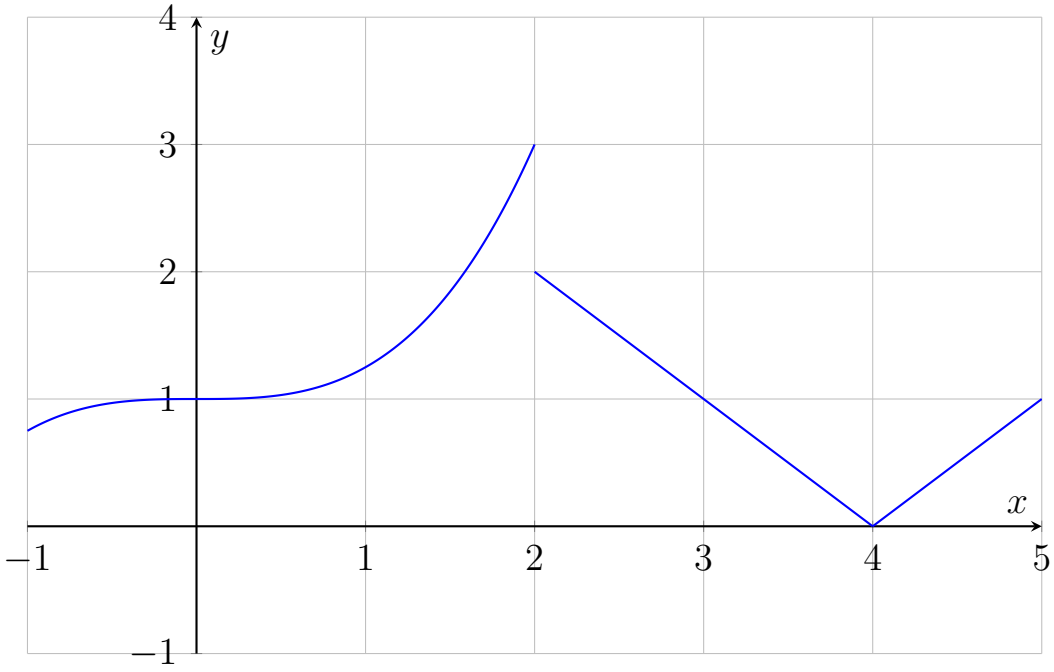
Name: **Date:** **Quiz 7** **Precalculus - Hargus**

Instructions: Please **show all work** (partial credit will be given for correct work, even if your answer is wrong).

1. (20 points) Use the graph of $f(x)$ below to answer the following questions.



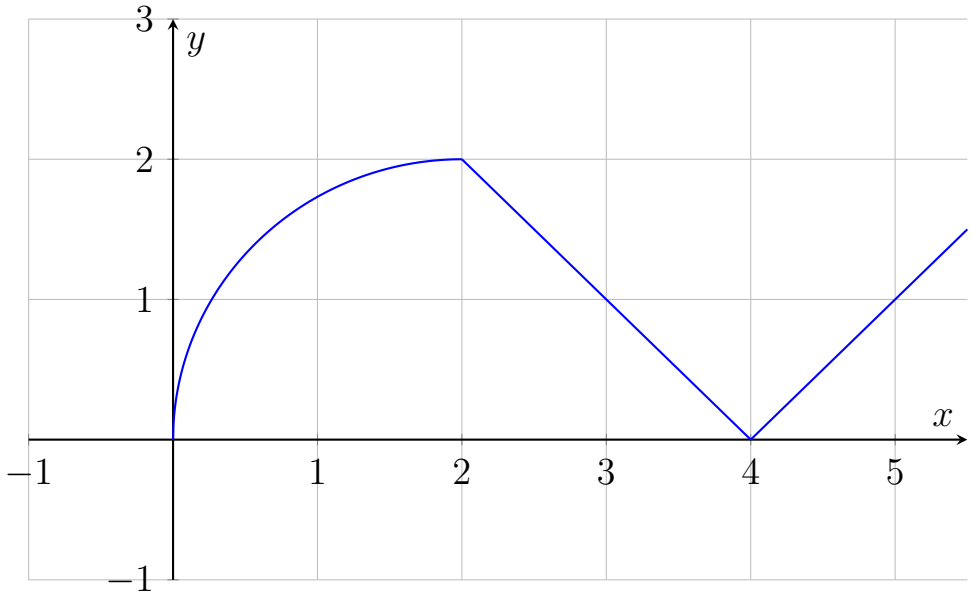
a) Does $f'(0)$ (the derivative of $f(x)$ when $x = 0$) exist? If yes, what does it equal?

b) Does $f'(2)$ exist? If yes, what does it equal?

c) Does $f'(3)$ exist? If yes, what does it equal?

d) Does $f'(4)$ exist? If yes, what does it equal?

2. (15 points) Use the graph of $f(x)$ below to answer the following questions.



a) Find $\int_2^5 f(x)dx$.

$$\int_2^5 f(x)dx = \_\_\_\_\_$$

b) Find $\int_0^3 f(x)dx$. **Note:** From $x = 0$ to $x = 2$, $f(x)$ makes a quarter circle.

$$\int_0^3 f(x)dx = \_\_\_\_\_$$

c) Find $\int_1^1 f(x)dx$.

$$\int_1^1 f(x)dx = \_\_\_\_\_$$

3. (10 points) Use the limit definition of the derivative to find $f'(x)$ if $f(x) = 4x^2 + 2$. Show all work.

$f'(x) =$ _____

4. (15 points) Evaluate the limit.

   (a) $\lim_{x \to -1} x^2 + 1 =$

   (b) $\lim_{x \to 3} \dfrac{x - 3}{x^2 - 2x - 3} =$

   (c) $\lim_{x \to 0} e^x \cos(x) =$

5. (15 points) On a history quiz, 4 students get a score of 70, 7 students get a 80, 3 students get a 90, and 6 students get a 100.

   a) What are the mean, median, and mode averages of grades on the quiz?

   Median average = _____

   Mean average = _____

   Mode average = _____

   b) Draw a histogram showing the quiz scores.

6. (5 points) Marc hates exercise and wants to prove that exercising does not make people more healthy. First, he goes to a library and counts the number of people who look healthy, which he finds is 80%. Then, he goes to a gym and finds that only 50% of people there look healthy. Marc concludes that exercise is bad for people's health. Which of the following is **not** a problem with Marc's conclusion? (Circle one answer)

   a) Observer Bias
   b) Optimism Bias
   c) Correlation $\neq$ Causation
   d) Sampling Bias