

Wednesday, January 14

# Clicker Questions

## Clicker Question 1

### A definite integral

Evaluate  $\int_1^{e^2} \frac{1}{t} dt$ .

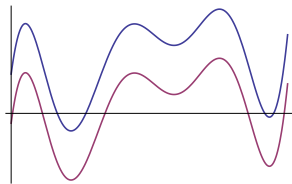
- A. 2, since  $\int_1^{e^2} \frac{1}{t} dt = \ln x \Big|_1^{e^2} = \ln(e^2) - \ln(1) = 2 - 0$
- B.  $1 - \frac{1}{e^4}$
- C.  $\frac{1}{e^2} - 1$
- D.  $\ln(e^2) - 1$
- E. none of the above

## Clicker Question 2

### Recalling properties of derivatives

Suppose that  $f(x)$  and  $g(x)$  are differentiable functions, and  $f'(x) = g'(x)$  for all  $x$ . What is the relationship between  $f$  and  $g$ ?

- A.  $f(x)$  is  $g(x)$  times a constant
- B.  $f(x)$  is  $g(x)$  plus a constant
- C.  $f(x)$  and  $g(x)$  add to 0
- D.  $f(x)$  and  $g(x)$  are the same function
- E. no relationship, totally random



## Clicker Question 3

### An indefinite integral

If  $a > 0$  is a constant, what is  $\int a^x dx$ ?

A.  $\frac{a^{x+1}}{x+1} + C$

B.  $a^x + C$

C.  $\frac{a^{x+1}}{a+1} + C$

D.  $\frac{1}{\ln a} a^x + C$ , as  $\frac{d}{dx} \left( \frac{1}{\ln a} a^x + C \right) = \frac{1}{\ln a} \frac{d(a^x)}{dx} = \frac{1}{\ln a} ((\ln a) a^x)$

E.  $(\ln a) a^x + C$

## Clicker Question 4

What's the right question?

Which of the following indefinite integrals equals  $x\sqrt{2x+3} + C$ ?

- A.  $\int \sqrt{2x+3} dx$
- B.  $\int (3\sqrt{x} + \sqrt{3}) dx$
- C.  $\int \frac{x}{\sqrt{2x+3}} dx$
- D.  $\int \frac{3x+3}{\sqrt{2x+3}} dx$
- E. none of the above

Indefinite integrals: sometimes easier to *check* than *find*!

$$\begin{aligned} & \frac{d}{dx}(x\sqrt{2x+3} + C) \\ &= 1 \cdot \sqrt{2x+3} + x \cdot \frac{1}{2} \frac{2}{\sqrt{2x+3}} + 0 \\ &= \frac{2x+3}{\sqrt{2x+3}} + x \cdot \frac{1}{2} \frac{2}{\sqrt{2x+3}} \\ &= \frac{3x+3}{\sqrt{2x+3}} \end{aligned}$$