

# Quiz 2

Math 3C: Precalculus

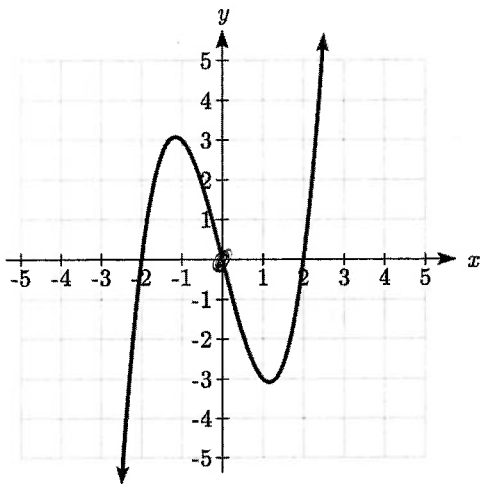
October 10, 2019

When you finish, please remain seated until class is dismissed

Name: Solutions

PID: \_\_\_\_\_

**Problem 1** (6 points). Consider the graph below and answer the following questions.



- (a) Where is the function concave up? Express your answer in interval or inequality notation.  
(do not include inflection points in your answer)

Concave Up:

All numbers greater than 0, so

$$\boxed{x > 0} \quad \text{or} \quad \boxed{(0, \infty)}$$

- (b) Where is the function concave down? Express your answer in interval or inequality notation.

(do not include inflection points in your answer)

Concave Down:

All numbers less than 0,  
this written as

$$\boxed{x < 0} \quad \text{or} \quad \boxed{(-\infty, 0)}$$

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**Problem 2** (4 points). Let

$$s(x) = \frac{1}{x+2} + x \quad \text{and}$$

$$r(y) = 2y^2 - 1$$

(a) What is  $s(r(1))$ ? Show your work.

$$r(1) = 2(1)^2 - 1 = 2 \cdot 1 - 1 = 2 - 1 = 1$$

$$\text{Therefore } s(r(1)) = s(1) = \frac{1}{1+2} + 1 = \frac{1}{3} + 1 = \boxed{\frac{4}{3}}$$

(b) What is the formula for  $(s \circ r)(y)$ ? Show your work.

*Hint: Recall that  $(s \circ r)$  is mathematical shorthand for "the composition of  $s$  with  $r$ "*

$$(s \circ r)(y) = s(r(y)) = s(2y^2 - 1)$$

← here I plugged in the definition of  $r(y)$ .

$$s(2y^2 - 1) = \frac{1}{(2y^2 - 1) + 2} + (2y^2 - 1)$$

$$= \boxed{\frac{1}{2y^2 + 1} + 2y^2 - 1}$$

Checking my work:  $s(r(1)) = \frac{4}{3}$  by part (a).

This part down here is optional, it's just me checking my answer

I plug in <sup>2</sup>1 to my formula:

$$\frac{1}{2 \cdot (1)^2 + 1} + 2 \cdot (1)^2 - 1 = \frac{1}{2+1} + 2 \cdot 1 - 1 = \frac{1}{3} + 1 = \frac{4}{3} \checkmark$$