Name: _____

Instructor: _____

Math 10550, Exam III
November 19, 2013

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- No calculators.
- The exam lasts for 1 hour and 15 min.
- Be sure that your name is on every page in case pages become detached.
- Be sure that you have all 10 pages of the test.

PLEASE MARK YOUR ANSWERS WITH AN X, not a circle!

1. (a)   (b)   (c)   (d)   (e)

2. (a)   (b)   (c)   (d)   (e)

....

3. (a)   (b)   (c)   (d)   (e)

4. (a)   (b)   (c)   (d)   (e)

....

5. (a)   (b)   (c)   (d)   (e)

6. (a)   (b)   (c)   (d)   (e)

....

7. (a)   (b)   (c)   (d)   (e)

8. (a)   (b)   (c)   (d)   (e)

....

9. (a)   (b)   (c)   (d)   (e)

10. (a)   (b)   (c)   (d)   (e)

Please do NOT write in this box.

Multiple Choice_____

11. _____

12. _____

13. _____

Total _____

Multiple Choice

1.(6 pts.) The slant asymptote of $y = \dfrac{x^2 + 2x + 1}{x - 1}$ is given by

(a) $x = 1$

(b) $y = x$

(c) $y = 1$

(d) $y = x + 3$

(e) $y = 3$

2.(6 pts.) The equation $x^5 + x - 1 = 0$ has one solution between 0 and 1. Find the result of one iteration of Newton's method applied to this equation with 1 as the starting point (i.e. find x_2 using Newton's method applied to the equation with $x_1 = 1$).

(a) $\dfrac{5}{7}$

(b) 1

(c) $\dfrac{1}{2}$

(d) $\dfrac{3}{4}$

(e) $\dfrac{5}{6}$

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3.(6 pts.) A car racing on a straight road crosses the starting line with a velocity of 88 ft/sec. From this point on it accelerates at $\dfrac{60}{\sqrt{t}}$ ft/sec^2. How fast in ft/sec will the car be going 4 seconds after the car has crossed the starting line?

(a) 292 ft/sec

(b) 244 ft/sec

(c) 328 ft/sec

(d) 152 ft/sec

(e) 208 ft/sec

4.(6 pts.) The graph of a piecewise defined function $f(x)$ consisting of a semicircle and 3 straight lines, is shown below. Use the graph to calculate the value of R_5, the right endpoint approximation to $\displaystyle\int_0^{10} f(x)dx$ using 5 approximating rectangles.
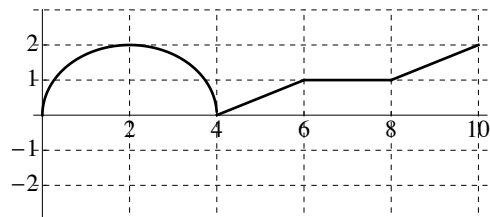
(a) $R_5 = 8$

(b) $R_5 = 12$

(c) $R_5 = 6$

(d) $R_5 = 16$

(e) $R_5 = 5$

5.(6 pts.) If $f(x) = \displaystyle\int_0^{5x} \cos(t^2)dt$, then $f'(x) =$

(a) $5\cos(5x^2)$ (b) $-5\cos(5x^2)$ (c) $5\cos(25x^2)$

(d) $-25\cos(5x^2)$ (e) $-5\cos(25x^2)$

6.(6 pts.) Evaluate $\displaystyle\int (4 - 3x^2)(4x + 1)dx.$

(a) $-12x^4 - 3x^3 + 16x^2 + 4x + C$ (b) $-\dfrac{3}{4}x^4 - x^3 + 8x^2 + 4x + C$

(c) $-2x^5 - x^4 + 8x^3 + 4x^2 + C$ (d) $-3x^4 - x^3 + 8x^2 + 4x + C$

(e) $-36x^2 + 16 + C$

4

7.(6 pts.) Evaluate the integral $\int_0^{\sqrt{\pi}} x\sin(x^2)dx$.

(a) 1   (b) $\dfrac{\pi}{4}$ (c) 2   (d) $1 - \dfrac{1}{\pi}$ (e) $\dfrac{1}{4}$

8.(6 pts.) Evaluate $\int_1^9 \dfrac{1}{\sqrt{x}(1 + 2\sqrt{x})^2}dx$.

