

YOUR NAME: \_\_\_\_\_

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Read each problem **very carefully** before starting to solve it. Each problem is worth 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Consider the quadratic function  $f(x) = -x^2 - 2x + 3$ .

(a) Find its vertex.

(b) Find the opening direction.

(c) Find its  $y$ -intercept.

(d) Find its  $x$ -intercept(s).

(e) Sketch the graph of the function, labeling all points of interest.

2. A friend of yours has set up a small home operation producing a certain type of gadget. Each gadget costs her \$100 and her fixed costs are \$220. If she produces and sells  $x$  gadgets, she has found that the price that she can charge per gadget is  $(132 - x)$  dollars.

- (a) Find the cost function of your friend's operation.

$$C(x) =$$

- (b) Find the revenue function of your friend's operation.

$$R(x) =$$

- (c) Find the profit function of your friend's operation.

$$P(x) =$$

- (d) How many gadgets does your friend have to sell in order to maximize her profit?

- (e) At which production level(s) does your friend's operation break even?