Lab 6

Problem 1 and 2:

a)By Rectangle rule, estimated value is -0.40000.
Bound for error by error formula is 1.13889.
Actual error is 0.33397.

b)By Rectangle rule, estimated value is 8.28652.
Bound for error by error formula is 9.67408.
Actual error is 5.69789.

c)By Rectangle rule, estimated value is 0.24320.
Bound for error by error formula is 0.32256.
Actual error is 0.26357.

d)By Rectangle rule, estimated value is 0.36788.
Bound for error by error formula is 0.99159.
Actual error is 0.09537.

Problem 3:

a)By Midpoint rule, estimated value is -0.67532.
Bound for error by error formula is 0.28086.
Actual error is 0.05864.
By Trapezoid rule, estimated value is -0.86667.
Bound for error by error formula is 0.56173.
Actual error is 0.13270.
By Simpsons rule, estimated value is -0.73911.
Bound for error by error formula is 0.06328.
Actual error is 0.00514.
By Corrected Trapezoidal rule, estimated value is -0.71019.
Bound for error by error formula is 0.25312.
Actual error is 0.02378.

b)By Midpoint rule, estimated value is 1.80391.
Bound for error by error formula is 1.14940.
Actual error is 0.78471.
By Trapezoid rule, estimated value is 4.14326.
Bound for error by error formula is 2.29881.
Actual error is 1.55463.
By Simpsons rule, estimated value is 2.58370.
Bound for error by error formula is 0.12679.
Actual error is 0.00493.
By Corrected Trapezoidal rule, estimated value is 2.61901.
Bound for error by error formula is 0.50715.
Actual error is 0.03039.

c)By Midpoint rule, estimated value is -0.01190.
Bound for error by error formula is 0.04004.
Actual error is 0.00848.
By Trapezoid rule, estimated value is -0.03702.
Bound for error by error formula is 0.08007.
Actual error is 0.01665.
By Simpsons rule, estimated value is -0.02027.
Bound for error by error formula is 0.00249.
Actual error is 0.00011.
By Corrected Trapezoidal rule, estimated value is -0.00273.
Bound for error by error formula is 0.00998.
Actual error is 0.01765.

d)By Midpoint rule, estimated value is 0.26584.
Bound for error by error formula is 0.22566.
Actual error is 0.00668.
By Trapezoid rule, estimated value is 0.28633.
Bound for error by error formula is 0.45133.
Actual error is 0.01382.
By Simpsons rule, estimated value is 0.27267.
Bound for error by error formula is 0.04359.
Actual error is 0.00016.
By Corrected Trapezoidal rule, estimated value is 0.15184.
Bound for error by error formula is 0.17436.
Actual error is 0.12067.

Problem 4:

Using Rectangle rule, the estimated value is 4.00000 and absolute error is 0.85841.
Using Trapezoidal rule, the estimated value is 3.00000 and absolute error is 0.14159.
Using Corrected Trapezoidal rule, the estimated value is 3.16667 and absolute error is 0.02507.
Using Simpsons one-third rule, the estimated value is 3.13333 and absolute error is 0.00826.
Using Simpsons three-eighth rule, the estimated value is 3.13846 and absolute error is 0.00313.

Problem 5:

a)Estimate by the composite trapezoid rule is: 0.42158.
b)Estimate by the composite trapezoid rule is: 0.44035.
c)Estimate by the composite trapezoid rule is: 3.15948.
d)Estimate by the composite trapezoid rule is: -0.48932.

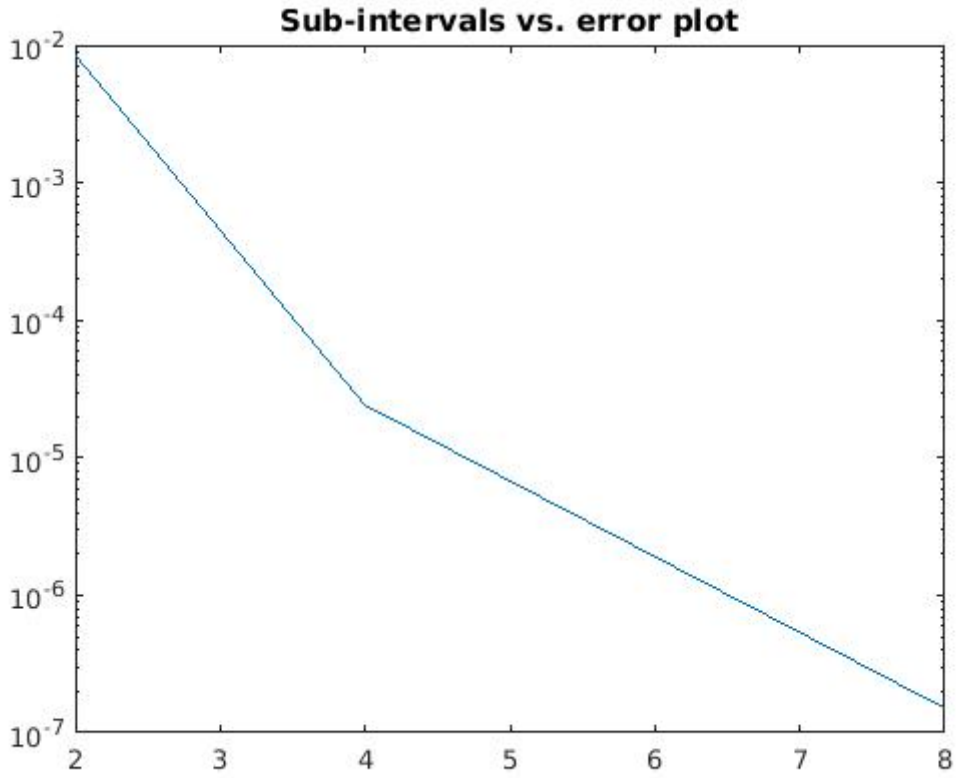
Problem 6:

