Two positive numbers have a sum of 60. What is the maximum product of one number times the square of other number?

- ◯ 0
- ◯ 32000
- ◯ 60000
- ◯ 64000

The point on $y = x^2 + 1$ closest to (0,1.5) is ***2 points***

- ◯ (0, 1)
- ◯ (0.707, -1.5)
- ◯ (-0.707,1.5)
- ◯ (0, -1)

The volume of largest cone that can be inscribed in a circle of radius 3 m is (correct up to two decimal places)

2 points

The area of largest rectangle that can be inscribed in a circle of radius 4 is ***2 points***

- ◯ 16
- ◯ 8
- ◯ 32
- ◯ 20

Use the below information for Q5 to Q8

A manufacturing plant produces two products M and N. Maximum production capacity is 700 for total production. At least 270 units must be produced every day. Machine hours consumption per unit is 6 hours for M and 5 hours for N. At least 1100 machine hours must be used daily. Manufacturing cost is Rs 25 for M and Rs 35 for N.

Let, x_1 = No of units of M produced per day

and x_2 = No of units of N produced per day

The objective function for the above problem is **1 point**

- ○ $\min f(x) = 25x_1 + 55x_2$
- ○ $\min f(x) = 35x_1 + 25x_2$
- ○ $\min f(x) = 25x_1 + 35x_2$
- ○ $\min f(x) = 10x_1 + 35x_2$

The constraint due to maximum production capacity is **1 point**

- ○ $x_1 + x_2 \leq 700$
- ○ $x_1 + x_2 \geq 700$
- ○ $x_1 + x_2 \geq 270$
- ○ $x_1 + x_2 = 700$

The constraint due to minimum production capacity is **1 point**

- ○ $x_1 + x_2 = 270$
- ○ $x_1 + x_2 = 270$
- ○ $x_1 + x_2 \leq 270$

- ○ $x_1 + x_2 \geq 270$

The constraint due to machine hour consumption is **1 point**

- ○ $6x_1 + 5x_2 \leq 1100$
- ○ $6x_1 + 5x_2 \geq 1100$
- ○ $6x_1 + 5x_2 = 1100$
- ○ $6x_1 + 5x_2 = 1100$

Use the below information for Q9 to Q11

A factory manufactures two products A and B. To manufacture one unit of A, 3 machine hours and 5 labour hours are required. To manufacture product B, 2 machine hours and 4 labour hours are required. In a month, 270 machine hours and 280 labour hours are available. Profit per unit for A is Rs. 55 and for B is Rs. 15.

Let x_1 =Number of units of A produced per month

and x_2 =Number of units of B produced per month

The objective function for the above problem is **1 point**

- ○ max $f(x) = 55x_1 + 15x_2$
- ○ min $f(x) = 55x_1 + 15x_2$
- ○ max $f(x) = 15x_1 + 45x_2$
- ○ min $f(x) = 15x_1 + 55x_2$

The constraint for machine hours is **2 points**

- $3x_1 + 2x_2 \geq 270$
- $3x_1 + 2x_2 \leq 270$
- $3x_1 + 2x_2 = 270$
- $3x_1 + 2x_2 = 270$

The constraint for labour hours is **2 points**

- $5x_1 + 4x_2 = 280$
- $5x_1 + 4x_2 \leq 280$
- $5x_1 + 4x_2 \geq 280$
- $5x_1 + 4x_2 = 280$

The area of the largest rectangle that can be inscribed in a circle of radius 1 is **2 points**

- 1
- 1.5
- 6
- 2

The value of a function at a point $x = 5$ is 3.2 and the value of the function's derivative at point $x = 5$ is 1.2. What will be the approximate value of the function at a point $x = 5.2$?

2 points

For the function $f(x) = \frac{xsinx-1}{2}$, with an initial guess of $x_0 = -7$, and step size of 0.25, the value of the function after two iterations is

2 points