

For **1-5** determine the vertex, axis of symmetry, and intercepts of the following quadratic functions by rewriting them in the form $y = a(x - h)^2 + k$ if necessary.

1. $y = 2(x + 2)^2 + 4$

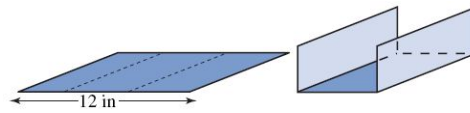
4. $y = (x + 1)^2 + (x - 3)^2$

2. $y = -x^2 + 6x - 1$

5. $y = 2x^2 + 5x + \frac{1}{8}$

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

6. Determine the quadratic function which has vertex $(2, 3)$ and passes through the point $(6, 11)$.
7. Determine a formula for the quadratic function whose x -intercepts are at $(-5, 0)$ and $(1, 0)$, and which passes through the point $(2, 14)$. Give your answer in the form $f(x) = ax^2 + bx + c$.
8. 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?



9. When the length of a rectangle is decreased by 4 meters and its width is 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?
10. 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 poster is 208 square inches. What are the dimensions of the poster?

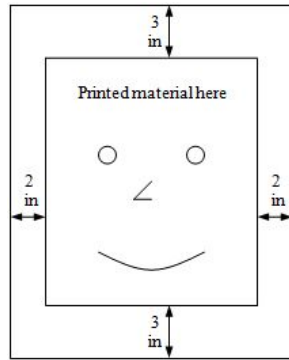


fig. for #10

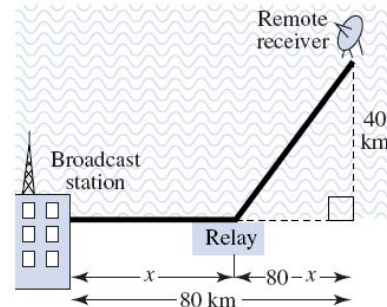


fig. for #11

11. A communications cable is to be installed from a broadcast station to a relay site and then to a remote receiver on an island 40 kilometers offshore from a point 80 kilometers down the shore from the broadcast station. The total length of the cable can be no longer than 100 kilometers without a significant loss of signal. To avoid interference, the relay station is to be built as far as possible from the broadcast station. How far from the broadcast station should the relay be built?
12. A farmer plans to construct two square livestock pens that share a side. The total area is to be 150 square meters. What are the dimensions of the pens?

