1. The objective function $Z = ax + by$ of an LLP has maximum value 42 at (4,6) and minimum value 19 at (3,2).Which of the following is true?

   (a) $a = 9, b = 1$
   (b) $a = 5, b = 2$
   (c) $a = 3, b = 5$
   (d) $a = 5, b = 3$

2. The corner point of the feasible region of a linear programming problem are (0,4),(8,0)and$(\frac{20}{3}, \frac{4}{3})$.if $Z = 30x + 24y$ is the objective fnction, then (maximum value of Z-minimum value of Z) is equal to

   (a) 40
   (b) 96
   (c) 120
   (d) 136

3. Solve the following linear programming problem graphically :

$$\begin{aligned} Maximum: & Z = x + 2y \\ subjecttoconstraints: & x + 2y \geq 100, \\ & 2x - y \leq 0, \\ & 2x + y \leq 200, \\ & x \geq 0, y \geq 0. \end{aligned}$$

4. Engine displacement is the measure of the cylinder volume swept by all the pistons engine.The piston move inside the cylinder bore

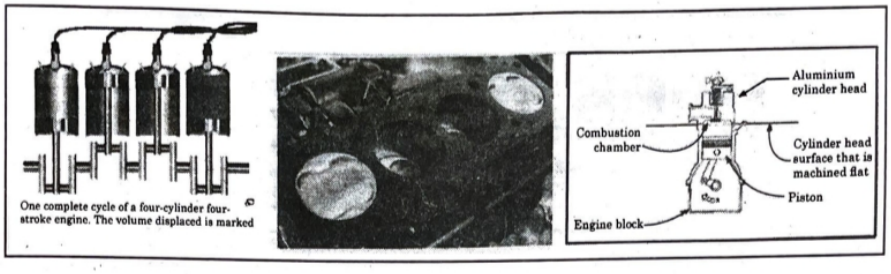

Figure 1: Engine

The cylinder bore in the form of circular cylinder open at the top is to be made from a metal sheet of area $75\pi cm^2$

Based on the above information,answer the following questions:

(a) if the radius of cylinder is r cm and height is h cm,then write the volme V of cylinder in terms of radius r.

(b) Find $\frac{dV}{dr}$.

(c) i. Find the radius of cylinder when its volume is maximum.

ii. For maximum volume,h>r.State true or false and justify.