## Quiz 9 Solution

## March 5, 2018

1. (2 points) If  $f'(x) = (x - 2)^2(x + 7)$ , find the largest intervals on which f(x) is increasing and decreasing.

**Solution:** First, we find the critical values by finding where f'(x) = 0 or is undefined. Since f'(x) is a polynomial, it is never undefined.

f'(x) = 0 when  $(x - 2)^2 = 0$  or when x + 7 = 0x - 2 = 0 x = -7x = 2

Now we create a sign chart and test values in each of the intervals  $(-\infty, -7)$ , (-7, 2),  $(2, \infty)$  to determine where f'(x) is positive and negative:

$$x \xrightarrow{f'(x)} x \xrightarrow{-7} 2$$

**Answer:** Increasing on  $(-7, \infty)$ ; decreasing on  $(-\infty, -7)$ 

- 2. (2 points) If  $g(x) = xe^{2x}$ , which of the following are true?
  - (a) g(x) has a relative maximum at x = -1/2
  - (b) g(x) has a relative minimum at x = -1/2
  - (c) q(x) has a relative maximum at x = 0
  - (d) g(x) has a relative minimum at x = 0
  - (e) q(x) is always increasing
  - (f) g(x) is always decreasing

**Solution:** First, find g'(x) using product rule:

$$g'(x) = e^x + xe^x$$
$$= e^x(1+x)$$

Since  $e^x$  is never zero, the only CV is at x = -1, and we get the following sign chart:

$$x \xrightarrow{g'(x)} x \xrightarrow{-1} +$$

So there is a relative minimum at x = -1. Answer: (b)

3. (1 point) What was most difficult for you on Exam 2? **Answer:** Answers will vary.