(a) $\dfrac{8}{9}$ (b) $\dfrac{4}{21}$ (c) $\dfrac{1}{7}$ (d) 1   (e) $\dfrac{1}{4}$

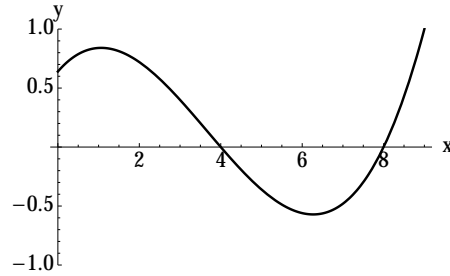**9.**(6 pts.) Evaluate $\displaystyle\int_1^6 |x-2|\,dx$.

(a) $\dfrac{15}{2}$ (b) 8   (c) 4   (d) $\dfrac{33}{2}$ (e) $\dfrac{17}{2}$

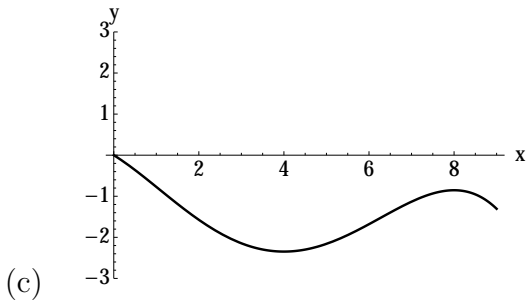**10.**(6 pts.) If the following is a graph of the function $f(x)$, which graph among the answers is the graph of $\int_0^x f(t)dt$?

Note: The letter corresponding to the diagram is on the lower left.

(a)

(b)

(c)

(d)

(e)
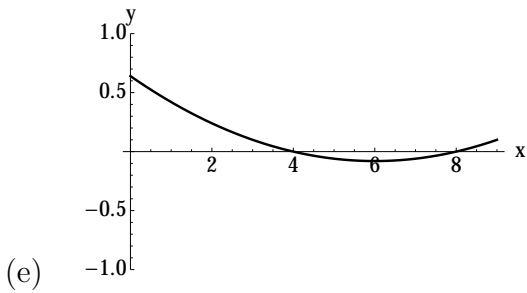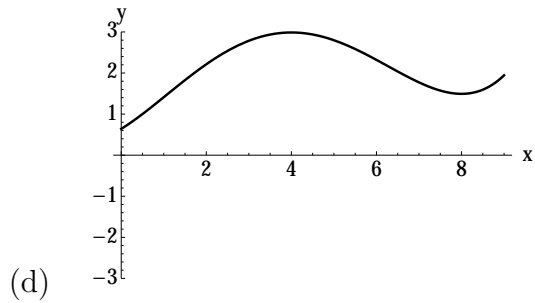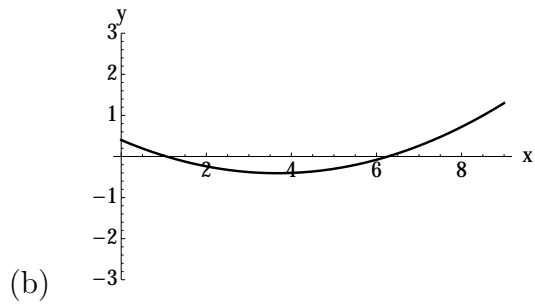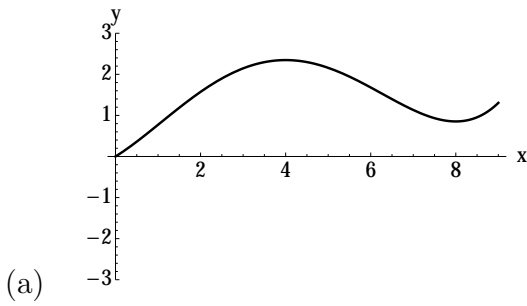
Partial Credit
You must show your work on the partial credit problems to receive credit!

11.(13 pts.) Evaluate the definite integral $\int_0^2 (1 + x^2)dx$ by using right endpoint approximations and the **limit definition** of the definite integral.

Hint: $1^2 + 2^2 + 3^2 + \cdots + n^2 = \dfrac{1}{6}n(n + 1)(2n + 1).$

12.(13 pts.) Find all the points on the hyperbola $y^2 - x^2 = 4$ that are closest to the point $(2, 0)$.

13.(14 pts.) A page of a book is to have a total area of 150 square inches, with 1 inch margins at the top and sides, and a 2 inch margin at the bottom. Find the dimensions in inches of the page which will have the largest print area.

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