

Review Problem Set 2

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Review: An application of integration

Does the curve

$$y = \int_0^{\sin x} e^{t^2} dt$$

have a horizontal tangent in the interval $[0, \pi]$?

- A. Yes, at the point $x = 0$
- B. No
- C. Yes, at the point $x = \pi/4$
- D. Yes, at the point $x = \pi/2$

Review: Riemann sums

Express the limit

$$\lim_{n \rightarrow \infty} \frac{1}{3n} \sum_{k=1}^n e^{3+\frac{k}{n}}$$

as a definite integral.

A.

$$\frac{1}{3} \int_3^4 e^x dx$$

B.

$$\int_0^1 e^{3+x} dx$$

C.

$$3 \int_3^4 e^x dx$$

D.

$$\int_0^1 e^{3x} dx$$

Review : Quadric surfaces

Which of the following surfaces is shaped like a bowl?

A. $x^2 + y^2 = 1$

B. $z = x^2 + y^2$

C. $z^2 = x^2 + y^2$

D. $y = x^2$

E. $x + y + z = 1$

Review: Level Curves

Consider the surface $z = f(x, y)$ given by the equations below. Only one of these equations has the property that the level curves can be both parabolas as well as straight lines (depending on the value of z you choose). Find the equation which has this property.

A. $z = x^2 + y^2$

B. $x^2 - zy^2 = 0$

C. $z = x^2 - y^2$

D. $xyz = 1$

E. $y^2 - zx = 0$

Review: Multivariable Calculus

You are standing on a surface at a point where the direction of steepest ascent is $\mathbf{u} = \langle 4/5, -3/5 \rangle$. Find all the vectors of length 10 that points in the direction of no change.

- A. $\langle 3, 4 \rangle$
- B. $\langle 6, 8 \rangle$
- C. $\langle 6, 8 \rangle$ and $\langle -6, -8 \rangle$
- D. $\langle -6, 8 \rangle$ and $\langle 6, -8 \rangle$