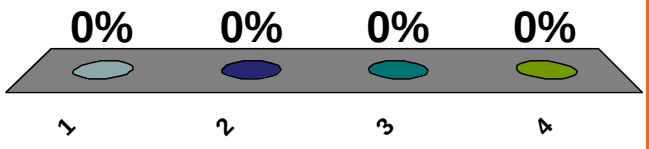
(a) $\sum_{j=1}^{n} \left[\frac{4}{n}\right] \left[(2+(4j/n))^5\right]$

nth left endpt Riem. sum for $\int_2^6 x^5\,dx$

(b) $\sum_{j=1}^{n} \left[\frac{4}{n}\right] \left[(2+(4j/n)-(4/n))^5\right]$

(c) $\sum_{j=1}^{n} \left[\frac{4}{n}\right] \left[(2+(4j/n)-(4/(2n)))^5\right]$

(d) none of the above



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(a) $\displaystyle\sum_{j=0}^{n-1} \left[\frac{4}{n}\right] \left[(2+(4j/n))^5\right]$

nth left endpt Riem. sum for $\displaystyle\int_2^6 x^5\,dx$

(b) $\displaystyle\sum_{j=0}^{n-1} \left[\frac{4}{n}\right] \left[(2+(4j/n)-(4/n))^5\right]$

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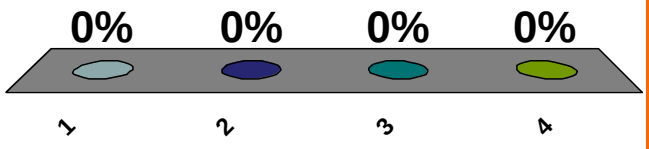
(d) none of the above



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tangent line to $y = f(x)$ at $(2, 7)$

$$y - 7 = 8(x - 2)$$

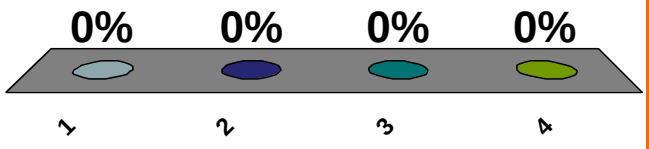
"linearization" of $f(x)$ at $x = 2$?

(a) 8

(b) $8(x - 2)$

(c) $7 + 8(x - 2)$

(d) none of the above



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$f(5) = -2, \quad f'(5) = 23$

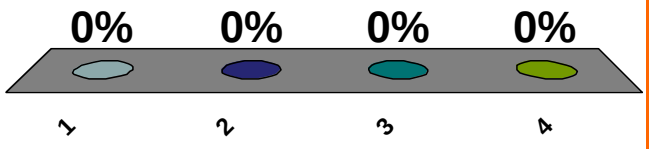
Linear approx. to $f(x)$ at $x = 5$?

(a) $23 - 2(x - 5)$

(b) $5x^2 + 23x - 2$

(c) $-2 + 23(x - 5)$

(d) none of the above



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Newton's method for solving $e^{5x} + x^2 = 7$:

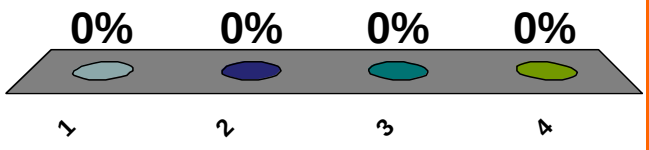
$x_{n+1} = ??$

(a) $x_n - \dfrac{e^{5x_n} + x_n^2}{e^{5x_n} + 2x_n}$

(b) $x_n - \dfrac{e^{5x_n} + x_n^2 - 7}{5e^{5x_n} + 2x_n}$

(c) $x_n - \dfrac{e^{5x_n} + x_n^2 - 7}{e^{5x_n} + 2x_n}$

(d) none of the above



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$$(d/dx)(\arctan x) = \frac{1}{1+x^2}$$

$$(d/dx)(\arctan e^x) = \text{??}$$

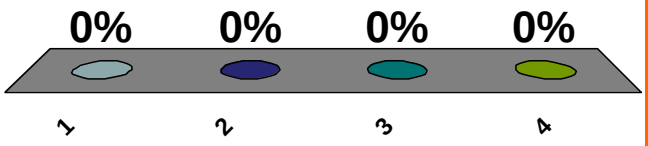
(a) $\dfrac{1}{1+(e^x)^2}$

(b) $(\operatorname{arcsec}^2 e^x)(e^x)$

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

(d) none of the above

Correct answer: $\dfrac{e^x}{1+(e^x)^2}$



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$$f(g(x)) = x$$
$$[f'(g(x))][g'(x)] = 1$$
$$[f'(g(7))][g'(7)] = 1$$

