Quiz 2

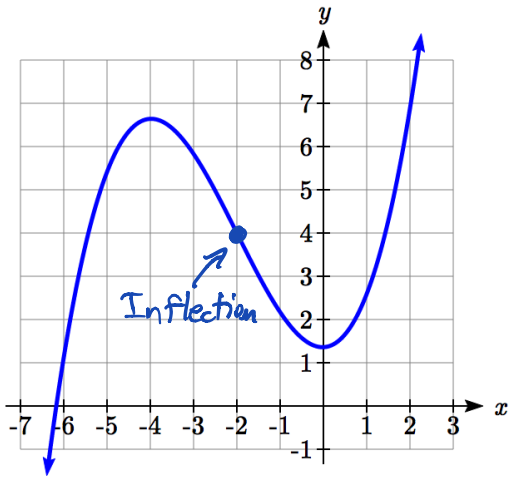
Math 3C: Precalculus

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 looks like ⌣

All points greater than -2:

$x > -2$ or $(-2, \infty)$

(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 looks like ⌢

All points less than -2:

$x < -2$ or $(-\infty, -2)$

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Problem 2 (4 points). Let

$$u(a) = \frac{3a^2}{a+1} \qquad \text{and}$$
$$v(b) = \sqrt{b-1}$$

(a) What is $u(v(2))$? Show your work.

$v(2) = \sqrt{2-1} = \sqrt{1} = 1$, so

$u(v(2)) = u(1) = \frac{3\cdot(1)^2}{1+1} = \frac{3\cdot 1}{2} = \boxed{\frac{3}{2}}$

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

Hint: Recall that $(u \circ v)$ is mathematical shorthand for "the composition of u with v"

$(u\circ v)(y) = u(v(y)) = u(\sqrt{y-1})$

↑ since $v(y) = \sqrt{y-1}$

Substituting into u formula,

$u(\sqrt{y-1}) = \frac{3(\sqrt{y-1})^2}{\sqrt{y-1}+1} = \frac{3(y-1)}{\sqrt{y-1}+1} = \boxed{\frac{3y-3}{\sqrt{y-1}+1}}$

Optional

Checking my work: $(u\circ v)(2) = \frac{3\cdot 2-3}{\sqrt{2-1}+1} = \frac{6-3}{\sqrt{1}+1} = \frac{3}{2}$ ✓

This agrees with my answer to part (a)