King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

Math 102
Exam I
Summer 113
Tuesday 26/06/2012
Net Time Allowed: 120 minutes

MASTER VERSION

1. $\lim_{n\to\infty} \dfrac{1+4+9+\ldots+n^2}{n^3} =$

(a) $\dfrac{1}{3}$

(b) $\dfrac{1}{6}$

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

(d) 1

(e) ∞

2. $\int_0^{\sqrt{2}} \sqrt{2-x^2}dx =$ (Hint: interpret the integral as an area)

(a) $\dfrac{\pi}{2}$

(b) $\dfrac{\pi}{4}$

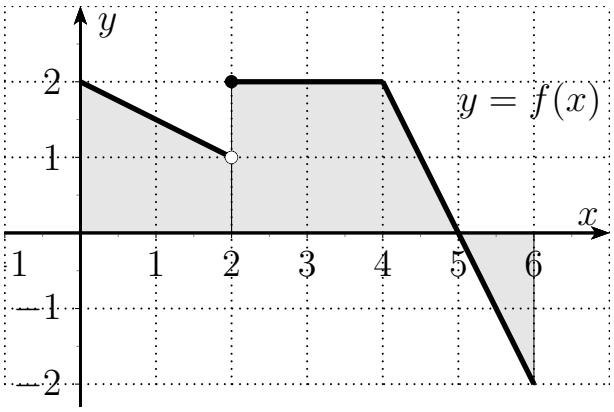
(c) 2π

(d) π

(e) $\dfrac{\pi}{\sqrt{2}}$

3. If the graph of f is the one shown below, then $\int_0^6 f(x)dx =$

a) 7
b) 6
c) 5
d) 8
e) 4



4. If $\int_1^3 f(x)dx = 2$ and $\int_5^1 f(x)dx = 7$, then $\int_5^3 f(x)dx =$

(a) 9

(b) -5

(c) 7

(d) 5

(e) -9

5. $\int_0^{\ln 2} e^{x-2}dx =$

(a) $\frac{1}{e^2}$

(b) e^2

(c) 0

(d) 1

(e) e

6. If $\int_1^x \frac{2f(t)}{t^2}dt = x^2 - 1$, then $f(2) =$

(a) 8

(b) 1

(c) 4

(d) 9

(e) 16

7. If $H(x) = \int_{\sqrt{x}}^{x^3} e^{u^2} du$ then $H'(1) + 3H(1) =$

(a) $\frac{5}{2}e$

(b) $\frac{3}{2}$

(c) $\frac{5}{2}e + 3$

(d) $-\frac{2}{5}e$

(e) 0

8. The area of the region enclosed by the two curves $x = y^2$ and $x = 2y^4 - y^2$ is

(a) $\frac{8}{15}$

(b) $\frac{4}{15}$

(c) $\frac{2}{5}$

(d) $\frac{3}{5}$

(e) $\frac{2}{3}$

9. The area of the region enclosed by the curves $y = \sec^2 x$, $y = 0$, $x = -\frac{\pi}{4}$, and $x = \frac{\pi}{4}$ is

(a) 2

(b) 4

(c) 8

(d) 1

(e) 0

10. The volume of the solid generated by revolving the region enclosed by the triangle with vertices $(1, 0), (2, 1)$ and $(1, 1)$ about the $y-$axis is:

(a) $\frac{4}{3}\pi$

(b) $\frac{3}{4}\pi$

(c) π

(d) $\frac{2}{3}\pi$

(e) $\frac{3}{2}\pi$

11. If the cross-sectional area of a solid is $A(x) = \dfrac{2x}{(x^2+1)^2}$, then the volume of this solid between $x = 0$ and $x = 1$ is:

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

(b) $\dfrac{1}{4}$

(c) $\dfrac{1}{6}$

(d) $\dfrac{1}{5}$

(e) $\dfrac{1}{3}$

12. If $f(2) = 2$ and $\int_1^2 f'(x)\,dx = 3$, then $f(1) =$

(a) -1

(b) 1

(c) 2

(d) 5

(e) -2

13. A particle moves along a line so that its velocity at time t is $v(t) = t^2 - 3t + 2$ (measured in meters(m) per second(s)). Find the total distance traveled during the period $1 \leq t \leq 3$

(a) 1m

(b) 2 m

(c) 3/2 m

(d) 1/2 m

(e) 2/3 m

14. $\int_0^{\pi} (-\cos x + |\cos x|)dx =$

(a) 2

(b) 0

(c) -1

(d) 1

(e) $\pi/2$

15. $\int \frac{(t+1)^2-1}{t^4}dt =$

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

(b) $\frac{1}{t^2}+\frac{2}{t^3}+C$

(c) $-\frac{1}{t}+\frac{2}{t^2}-\frac{1}{t^3}+C$

(d) $\frac{1}{t}-\frac{2}{t^2}+C$

(e) $\ln|t|+\frac{1}{t}+\frac{1}{t^2}+C$

16. $\int_0^{\pi/2}(\sin\theta+\cos\theta)^2\,\sin\theta d\theta =$

(a) $\frac{5}{3}$

(b) $\frac{2}{3}$

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

(d) $\frac{3}{5}$

(e) $\frac{1}{3}$

17. $\int \frac{3x}{\sqrt{2x+1}} dx =$

(a) $(x-1)\sqrt{2x+1} + C$

(b) $(2x+1)\sqrt{x-1} + C$

(c) $3(x+1)\sqrt{2x-1} + C$

(d) $3(1-x)\sqrt{2x-1} + C$

(e) $3\sqrt{1-2x}(1-x) + C$

18. $\int_0^{\ln(2)} \frac{e^x}{(3+2e^x)^2} dx =$

(a) $\frac{1}{35}$

(b) $-\frac{1}{35}$

(c) $\frac{7}{5}$

(d) $\frac{5}{7}$

(e) $-\frac{1}{15}$

19. The area of the region in the first quadrant that is bounded above by $y = \sqrt{x}$ and below by the x-axis and the line $y = x - 2$ is given by the integral

(a) $\int_0^2 (y + 2 - y^2)dy$

(b) $\int_1^4 (\sqrt{x} - x + 2)dx$

(c) $\int_0^4 (\sqrt{x} - x + 2)dx$

(d) $\int_1^4 (y - 2 - y^2)dy$

(e) $\int_0^4 (2y - y^2)dy$

20. The area of the region between x-axis and the graph of $f(x) = x^3 - x^2 - 2x;\ 0 \leq x \leq 2$

(a) $\frac{8}{3}$

(b) $-\frac{8}{3}$

(c) $\frac{32}{3}$

(d) $\frac{16}{3}$

(e) $\frac{4}{3}$