

Exam 4 – Math 141 Fall 2012

Name: _____

Exam Version B

This exam is multiple choice. Make sure you fill in your answers on the scantron answer sheet provided. Fill in your name, student ID number, and the exam version on the scantron answer sheet. You may use this exam to work out the problems. You must hand in this exam as well as the scantron answer sheet. To hand in your exam, be prepared to show your picture ID. This is a closed book, closed notes exam. Calculators are allowed but must be equivalent to a TI-83/84; no TI-89s or equivalent are allowed. No cell phones are permitted outside of your bag at anytime during the test.

1. $\lim_{x \rightarrow 2} \left(\frac{x^2 - 8x + 12}{x - 2} \right) =$

- (a) -6
- (b) 1
- (c) -4
- (d) does not exist (or undefined)
- (e) none of the above

2. If $f(x) = \sqrt[4]{4x^2 - x}$, then $f'(x) =$

- (a) $\frac{1}{4}(4x^2 - x)^{-1/4}(8x - 1)$
- (b) $\frac{1}{4}(4x^2 - x)^{-3/4}(8x - 1)$
- (c) $\frac{1}{4}(8x - 1)^{-3/4}$
- (d) $\frac{1}{4}(4x^2 - x)^{-3/4}$
- (e) none of the above

3. Evaluate $\int \left(4\sqrt[3]{x} + \frac{5}{x} - 15 \right) dx$, where $x > 0$.

- (a) $4x^{1/3} + 5 \ln(x) - 15x + C$
- (b) $3x^{2/3} + 5 \ln(x) - 15x + C$
- (c) $3x^{4/3} + 5 \ln(x) - 15x + C$
- (d) $3x^{4/3} + 5x^{-2} - 15x + C$

4. The equilibrium point for the supply curve $S(x) = x^2 + 2x + 6$ and the demand curve $D(x) = (x - 4)^2$ is $(1, 9)$. Determine the producer's surplus at the equilibrium point.

- (a) \$1.67
- (b) -\$1.67
- (c) \$3.33
- (d) -\$3.33

5. The equilibrium point for the supply curve $S(x) = x^2 + 2x + 6$ and the demand curve $D(x) = (x - 4)^2$ is $(1, 9)$. Determine the consumer's surplus at the equilibrium point.
- (a) \$1.67
 - (b) -\$1.67
 - (c) \$3.33
 - (d) -\$3.33
6. Find the equilibrium point given the supply curve $S(x) = x^2 + 2x + 21$ and the demand curve $D(x) = (x - 9)^2$.
- (a) $(4, 45)$
 - (b) $(2, 29)$
 - (c) $(2, 49)$
 - (d) $(3, 36)$
7. An investment triples in value after 50 years. At what interest rate is it appreciating if the investment is compounded continuously?
- (a) 0.022%
 - (b) 0.0667%
 - (c) 2.2%
 - (d) 6.67%
8. You invest \$1000 dollars today in a savings account that compounds continuously at an interest rate of 5% per year. After 4 years what is your total savings?
- (a) \$161.83
 - (b) \$1221.40
 - (c) \$3153.81
 - (d) \$3481.69
 - (e) \$4481.69

9. A chemical substance has a decay rate of 3.1% per year. The amount of that substance at time t , measured in years, is given by the equation $N = N_0 e^{-0.031t}$. How many years will it take for a given amount of this chemical substance to decay to a quarter of its initial amount?
- (a) about 1 year
 - (b) about 22 years
 - (c) about 72 years
 - (d) about 5 years
10. How much money, to the nearest dollar, must you invest now at 4.3% interest compounded continuously in order to have \$10,000 at the end of 6 years?
- (a) \$1165
 - (b) \$8065
 - (c) \$7726
 - (d) \$12943
 - (e) Cannot be determined
11. Over time, a car's value depreciates continuously with respect to time, t . Which of the following statements is true?
- (a) $r > 0$
 - (b) $r < 0$
 - (c) If $A(0) = P$ then $P < A(t)$ for all values of t .
 - (d) $A(3) > A(2)$
 - (e) none of the above
12. Determine the x -values at which the graphs $f(x) = x^2 + 5x + 8$ and $g(x) = x + 13$ cross.
- (a) -15 and -3
 - (b) -3 and 1
 - (c) 0 and 1
 - (d) -5 and 0
 - (e) -5 and 1

