

PRACTICE TEST #2

FREE RESPONSE QUESTIONS #1-3

Complete each FRQ on a separate sheet of paper.
Please allow yourself 15 minutes for each FRQ and treat these like a test. Do not look through your notes or work together.

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PRACTICESTEST 2-1 (CALC ALLOWED)

Let R be the region bounded by the x -axis, the graph of $y = \sqrt{x}$, and the line $x = 4$.

- Find the area of the region R .
- Find the value of h such that the vertical line $x = h$ divides the region R into two regions of equal area.
- Find the volume of the solid generated when R is revolved about the x -axis.
- The vertical line $x = k$ divides the region R into two regions such that when these two regions are revolved about the x -axis, they generate solids with equal volumes. Find the value of k .

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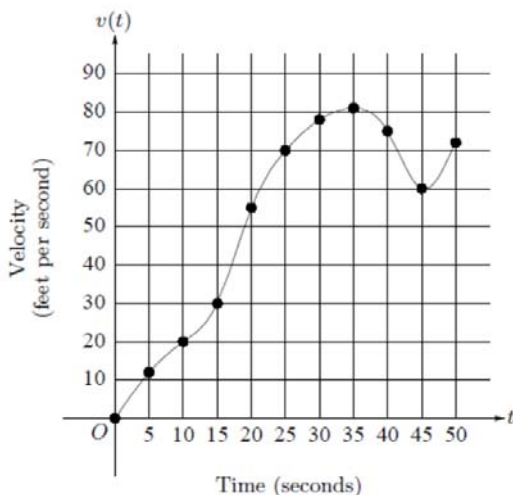
PRACTICETEST 2-2 (CALC ALLOWED)

Let f be the function given by $f(x) = 2xe^{2x}$.

- Find $\lim_{x \rightarrow -\infty} f(x)$ and $\lim_{x \rightarrow \infty} f(x)$.
- Find the absolute minimum value of f . Justify that your answer is an absolute minimum.
- What is the range of f ?
- Consider the family of functions defined by $y = bxe^{bx}$, where b is a nonzero constant. Show that the absolute minimum value of bxe^{bx} is the same for all nonzero values of b .

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PRACTICETEST 2-3 (CALC ALLOWED)



t (seconds)	$v(t)$ (feet per second)
0	0
5	12
10	20
15	30
20	55
25	70
30	78
35	81
40	75
45	60
50	72

The graph of the velocity $v(t)$, in ft/sec, of a car traveling on a straight road, for $0 \leq t \leq 50$, is shown above. A table of values for $v(t)$, at 5 second intervals of time t , is shown to the right of the graph.

- During what intervals of time is the acceleration of the car positive? Give a reason for your answer.
- Find the average acceleration of the car, in ft/sec^2 , over the interval $0 \leq t \leq 50$.
- Find one approximation for the acceleration of the car, in ft/sec^2 , at $t = 40$. Show the computations you used to arrive at your answer.
- Approximate $\int_0^{50} v(t) dt$ with a Riemann sum, using the midpoints of five subintervals of equal length. Using correct units, explain the meaning of this integral.

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