1. Section 4.1
   (a) Finding maxima and minima
   (b) critical points
   (c) extreme values on an interval

2. Section 4.2: Mean Value Theorem

3. Section 4.3: Consequences of the MVT
   (a) $f'(x) = 0$ implies $f(x) = c$
   (b) $f'(x) = g'(x)$ implies $f(x) = g(x) + c$
   (c) antiderivative
   (d) increasing and decreasing functions ($f'(x) > 0, f'(x) < 0$)

4. Section 4.3: Exponential Growth and Decay
   (a) $f'(t) = kf(t)$ then $f(t) = Ce^{kt}$ ($C = f(0)$)
   (b) radioactive decay

5. Section 4.5: First and Second Derivative Tests
   (a) relative max and min
   (b) first derivative test ($f'(x)$ changes sign implies max or min)
   (c) second derivative test ($f'(x) = 0$: $f''(x) > 0$ implies min, $f''(x) < 0$ implies max)

6. Section 4.6: Extreme Values on an Arbitrary Interval
   (a) key setting: $f(x)$ has only one critical value on an interval
   (b) applications: surface area, balloons, ships passing in the night...

7. Section 4.7: Concavity and Inflection Points
   (a) concave up: $f''(x) > 0$, concave down: $f''(x) < 0$
   (b) inflection point: $f''(x)$ changes sign

8. Section 4.8: Limits at infinite
   (a) $\lim_{x \to \pm \infty} f(x)$

9. Section 4.9: Graphing
   (a) Table 4.1
   (b) using intercepts, max/min, concavity, inflection point, asymptotes to graph functions