1. $y = -\frac{1}{2}x^2 + 2x - 2$

2. $y = -2x^2 - 8x - 8$

3. $y = \frac{1}{4}x^2 + x$

4. $y = x^2 + 5x + \frac{9}{4}$

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

Determine the intercepts, vertex and axis of symmetry of the graph of each of the following:

6. $y = -2(x+6)^2 + 8$

7. $y = x^2 + 4x - 6$

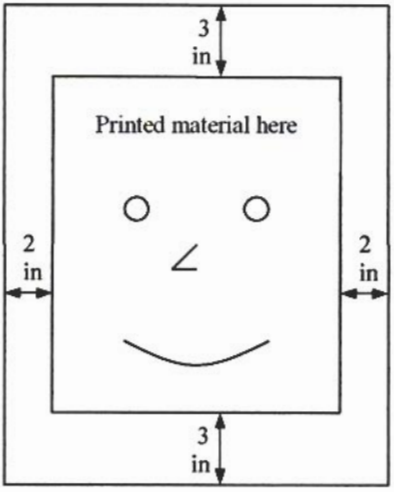
8. $y = -x(x-2) - 4$

9. A manufacturer of fax machines finds that the cost (in dollars) generated by manufacturing x units per week is given by the function $C(x) = 0.15x^2 - 39x + 4500$.
How many units should be manufactured to minimize the cost?

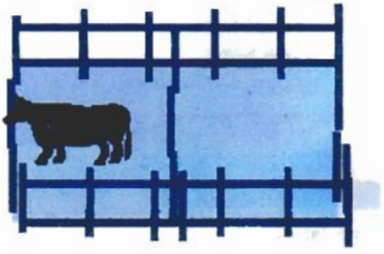
10. A rain gutter is constructed by folding the edges of a sheet of metal 12 inches wide so that the cross section of the gutter is a rectangle. The capacity of the gutter is the product of the length of the gutter times the area of the cross section. How much edge should be folded up on each side to maximize the capacity?

12. When the length of a rectangle is decreased by 4 meters and its width in increased by 3 meters the result is a square that has the same area as the original rectangle. What are the dimensions of the original rectangle?

13. A rectangle of printed material with an area of 90 square inches is to be placed on a poster so that there are 3 inch margins at the top and bottom and 2 inch margins on the sides. The area of the entire is 208 square inches. What are the dimensions of the poster?



14. A farmer plans to construct two square livestock pens that share a side. The total area is to be 120 square meters. What are the dimensions of the pen?



15. Suppose that $f(x) = x^2 - kx + 16$. Determine a value for k such that the graph of f has:

a) No x-intercepts
b) Exactly on x-intercept
c) Two x-intercepts

16. Suppose that $f(x) = x^2 - 4x + c$. Determine a value for c such that the graph of f has:

a) No x-intercepts
b) Exactly on x-intercept
c) Two x-intercepts