VARIATIONS ON PRACTICE TEST 3

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1. If S is a plane in Euclidean 3-space containing $(0,0,0)$, $(2,0,0)$ and $(3,1,1)$, then S is the

(A) xy-plane
(B) xz-plane
(C) yz-plane
(D) plane $y - z = 0$
(E) plane $x + 2y - 2z = 0$

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2. If a and b are real numbers, which of the following are necessarily true?

I. If $a < b$ and $ab > 0$, then $\dfrac{1}{a} > \dfrac{1}{b}$.
II. If $a < b$, then $ac < bc$, for all real numbers $c > 0$.
III. If $a < b$, then $a + c < b + c$, for all real numbers c.
IV. If $a < b$, then $-a > -b$.

Choose one of these answers:

(A) I only
(B) I and III only
(C) III and IV only
(D) II, III and IV only
(E) I,II,III and IV

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3. Compute $\displaystyle\int_0^1 \int_0^y x^3 y^4 \, dx \, dy$.

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4. For $x \geq 0$, compute $\dfrac{d}{dx}\left(x^\pi \cdot \pi^x\right)$.

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5. Find all functions f defined on the xy-plane such that

$$\frac{\partial}{\partial x}[f(x,y)] = 2x - y \qquad \text{and} \qquad \frac{\partial}{\partial y}[f(x,y)] = x + 2y.$$

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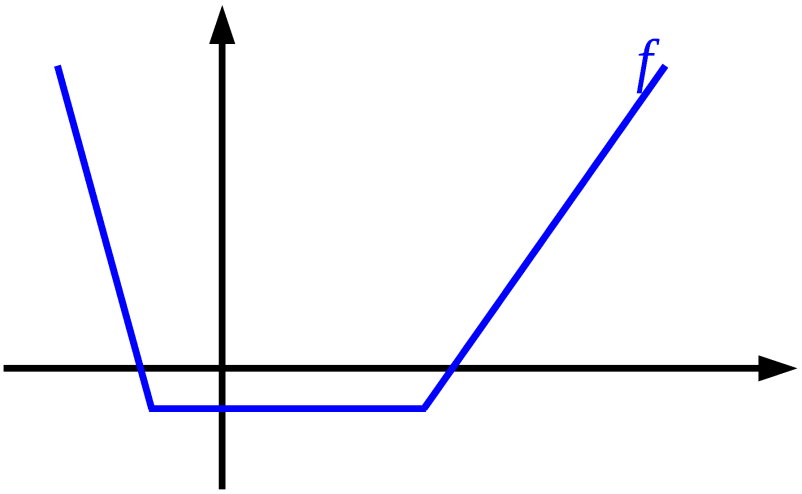
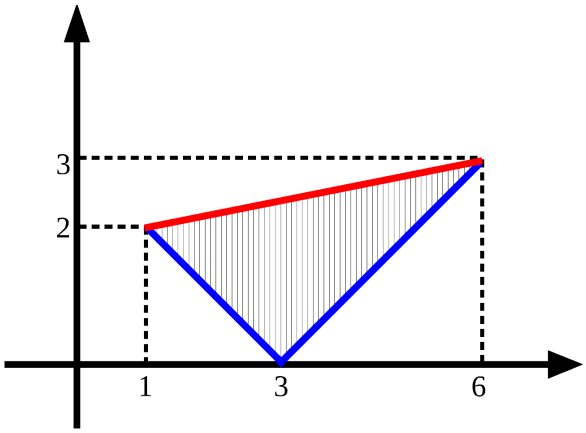


6. Sketch the graph of an antiderivative of the function f whose graph is shown in the figure above.



7. Compute the shaded area shown above.

8. Compute $\displaystyle\sum_{n=1}^{\infty} \frac{n}{n^2+1}$.