

MA114 Summer II 2017
Worksheet 8 – Exam 1 Review
6/21/17

1. Compute the following integrals.

a) $\int \sqrt{4 - 9x^2} \, dx,$

e) $\int 6x^2 \cdot \frac{\cos(2x^3 - 5)}{\sin(2x^3 - 5)} \, dx,$

b) $\int \sin^2(x) \sin(2x) \cos(x) \, dx$
Hint: $\sin(2x) = 2 \sin(x) \cos(x),$

f) $\int \frac{dx}{\sqrt{6 - x^2}},$

c) $\int_1^{\sqrt{3}} \arctan\left(\frac{1}{x}\right) \, dx,$

g) $\int \frac{(1 - x^2)x}{(1 + x^2)^2} \, dx,$

d) $\int \tan^3(y) \sec^2(y) \, dy,$

h) $\int \frac{1}{x^2 - x} \, dx.$

2. Sketch the graph of the function $f(x) = x^2$ on $[0, 4]$ as well as the approximations $L_4, R_4, M_4,$ and T_4 . Compute each approximation.

3. Determine the form of the partial fraction decompositions for each of the following fractions.

a) $\frac{2x + 1}{(x - 1)(x^2 + 1)^2}$

b) $\frac{x^2 + 1}{(x^2 - 1)(x + 3)^2}$

4. Determine whether the following improper integrals are convergent or divergent. Explain your reasoning

a) $\int_1^{\infty} \frac{8}{(2x + 3)^3} \, dx$

b) $\int_1^{\infty} \frac{1 + e^{-x}}{\sqrt{x}} \, dx$

5. Determine whether the following improper integrals are convergent or divergent. If the integral converges, find the value it converges to.

a) $\int_0^{-1} \frac{e^{1/x}}{x^3} \, dx$

b) $\int_0^2 \frac{x}{x - 1} \, dx$