# Section Check In – CA: Calculus

## Questions

1. Given that , find the value of . [CA1]

2. Find . [CA8]

3. Evaluate . [CA11]

4. A particle has acceleration ms-2. At , the particle starts from point P with , calculate;

(i) the velocity at s.

(ii) the distance travelled from P in 10 s. [CA14]

5. Determine the equation of the normal to the curve  at the point . [CA4]

6. Given that  find the equation of the curve which passes through the point (2, 11). [CA9]

7. The equation of a curve is . Determine the area of the region enclosed by the curve and the axis. [CA12]

8. The equation of a curve is . Determine the nature and the coordinates of each of the stationary points. [CA5,6]

9. The curve , where , has a stationary point at 

Find the value of  . [CA5]

10. Find the area of the region enclosed by the curves  and . [CA13]

**Extension**

A rectangular sheet of card, 400 cm by 300 cm is to be used to make an open box. Squares, *x* by *x* are cut from each corner and then the sides folded to make the box.

Find the value of *x* that gives the maximum volume of the box.

## Worked solutions

1. .

Substituting  gives 

2. Expanding the integrand,  giving 

3. 

4. (i) 





 ms-1

(ii) 





 m (2 km)

5. When , 



When ,  , therefore gradient of normal -1

 , at (2, -30) equation of normal oe

6. 

Passing through (2, 11),  , 

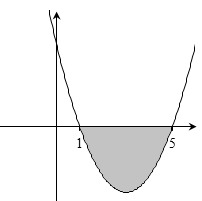


7. When ,









*x*

*y*





Therefore area enclosed by curve and *x*-axis (below the *x*-axis) is 32 units squared.

8. 

For stationary point,  giving  and therefore  and 

Sketch of positive cubic curve shows  is a maximum and  is a minimum.

When  ,  : (-2, 53)

When  ,  : (2, -43)

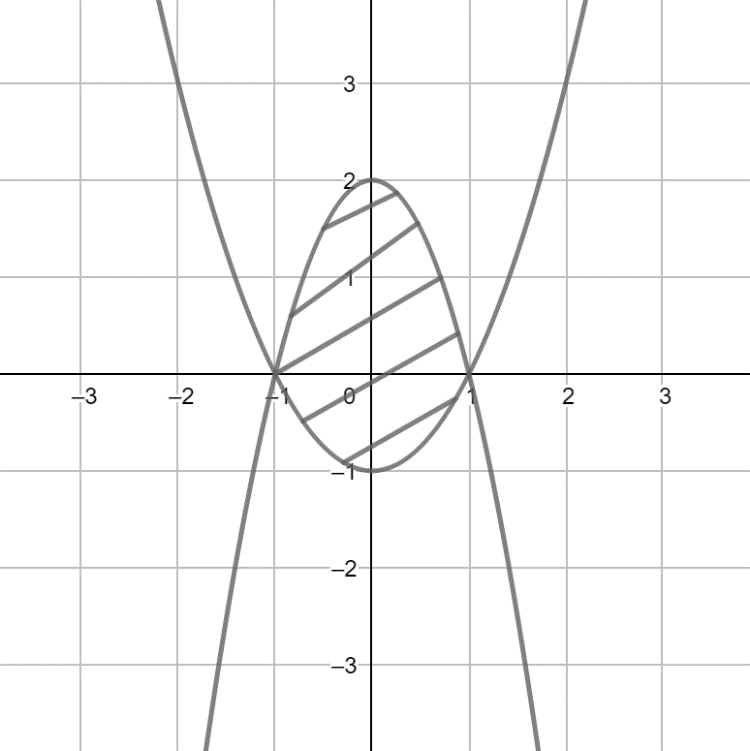
9. 

 when 

 , 

10.

*y*



**

**

*x*

Curves intersect   , 

Area = 





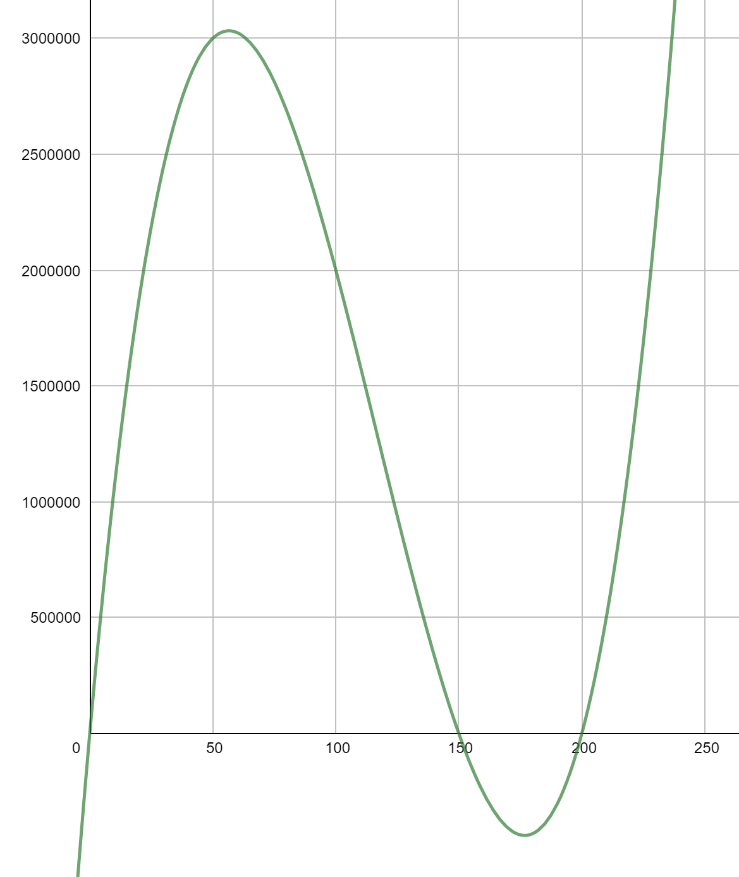
 square units

**Extension**

  for turning point.

But  which is greater than 300 width of card, therefore cm.

Checking graphically:



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