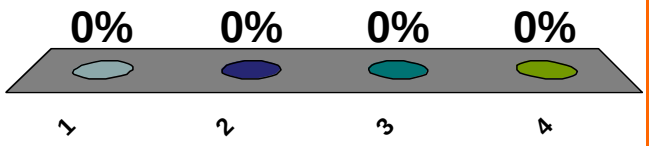
$$g = f^{-1}$$
$$f(4) = 7,\ g(7) = 4$$
$$f'(4) = 2,\ g'(7) = ??$$

(a) 1/2

(b) 4

(c) 0

(d) none of the above



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$\int_3^4 x^2\,dx$ via limit of Riemann sums,

then via Fund. Th'm of Calculus.

$$\lim_{n\to\infty}\sum_{j=1}^{n}\frac{1}{n}\left(3+\frac{j}{n}\right)^2=\lim_{n\to\infty}\sum_{j=1}^{n}\frac{1}{n}\left(9+\frac{6j}{n}+\frac{j^2}{n^2}\right)$$

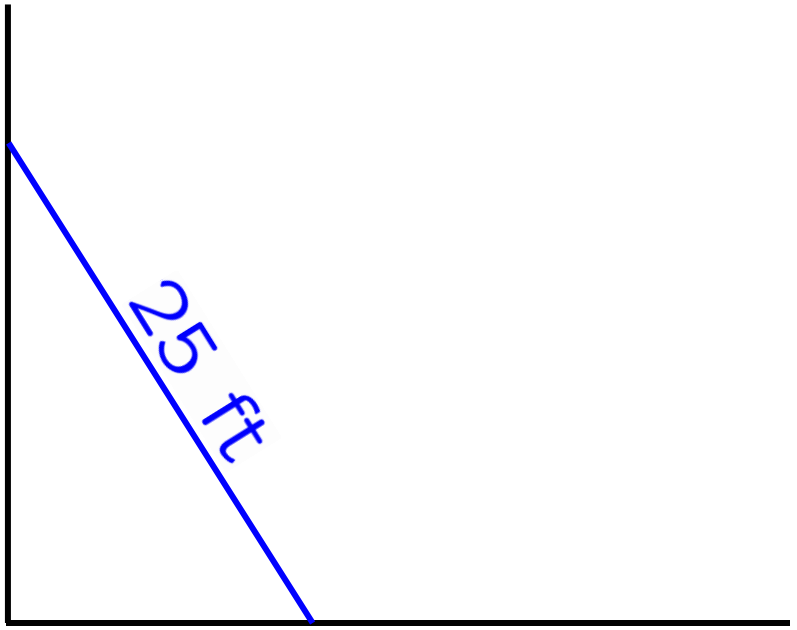
$$=\lim_{n\to\infty}\frac{1}{n}\left(9n+\frac{6}{n}\left[\frac{n(n+1)}{2}\right]+\frac{1}{n^2}\left[\frac{n(n+1)(2n+1)}{6}\right]\right)$$

$$=\lim_{n\to\infty}\left(9+\frac{6n(n+1)}{2n^2}+\frac{n(n+1)(2n+1)}{6n^3}\right)$$

$$=9+\frac{6}{2}+\frac{2}{6}\ =\frac{37}{3}\ =\frac{64-27}{3}\ =\frac{4^3-3^3}{3}\ =\left[\frac{x^3}{3}\right]_{x:\to 3}^{x:\to 4}$$

LOOK BACK (RELATED RATES)

A 25 ft ladder is leaning against a vertical wall. The floor is slightly slippery and the foot of the ladder slips away from the wall at a rate of 0.2 in/sec. How fast is the top of the ladder sliding down the wall when the top is 20 ft above the floor?



$$e^{\ln x} = x \quad ?$$
$$\ln e^{x} = x \quad ?$$
$$x^2/x = x \quad ?$$
$$x/x^2 = 1/x \quad ?$$

SAVE THE SESSION DATA

RETURN TO PRESENTATION