AP Calculus AB Name _____
Dr. Quattrin
2020 Spring Final #1A score _____

1. Mr. Alvarado takes the Cross Country team out for a morning run and tracks his pace. The data table below shows his pace $p(t)$ in minutes per mile and his velocity $v(t)$ miles per minute at 15-minute intervals.

t (in minutes)	0	15	30	45	60
$p(t)$ (in min/mile)	8:07	7:34	8:16	8:07	7:14
$v(t)$ (in mi/min)	0.123	0.132	0.121	0.123	0.138

Both $p(t)$ and $v(t)$ are continuous and differentiable functions.

a) Find an approximation for $\int_0^{60} v(t)dt$ using midpoint rectangles.

b) Using correct units, explain the meaning of $\frac{1}{60}\int_0^{60} v(t)dt$.

c) Approximate the acceleration at $t = 37$ minutes.

d) Is there a time during which the pace reaches a maximum? Explain your reasoning.

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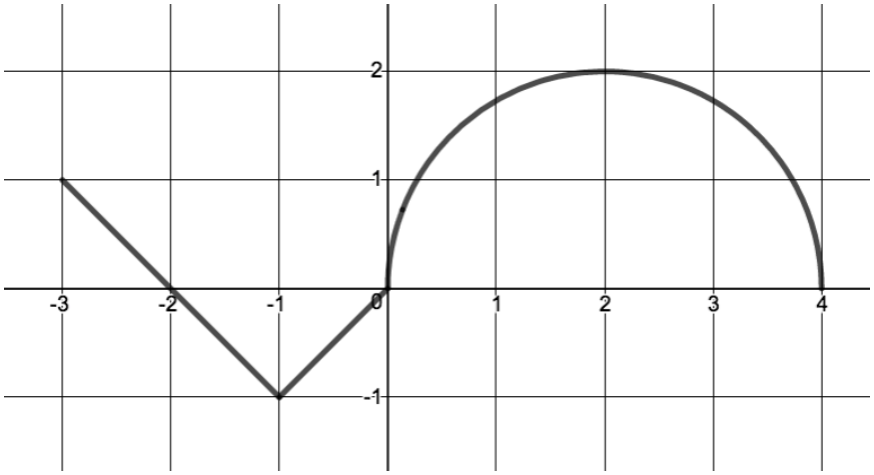
2. The function $h(x)$ is graphed below for the domain $-3 \le x \le 4$. The graph of $h(x)$ consists of line segments and a semi-circle. Let $g(x) = \int_2^x h(t)\,dt$.



graph of $h(x)$

(a) Find $g(4)$ and $g(-3)$.

(b) Find $g'(2)$ and $g''(2)$

(c) Where are the critical points of $g(x)$ on $-3 < x < 4$? Classify them as relative max, min, or neither and explain your reasoning.

(d) What are the absolute maximum and minimum values of $g(x)$ on $-3 \le x \le 4$?