

Math 20E

August 12, 2014

Question 1 Consider the iterated integral

$$\int_{y=0}^{\sqrt{\pi/2}} \int_{x=y}^{\sqrt{\pi/2}} \sin(x^2) dx dy.$$

Which best describes how it might be evaluated?

- A.** The iterated integral can easily be integrated by evaluating it as written, integrating with respect to x first and then y .
- B.** The iterated integral is impossible to integrate analytically because the antiderivative of $\sin(x^2)$ cannot be expressed in terms of elementary functions.
- C.** The iterated integral should be expressed as

$$\iint_D \sin(x^2) dA$$

for an appropriate region D .

- D.** The iterated integral should be rewritten as an iterated integral with respect to y first and then x .
- *E.** Both **C** and **D**: one should determine the region D in **C** in order to determine the appropriate limits of integration for the re-ordered iterated integral in **D**.

Question 2 Consider the triple integral

$$\int_{z=p}^q \int_{y=c}^d \int_{x=a}^b f(x, y, z) dx dy dz.$$

Which of the following best describes the possibility(s) for the order of integration?

- A.** There is only one possible order of integration: the one given.
- B.** There are two possible orders of integration: x and y may be switched, as in double integrals.
- C.** There are three possible orders of integration: one for each variable.
- *D.** There are six possible orders of integration: one for each permutation of (x, y, z) .
- E.** None of the above: not enough information is given about the region of integration to decide.

Question 3 The speed of an object is constant. The object's

***A.** velocity and acceleration are perpendicular.

B. acceleration is zero.

C. velocity is constant.

D. both **B** and **C**.