

Calculus Ch. 4 Test Review II

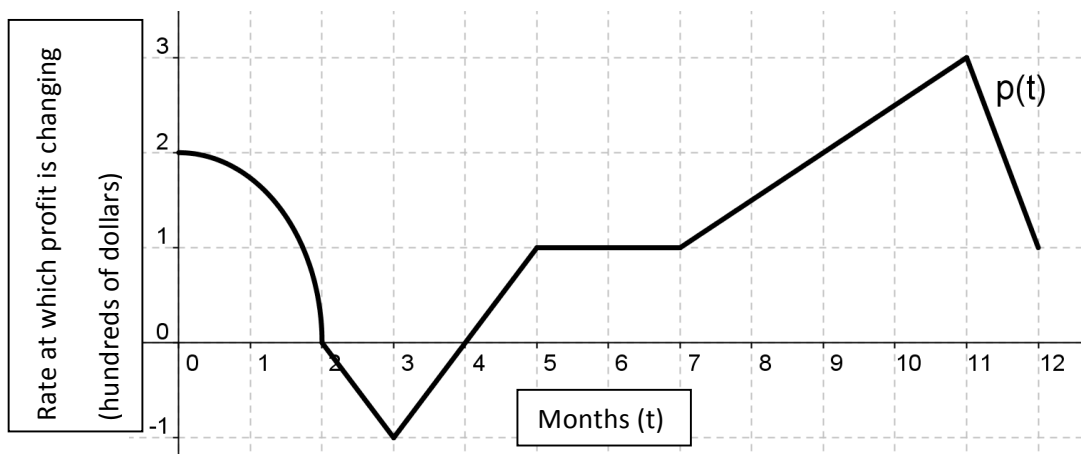
p. 255# 57, 63

p. 278# 17, 27, 31, 33-38 all, 42, 46 (also trapezoidal), 47

p. 291# 47-48, 63, 74, 83, 87, 89

p. 304# 8-34 even, 45, 49, 49-55 odd, 61, 71, 82, 87, 113, 115

The graph below shows the rate, $p(t)$, at which a company's profit is changing in hundreds of dollars per month. Where t is months and $0 \leq t \leq 12$. $0 \leq t \leq 2$ is a quarter circle.



- How much profit did the company make in the first 3 months?
- On what interval(s) was the profit increasing?
- What was the average rate that the profit was changing in the first 6 months?
- What was the average rate at which the rate of the profit change curve was changing?
- If $r(t)$ represents the profit made in hundreds of dollars over t months and $r(3) = 5$, find $r(6)$.
- According to the graph, where does $r(t)$ have relative extrema?
- According to the graph, where does $r(t)$ have points of inflection?
- Write an equation of the tangent line of $r(t)$ when $t = 3$.
- Is the tangent line of $r(t)$ at $t = 4$ above or below the curve. Explain.

The function $v(t) = 6 \sin^3 t \cos^2(t - 0.1)$ models a particle's velocity as it travels along a line from time $t = 0$ to $t = \frac{5\pi}{4}$.

- What is the particle's distance from its starting position at time $t = 2$?
- What is the total distance traveled by the particle from $t = 0$ to $t = \frac{5\pi}{4}$?
- If $s(t)$ is the position function for the particle and $s(3) = 5$, find $s(2)$.
- On what interval from $t = 0$ to $t = \frac{5\pi}{4}$ is $s(t)$ increasing? Explain.
- How many points of inflection does $s(t)$ have on $[0, \frac{5\pi}{4}]$? Explain.
- At time $t = 3.7$ is the particle speeding up or slowing down? Explain.

The velocity of a squirrel moving over t hours is shown in the table below:

Time (Hours)	2	5	7	11
Velocity (ft/hour)	6	10	2	3

- Use a trapezoidal sum to estimate the average velocity of the squirrel from $[2, 11]$.
- Use a right hand sum to estimate the squirrel's net change in position from $[2, 11]$.
- What is the squirrel's average acceleration from $[2, 11]$?
- Estimate the squirrel's acceleration at $t = 6$.
- Based on the table, which of the following is true?
 - The squirrel's position curve is always increasing.
 - There are at least two points of inflection on the position curve.
 - The squirrel's position curve has a relative maximum.