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 :

$$Maximum : Z = x + 2y$$
$$subject to constraints : x + 2y \geq 100,$$
$$2x - y \leq 0,$$
$$2x + y \leq 200,$$
$$x \geq 0, y \geq 0.$$

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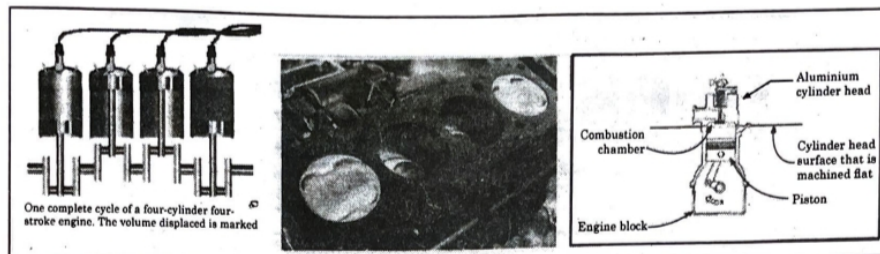

Figure 1: Engine

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.