***Section* 2.4 – Partial Fractions**

This section shows how to express a rational; function as a sum of simpler functions, called ***partial fractions***.

***Example***

Evaluate 

***Solution***















***Example***

Use partial fractions to evaluate 

***Solution***









 

 







**Method of Partial Fractions** 

1. Let be a linear factor of . Suppose that  is the highest power of  that divides . Then,



1. Let  be an irreducible quadratic function of  has no real roots. Suppose that  is the highest power. Then



1. Set the original fraction  equal to the sum of these partial fractions.
2. Equate the coefficients of corresponding powers of *x* and solve the resulting equations for the undetermined coefficients.

***Example***

Use partial fractions to evaluate 

***Solution***









 







***Example***

Use partial fractions to evaluate 

***Solution***





















***Example***

Use partial fractions to evaluate 

***Solution***











 









***Example***

Use partial fractions to evaluate 

***Solution***



















***Exercises*** ***Section* 2.4 – Partial Fractions**

Express the integrand as a sum of partial fractions and evaluate the integrals

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1. Find the volume of the solid generated by the revolving the shaded region about *x*-axis



Find the area of the region bounded by the graphs of

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1. Find the length of the graph of the function 
2. The region in the first quadrant that is enclosed by the *x*-axis, the curve  , and the lines  and  is revolved about the *x*-axis to generate a solid. Find the volume of the solid.
3. Consider the region bounded by the graphs .
4. Find the volume of the solid generated by revolving the region about the 
5. Find the centroid of the region.
6. Consider the region bounded by the graph .

Find the volume of the solid generated by revolving this region about the .

1. A single infected individual enters a community of *n* susceptible individuals. Let *x* be the number of newly infected individuals at time *t*. The common epidemic model assumes that the disease spreads at a rate proportional to the product of the total number infected and the number not yet infected. So,

 and you obtain



Solve for *x* as a function of *t*.

1. Evaluate  in ***two*** different ways.