## 5.1-5.4 Quadratics Review Fall 2013 - Due on day of test!

Use a separate sheet of paper to show ALL WORK - you WILL lose points if you don't have work shown for each problem!!
Determine whether the function is linear or quadratic. Identify the quadratic, linear, and constant terms.

1. $y=(x+1)(3 x+2)-3 x^{2}$
2. $f(x)=(3 x-2)(5 x+3)$

Identify the vertex and the axis of symmetry of the parabola. Identify points corresponding to $P$ and $Q$.
3.

4.

5. A manufacturer determines that the number of drills it can sell is given by the formula
$D=-3 p^{2}+180 p-305$, where $p$ is the price of the drills in dollars.
a. At what price will the manufacturer sell the maximum number of drills?
b. What is the maximum number of drills that can be sold?
6. Dalco Manufacturing estimates that its weekly profit, $P$, in hundreds of dollars, can be approximated by the formula $P=-5 x^{2}+10 x+9$, where $x$ is the number of units produced per week, in thousands.
a. How many units should the company produce per week to earn the maximum profit?
b. Find the maximum weekly profit.
7. Write $y=4 x^{2}-24 x+34$ in vertex form.

Use vertex form to write the equation of the parabola.

9.


Write the equation of the parabola in vertex form.
10. vertex $(-4,4)$, point $(-1,31)$

Find a quadratic model for the set of values.
11. $(-2,6),(0,-2),(4,78)$
12. $(-2,18),(0,-2),(4,30)$
13. In an experiment, a petri dish with a colony of bacteria is exposed to cold temperatures and then warmed again.
a. Find a quadratic model for the data in the table.
b. Use the model to estimate the population of bacteria at 9 hours.

| Time (hours) | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Population (1000s) | 5.1 | 3.03 | 1.72 | 1.17 | 1.38 | 2.35 | 4.08 |

14. Graph $y=2(x+1)^{2}-5$.
15. Graph $y=-4(x-1)^{2}+3$.
16. Graph $y=3 x^{2}-5$. Identify the domain and range.
17. Graph $y=x^{2}+5 x+4$. Identify the vertex and the axis of symmetry.
18. Graph $y=-2 x^{2}+4 x+7$. Does the function have a maximum or minimum value? What is this value?
19. Graph $y=(x-7)^{2}+1$. Identify the domain and range.
20. Consider the function $f(x)=-3 x^{2}-6 x+4$. Determine whether the graph opens up or down. Find the axis of symmetry, the vertex and the $y$-intercept.
21. Identify the axis of symmetry for the graph of $f(x)=-2 x^{2}-4 x-2$.

## Factor the expression.

22. $21 x^{2}+18 x$
23. $x^{2}+19 x+90$
24. $x^{2}+11 x+24$
25. $x^{2}-x-30$
26. $3 x^{2}+11 x+6$
27. $4 x^{2}+13 x+10$
28. $25 x^{2}-49$

## Write the quadratic equation in vertex form.

29. $y=-3 x^{2}-12 x-8$
30. $y=2 x^{2}+16 x+34$

