

**Quiz 5 Solutions**

MAC 1147.6861, Fall 2016

Thursday, October 6, 2016

Show all relevant work to support your answer. A correct answer without supporting work will not earn the points. **Problems 3 and 4 are on the back.**

1. (1 point) What is your favorite genre of music? (Hint: There is no wrong answer)

1. \_\_\_\_\_

2. (4 points) Given the function  $f(x) = \frac{(3x - 2)(6 - x)}{(x + 3)(x - 8)}$ , determine the following:

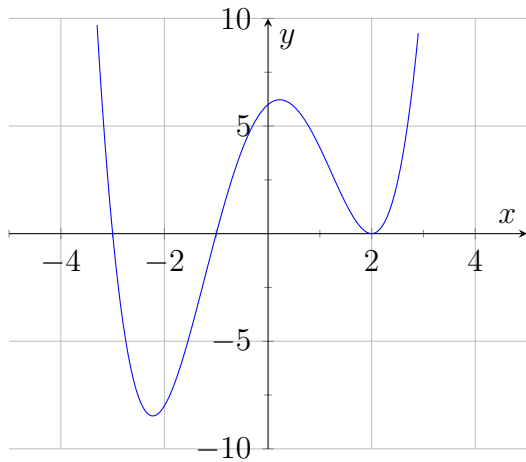
- (a) All asymptotes of  $f(x)$ .

**Solution:** First note that nothing in  $f(x)$  cancels. Hence there are vertical asymptotes at  $x = -3$ ,  $x = 8$  and a horizontal asymptote at  $y = -3$ .

- (b) The zeros of  $f(x)$ .

**Solution:** The zeros are found when  $f(x) = 0$ , or  $(3x - 2)(6 - x) = 0$ . Hence, there are zeros at  $x = \frac{2}{3}$ , 6.

3. (2 points) Match the graph with one of the given functions:



- A.  $f(x) = -(x + 3)(x + 1)(x - 2)^2$
- B.  $f(x) = \frac{1}{2}(x + 2)^2(x - 1)(x + 3)$
- C.  $f(x) = 2(x + 3)^2(x + 1)(x - 2)x$
- D.  $f(x) = \frac{1}{4}(x - 2)^4(x + 1)^2(x - 3)$
- E.  $f(x) = \frac{1}{2}(x + 3)(x + 1)(x - 2)^2$

**Solution:** Observe that the zeros at  $-3$  and  $-1$  have odd multiplicity, while the zero at  $2$  has even multiplicity. Also using the leading coefficient test, we see the leading coefficient should be positive. Hence, we eliminate all choices except E.

4. (3 points) Find the product of  $(\sqrt{3} + \sqrt{15}i)(\sqrt{3} - \sqrt{15}i)$ .

**Solution:** Foiling the product, we get  $3 - \sqrt{45}i + \sqrt{45}i - 15i^2$ . Noting that  $i^2 = -1$ , the solution is then 18.