

**Math 0120 Final Examination  
Sample**

Name (Print) \_\_\_\_\_

ID # \_\_\_\_\_

Signature \_\_\_\_\_

Instructor (circle one):

Lecture time (circle one):

**Instructions:**

1. Show your University of Pittsburgh ID if requested.
2. Clearly print your name and PeopleSoft number and sign your name in the space above. Circle the name of your lecturer and the time of your lecture.
3. Work each problem in the space provided. Extra space is available on the back of each exam sheet. Clearly identify the problem for which the space is required when using the backs of sheets.
4. Show all calculations and display answers clearly. Unjustified answers will receive no credit.
5. Write neatly and legibly. Cross out any work that you do not wish to be considered for grading.
6. **No tables, books, notes, earphones, calculators, or computers may be used. All derivatives and integrals are to be found by methods of calculus learned in this course.**

**DO NOT WRITE BELOW THIS LINE**

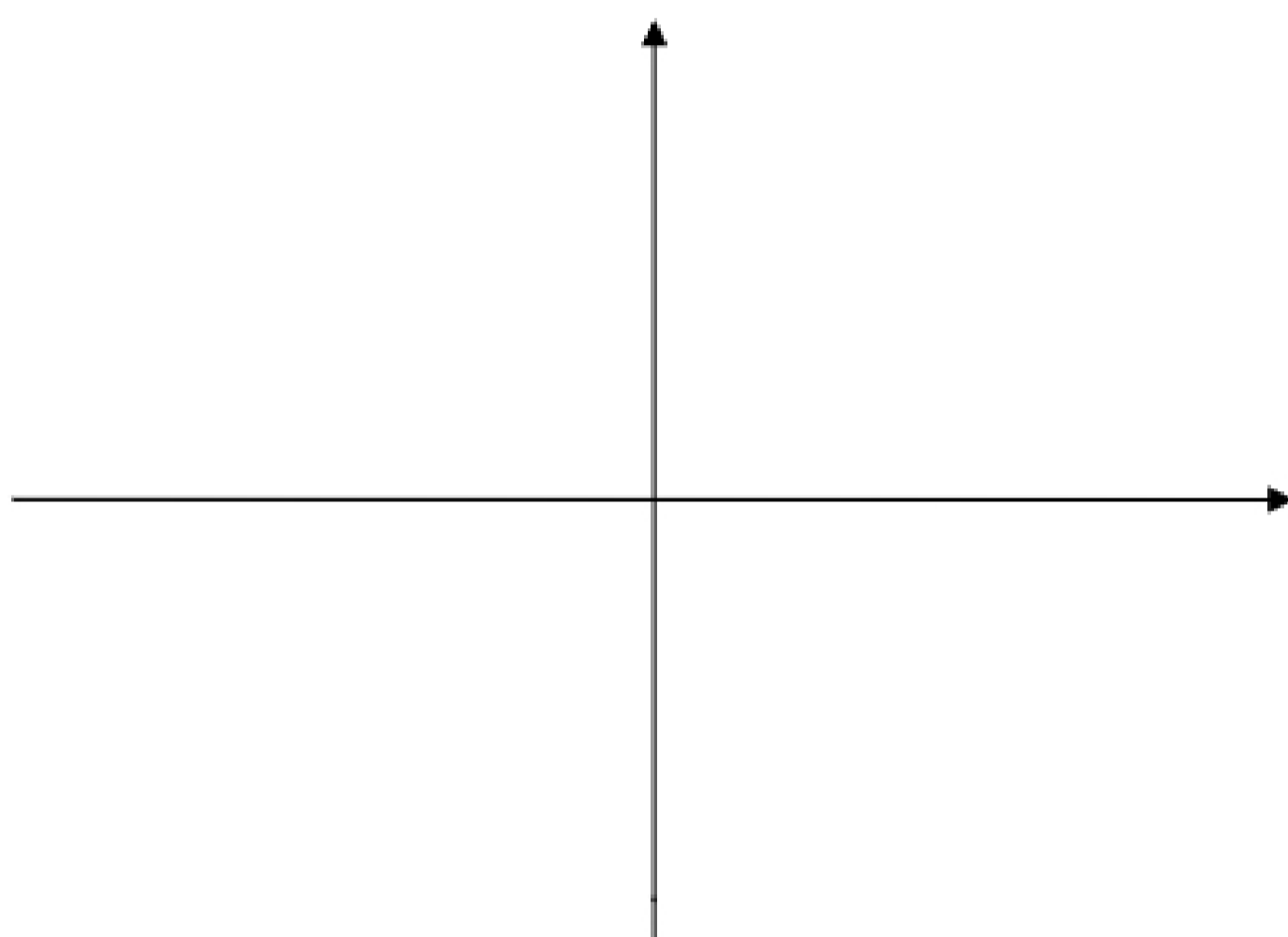
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| <b>Problem</b> | <b>Points</b> | <b>Score</b> | <b>Problem</b> | <b>Points</b> | <b>Score</b> |
|----------------|---------------|--------------|----------------|---------------|--------------|
| <b>1</b>       | <b>10</b>     |              | <b>6</b>       | <b>12</b>     |              |
| <b>2</b>       | <b>15</b>     |              | <b>7</b>       | <b>25</b>     |              |
| <b>3</b>       | <b>30</b>     |              | <b>8</b>       | <b>30</b>     |              |
| <b>4</b>       | <b>25</b>     |              | <b>9</b>       | <b>21</b>     |              |
| <b>5</b>       | <b>20</b>     |              | <b>10</b>      | <b>12</b>     |              |
|                |               |              | <b>Total</b>   | <b>200</b>    |              |

1. (a) (3 pts.) Find an equation of the line with slope  $m = 2$  that passes through the point  $(1, 3)$ .

(b) (3 pts.) Find the vertex of the parabola  $y = 4x - x^2$ .

(c) (4 pts.) Sketch the line and the parabola on the same set of axes.



2. (a) (5 pts.) Find  $\lim_{x \rightarrow -1} \frac{x^3 + 1}{x + 1}$ .

(b) (10 pts.)  $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ . Use this definition to find the derivative of  $f(x) = x^2$ .

3. (30 pts.) Find the derivatives. (You need not simplify):

(a)  $g(x) = \frac{x^2 + 1}{x^3 - 2}$ .

(b)  $f(x) = (x^3 - x)(2x^2 - 1)^{-3}$ .

(c)  $x^2y - xy^2 = 0$ . Find  $\frac{dy}{dx}$ .