4. Do WebAssign 7.5. Remember that the WebAssign will be reopened three days before Exam I for you to review the problems. You will be allowed to improve your score by a maximum of three points. Additional attempts on the problems will not be given.

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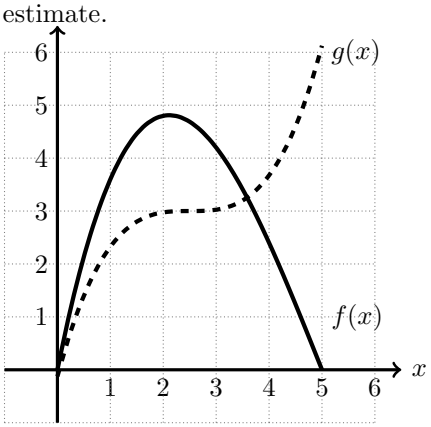
5. Decide which approximation(s)-left, right, trapezoid or midpoint- is guaranteed to give and overestimate and which approximation(s) is guaranteed to give and underestimate.



f

(a) left: overestimate, underestimate, neither.
(b) right: overestimate, underestimate, neither.
(c) mid: overestimate, underestimate, neither.
(d) trap: overestimate, underestimate, neither.

g

(a) left: overestimate, underestimate, neither.
(b) right: overestimate, underestimate, neither.
(c) mid: overestimate, underestimate, neither.
(d) trap: overestimate, underestimate, neither.

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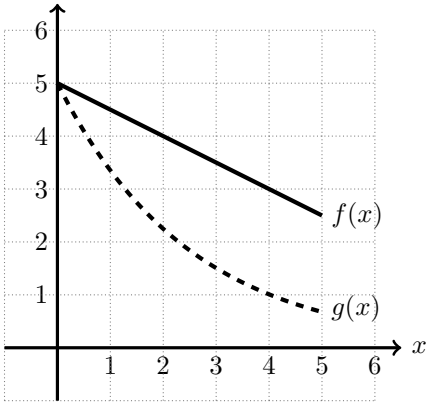
6. Using a fixed number of subdivisions, we approximate the integrals of f and g.



(a) For which function is LEFT more accurate? f, g.
(b) For which function is RIGHT more accurate? f, g.
(c) For which function is MID more accurate? f, g.
(d) For which function is TRAP more accurate? f, g.

7. Assume $f(s)$ is continous with no critical points or points of inflection on the interval $0 \le s \le 12$. Values of $f(s)$ are in the table.

s	0	3	6	9	12
$f(s)$	100	97	90	78	55

Which of the four approximation methods in this section is most likely to give the best estimate of $\int_0^{12} f(s)\,ds$?

Estimate the integral using your method.

Is your estimate an overestimate or an underestimate. Explain.

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8. Show geometrically why $\int_0^1 \sqrt{2-x^2}\,dx = \frac{\pi}{4} + \frac{1}{2}$.

Approximate the integral for $n = 5$ using the left, right, trapezoid and midpoint rules. Compare the error in each case with the correct answer.

For each of the integrals below, identify all viable methods of integration. For problems 3 and 4, elaborate on each method as demonstrated in problems 1 and 2.

1. $\int x^7 e^{x^2}\,dx$

   __ Substitution: Let $w = x^2$.

   __ Integration by parts: Set $u = x^2, v' = e^{x^2}$.

   __ Integration by parts: Let $u = e^{x^2}, v' = x^7$.

   __ Integration by parts: Let $u = xe^{x^2}, v' = x^6$.

   __ Tables: Use #IV - 14

2. $\int \frac{12x - 10}{3x^2 - 5x + 2}\,dx$

   __ Substitution: Let $w = 3x^2 - 5x + 2$.

   __ Integration by parts: Set $u = 12x - 10, v' = 1/(3x^2 - 5x + 2)$.

   __ Tables: Complete the square, then use

   __ Tables: Factor denominator, then use #IV - 27

   __ Partial Fractions: Structure -

   __ Trig substitution: Let $x =$ ____

3. $\int \frac{x^3}{2 + x^2}\,dx$

   __ Substitution: Let $w =$ ____ .

   __ Integration by parts: Set $u =$ ____ , $v' =$ ____ .

   __ Tables: Table number ____

   __ Partial Fractions without polynomial division: Structure - ____

   __ Partial Fractions with polynomial division: Structure - ____

   __ Trig substitution: Let $x =$ ____

4. $\int \frac{12 + 3x - 9x^2}{(x - 1)(x^2 - 4)}\,dx$

   __ Substitution: Let $w =$ ____

   __ Integration by parts: Set $u =$ ____ , $v' =$ ____ .

   __ Tables: Table number ____

   __ Partial Fractions: Structure -

   __ Trig substitution: Let $x =$ ____