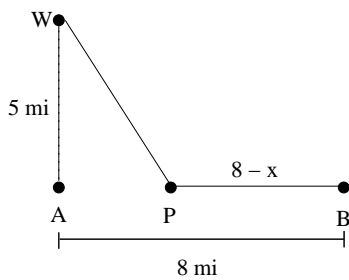




3. A wire 60 inches long is to be cut into two pieces. One piece will be bent into the shape of a circle and the other into an equilateral triangle. Where should the wire be cut to minimize the total area of the circle and triangle? Where should the wire be cut to maximize the total area?

4. An offshore oil well is located in the ocean at a point  $W$ , 5 miles from the closest shore point  $A$  on a straight shoreline (See picture below). The oil must be piped to a shore point  $B$  that is 8 miles from  $A$  by piping it on a straight line under water from  $W$  to some shore point  $P$  between  $A$  and  $B$  and then on to  $B$  via a pipe along the shoreline. If the cost of laying pipe is \$100,000 per mile under water and \$75,000 per mile over land, where should point  $P$  be located in order to minimize the cost of laying the pipe? (round to the nearest hundredth of a mile) What will the minimum cost be?



5. A concessionaire had been selling 5000 hot dogs at each football game at 50 cents apiece. When he raised the price to 70 cents apiece, sales dropped to only 4000 per night. Assume a linear relationship between price and sales. If the fixed costs each night are \$1000, and each hot dog costs him 25 cents, what price per hot dog will maximize his nightly profit?
6. A gutter is to be made from a long strip of tin that is 18 inches wide by bending up the sides so that its cross section is an isosceles trapezoid (so the bottom and the two sides are all the same length). At what angle should the sides be bent to maximize the volume of the gutter?