13. Find the area between $f(x) = 2 - x^2$ and $g(x) = 2 - 4x$
- (a) $\frac{32}{3}$
 - (b) $\frac{16}{3}$
 - (c) $\frac{25}{3}$
 - (d) $\frac{8}{3}$
 - (e) none of the above
14. Find the area between $f(x) = x$ and $g(x) = \sqrt[4]{x}$
- (a) 0.9
 - (b) 1
 - (c) 0.6
 - (d) 0.3
 - (e) none of the above
15. Find the area of the region bounded by $f(x) = x$, $g(x) = x^5$, $x = 0$, and $x = 1$
- (a) 1
 - (b) 0
 - (c) $\frac{2}{3}$
 - (d) $\frac{1}{3}$
 - (e) none of the above
16. What does $\int_a^b f'(x)dx$ represent?
- (a) $f(b) - f(a)$
 - (b) Area under $f'(x)$ on $[a, b]$
 - (c) Definite integral of $f'(x)$ on $[a, b]$
 - (d) all of the above
 - (e) none of the above

Let $D(x)$ be the consumer's demand curve, and let $S(x)$ be the producer's supply curve. The equilibrium point in this example is $(14, 26)$.

Figure 1:

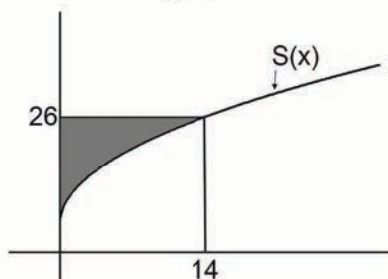


Figure 2:

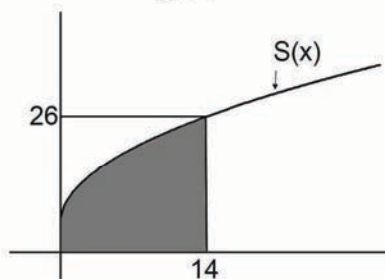


Figure 3:

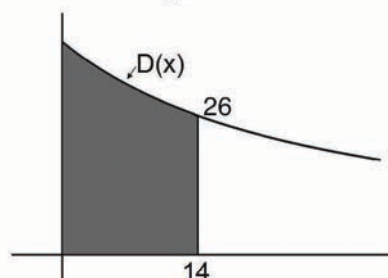
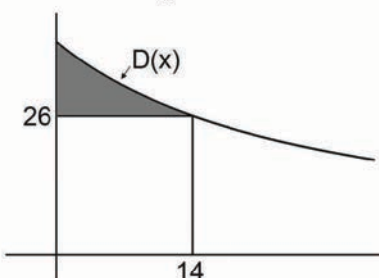


Figure 4:



17. The quantity shaded in Figure 1 is

- (a) $14 * 26 - \int_0^{14} S(x)dx$
- (b) $\int_0^{14} D(x)dx - 14 * 26$
- (c) $\int_0^{14} D(x)dx$
- (d) $\int_0^{14} S(x)dx$
- (e) $14 * 26$

19. The quantity shaded in Figure 3 is

- (a) $14 * 26 - \int_0^{14} S(x)dx$
- (b) $\int_0^{14} D(x)dx - 14 * 26$
- (c) $\int_0^{14} D(x)dx$
- (d) $\int_0^{14} S(x)dx$
- (e) $14 * 26$

18. The quantity shaded in Figure 2 is

- (a) $14 * 26 - \int_0^{14} S(x)dx$
- (b) $\int_0^{14} D(x)dx - 14 * 26$
- (c) $\int_0^{14} D(x)dx$
- (d) $\int_0^{14} S(x)dx$
- (e) $14 * 26$

20. The quantity shaded in Figure 4 is

- (a) $14 * 26 - \int_0^{14} S(x)dx$
- (b) $\int_0^{14} D(x)dx - 14 * 26$
- (c) $\int_0^{14} D(x)dx$
- (d) $\int_0^{14} S(x)dx$
- (e) $14 * 26$