a)Estimate by the composite midpoint rule is: 0.42330.
b)Estimate by the composite midpoint rule is: 0.43861.
c)Estimate by the composite midpoint rule is: 3.08420.
d)Estimate by the composite midpoint rule is: -0.48887.

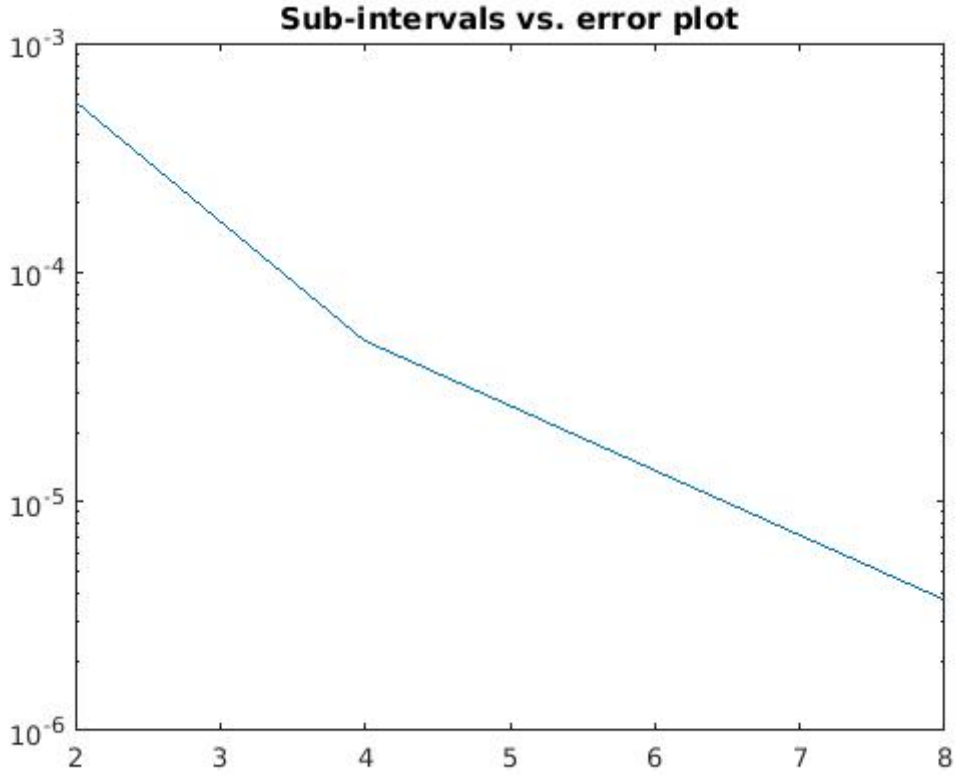
a)Estimate by the composite Simpson rule is: 0.42272.
b)Estimate by the composite Simpson rule is: 0.43919.
c)Estimate by the composite Simpson rule is: 3.10929.
d)Estimate by the composite Simpson rule is: -0.48902.

Problem 7:

a) Approximate value using Simpsons one third rule is 3.14159.



b)Approximate value using Simpsons one third rule is 0.39270.



Problem 8: Estimate by the composite trapezoid rule is: 7.12500.

Problem 9:

- By composite trapezoidal rule, the approximate value is 0.636304.
  Value of n is 77 and value of h is 0.01299.
- By composite simpsons rule, the approximate value is 0.636295.
  Value of n is 8 and value of h is 0.12500.
- By composite midpoint rule, the apaproximate value is 0.636284.
  Value of n is 108 and value of h is 0.01852.

Problem 10: The length of the graph of the ellipse is 15.86544 (found by composite Simpson's method).

Problem 11: Using composite simpson's rule for calculation, the length of the track obtained is 9858.00 feet.