

Name: _____

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Please circle your instructor's name:

James Gossell

Gordon Williams

There are 25 points possible on this quiz. Any outside materials are not allowed. **For full credit, show all work clearly.**

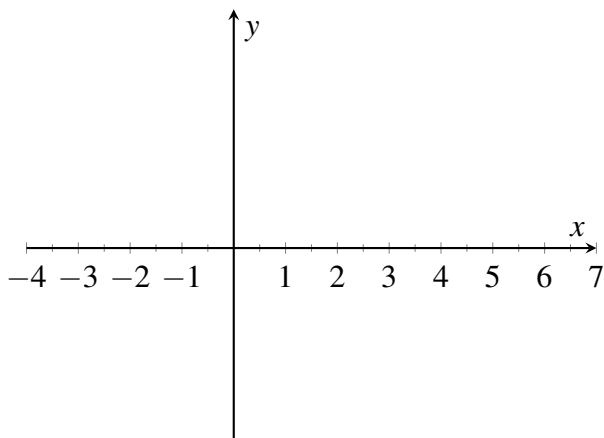
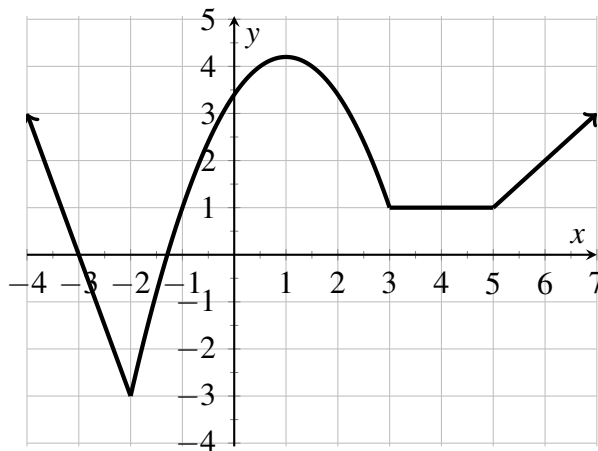
1. [10 points] The **derivative** of $f(x)$ is defined as follows:

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}.$$

- a. Use the definition of the derivative (above) to find the derivative of the function $f(x) = \frac{2}{\sqrt{x}}$. Use proper limit notation. **No credit will be awarded for finding the derivative via other methods.**

- b. Use your answer in part (a) to find the equation of the tangent line to $f(x) = \frac{2}{\sqrt{x}}$ at the point $(4, 1)$. **Simplify your answer.**

2. [6 points] The graph of $f(x)$ is shown below. On the **other set of axes**, sketch the graph of $f'(x)$. If there are any asymptotes, draw them with dashed lines. Use open circles to show points where the derivative is not defined, if any. (You are not given values on the y-axis; I am interested in the correct shape/holes/asymptotes of the derivative, not the specific values.)



3. [9 points] Find $f'(x)$ for each function below. You may use any method you like, and you do not need to simplify your answer.

a. $f(x) = \frac{8x^3 - 2\sqrt{x}}{x} - \frac{1}{\pi x}$

(Hint: Make it easier, first.)

b. $f(x) = (3x^2 + x) \sin(x)$

c. $f(x) = \frac{3 \cos(x)}{2^5 + 7x}$