14 Multiple Choice Problems

Name _____
Date _____

Part I – Multiple Choice (You may use a calculator)

Please circle the best answer.

1. At time $t \geq 0$, the acceleration of a particle moving on the x-axis is given by $a(t) = t + \sin t$. At $t = 0$, the velocity of the particle is -2. For what value of t will the velocity of the particle be 0?

(A) 1.02 (B) 1.48 (C) 1.85 (D) 2.81 (E) 3.14

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2. The average value of the function $f(x) = x^2 \sin x$ on the interval [2, 4]

(A) -0.686 (B) 0.686 (C) -1.373 (D) 1.373 (E) -2.746

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3. Find the distance traveled in the first four seconds, for a particle whose velocity is given by $v(t) = 7\sin(t)$; where t represents time, in seconds.

(A) -16.424 (B) -11.576 (C) 0 (D) 11.576 (E) 16.424

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4. The volume generated by revolving about the x-axis the region below the curve $y = x^3$, above the x-axis, and between $x = 0$ and $x = 1$ is

(A) $\frac{\pi}{42}$ (B) 0.143π (C) $\frac{\pi}{7}$ (D) 0.643π (E) $\frac{6\pi}{7}$

5. If f is a continuous function, and $F'(x) = f(x)$ for all real numbers x, then $\int_1^3 f(2x)dx =$

(A) $2F(3) - 2F(1)$ (B) $\frac{1}{2}F(3) - \frac{1}{2}F(1)$ (C) $2F(6) - 2F(2)$ (D) $F(6) - F(2)$ (E) $\frac{1}{2}F(6) - \frac{1}{2}F(2)$

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6. Let g be the function given by $g(x) = \int_0^x \sin\left(t^2\right)dt$ for $-1 \le x \le 3$. On which of the following intervals is g decreasing?

(A) $-1 \le x \le 0$ (B) $0 \le x \le 1.772$ (C) $1.253 \le x \le 2.171$ (D) $1.772 \le x \le 2.507$ (E) $-1 \le x \le 3$

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7. If the region enclosed by the y-axis, the curve $y = 4\sqrt{x}$, and the line $y = 8$ is revolved about the x-axis, the volume of the solid generated is

(A) $\frac{32\pi}{3}$ (B) 128π (C) $\frac{128}{3}$ (D) 128 (E) $\frac{128\pi}{3}$

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8. Find the length of the curve $y = x^{3/2}$ from x = 1 to x = 2

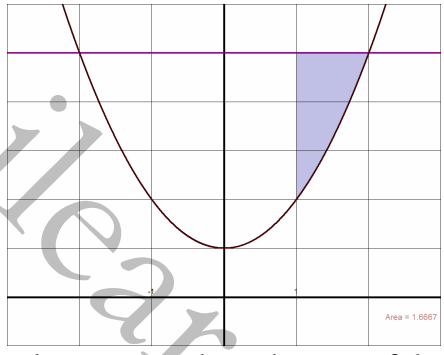
(A) 0 (B) 1.456 (C) 2.086 (D) 3.498 (E) 10.862

Part II – Multiple Choice (You may not use a calculator)

Please circle the best answer.

1. What is the average value of $y = \sin 2x$ over the interval $\left[\frac{\pi}{4}, \frac{\pi}{3}\right]$

(A) $-\frac{6}{\pi}$ (B) $-\frac{1}{6\pi}$ (C) $\frac{3}{\pi}$ (D) 3π (E) $\frac{6}{\pi}$



2. Which of the following integrals correctly corresponds to the area of the shaded region in the figure above? (FYI: the functions graphed are: $f(x) = 1 + x^2$ and $g(x) = 5$)

(A) $\int_1^2 \left(x^2 - 4\right) dx$ (B) $\int_1^2 \left(4 - x^2\right) dx$ (C) $\int_1^5 \left(x^2 - 4\right) dx$ (D) $\int_1^5 \left(x^2 + 4\right) dx$ (E) $\int_1^5 \left(4 - x^2\right) dx$

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3. A particle's position is given by $s(t) = \sin t + 2\cos t + \frac{t}{\pi} + 2$. The average velocity of the particle over $[0, 2\pi]$

(A) $-\frac{\pi + 1}{\pi}$ (B) $-\frac{1}{3}$ (C) 0 (D) $\frac{1}{\pi}$ (E) $\frac{\pi + 1}{\pi}$

4. A solid is generated when the region in the first quadrant enclosed by the graph of $y=\left(x^2+1\right)^3$, the line $x=1$, the x-axis, and the y-axis is revolved about the x-axis. Its volume is found by evaluating which of the following integrals?

(A) $\pi\int_1^8\left(x^2+1\right)^3dx$ (B) $\pi\int_1^8\left(x^2+1\right)^6dx$ (C) $\pi\int_0^1\left(x^2+1\right)^3dx$ (D) $\pi\int_0^1\left(x^2+1\right)^6dx$ (E) $2\pi\int_0^1\left(x^2+1\right)dx$

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5. $\int_0^{\pi/2}\cos x\,dx$

(A) $-\pi$ (B) -1 (C) 0 (D) 1 (E) π

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6. $\frac{d}{dx}\int_0^x\sin(t)dt=$

(A) $\sin t$ (B) $\cos t$ (C) $-\cos x$ (D) $\sin x$ (E) $\cos x$

SECTION 1 KEY

1	2	3	4	5	6	7	8
B	A	E	C	E	D	B	C

SECTION 2 KEY

1	2	3	4	5	6		
C	B	D	D	D	D		