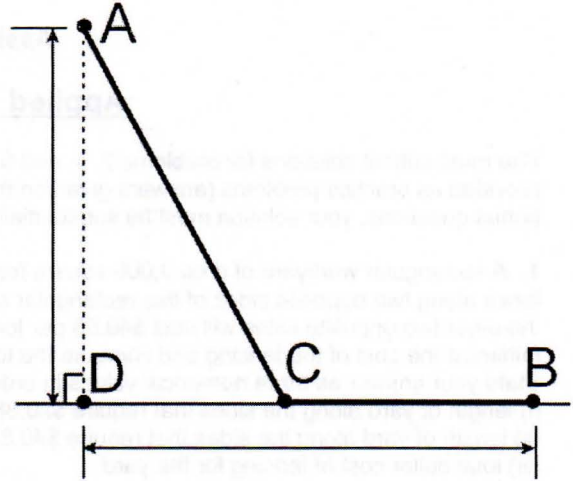


Bonus Question:

B1. (a) The diagram to the right is a view from above of a large service conduit channel that must be constructed from point B to point A along the ceiling of a large production room. The section from point A to point C needs to be suspended from the ceiling, and would cost \$840 per meter, whereas the stretch from point C to point B would cost just \$620 per meter because the conduit can be supported by the wall as well as the ceiling. Determine the distance from point D to point C so that the total cost of the conduit is minimized. Also calculate what that minimum cost would be. The distance from point B to point D is 52 meters and the distance from point D to point A is 36 meters. Obviously the diagram is not necessarily drawn accurately to scale. Your answer should be two numbers in order:
 (i) the distance between points D and C, and
 (ii) the actual cost of constructing the entire conduit based on the above information. (3 marks)



(b) Repeat part (a) but now with the cost of conduit along the wall from C to B being \$710 per meter. (2 marks)

B2. Rework problem 1, but represent the costs of the fencing by symbolic constants (say, one pair of opposite sides cost g dollars per foot, and the other pair of opposite sides cost h dollars per foot). Represent the area by the constant A . Obtain formulas for the length and width of the work yard which will minimize the total cost of fence. Then, work out formulas for the total cost of each of the two types of fence, and make a surprising (or at least perhaps unexpected) observation about the relationship between these two costs. (4 marks)

Answers to Practice Problems:

- (1) (i) 76.64 ft; (ii) 39.14 ft; (iii) \$6400.90
- (3) $r = 8.914$ cm; $h = 35.655$ cm
- (5) $r = 17.594$ cm; $h = 221.09$ cm

