***Solution*** ***Section* 1.7 – Length of Curves**

***Exercise***

Find the curve’s unit tangent vector. Also, find the length of the indicated portion of the curve



***Solution***











*Length*: 







***Exercise***

Find the curve’s unit tangent vector. Also, find the length of the indicated portion of the curve



***Solution***

 



 

*Length*: 

 









***Exercise***

Find the curve’s unit tangent vector. Also, find the length of the indicated portion of the curve



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***Solution***

 







 

 







***Exercise***

Find the curve’s unit tangent vector. Also, find the length of the indicated portion of the curve



***Solution***

 

















 







***Exercise***

Find the point on the curve  at a distance 26π units along the curve from the point (0, 5, 0) in the direction of increasing arc length.

***Solution***

 











 











The point is: 

***Exercise***

Find the arc length parameter along the curve from the point where *t* = 0. Also, find the length of the indicated portion of the curve. 

***Solution***

 







 





***Exercise***

Find the arc length parameter along the curve from the point where *t* = 0. Also, find the length of the indicated portion of the curve. 

***Solution***

 











 



















***Exercise***

Find the arc length parameter along the curve from the point where *t* = 0. Also, find the length of the indicated portion of the curve. 

***Solution***

 



 



Length: 

***Exercise***

Find the arc length of the curve 

***Solution***

 

 











***Exercise***

Find the arc length of the curve 

***Solution***



 











***Exercise***

Find the arc length of the curve 

***Solution***





 









***Exercise***

Find the lengths of the curves 

***Solution***









 







***Exercise***

Find the lengths of the curves 

***Solution***







 











***Exercise***

The acceleration of a wayward firework is given by . Suppose the initial velocity of the firework is .

1. Find the velocity of the firework, for .
2. Find the length of the trajectory of the firework over the interval 

***Solution***

1. 













1.  











***Exercise***

If a string wound around a fixed circle in unwound while held taut in the plane of the circle, its end *P* traces an involute of the circle. The circle in question is the circle  and the tracing point starts at (1, 0). The unwound portion of the string is tangent to the circle at *Q*, and *t* is the radian measure of the angle from the position *x*-axis to segment *OQ*. Derive the parametric equations

 of the point  for the involute.

***Solution***





PQ = Length of the unwound string















