1. In the Maclaurin expansion of

$$e^{-2x} + (1 + 3x)^2 + \cos(2x^2)$$

the coefficient of x^4 is

(A) $\frac{1}{3}$ (B) $\frac{3}{2}$ (C) $-\frac{4}{3}$ (D) 0 (E) $-\frac{1}{2}$

2. The degree 5 term of the Maclaurin series for $\sin x \cos x$ is

(A) x^5 (B) $\frac{2}{15}x^5$ (C) $-\frac{x^5}{10}$ (D) $\frac{3}{20}x^5$ (E) $\frac{8}{5}$
x^5

3. Suppose that we compute an approximate value for $(1.2)^{9/4}$ by using the 2nd order Taylor polynomial for $f(x) = x^{9/4}$ at $a = 1$. According to Taylors theorem, the error in the approximation is

(A) $\frac{45}{64} \cdot c^{9/4}$, where $1 < c < 1.2$

(B) $\frac{1}{1600} \cdot \frac{1}{c^{3/4}}$, where $0 < c < 0.2$

(C) $\frac{45}{64} c^3$, where $0 < c < 0.2$

(D) $\frac{3}{3200} \cdot \frac{1}{c^{3/4}}$, where $1 < c < 1.2$

(E) $\frac{1}{3200} c^3$, where $1 < c < 1.2$

4. The number $\int_0^1 \cos\sqrt{t}\, dt$ is equal to which of the following infinite series?

(A) $\sum_{n=0}^{\infty} (-1)^n \frac{1}{n[(2n)!]}$

(B) $\sum_{n=0}^{\infty} (-1)^n \frac{1}{(n+1)[(2n)!]}$

(C) $\sum_{n=0}^{\infty} (-1)^n \frac{1}{n[(2n-1)!]}$

(D) $\sum_{n=0}^{\infty} (-1)^n \frac{1}{2n[(2n)!]}$

(E) $\sum_{n=0}^{\infty} (-1)^n \frac{1}{2n[(2n-1)!]}$

5. The curve C is given parametrically by

$$x = e^{-t} \qquad \text{for all } t$$
$$y = e^{t}$$

Which of the following curves most clearly resembles C?

(A)

(B)

(C)

(D)

(E)

6. The curve C is described by the parametric equations

$$x = \sec^2 t - 1$$

$$y = \tan t$$

The equation of the tangent line to C at $t = \frac{-\pi}{4}$ is

(A) $x - 2y + 3 = 0$ (B) $y = 2x - 3$

(C) $x + 2y + 1 = 0$ (D) $2x + y - 1 = 0$

(E) $y = -\frac{x}{2} - \frac{1}{2}$

7. The length of the curve given by parametric equations

$$x = 2(\cos t + t \sin t)$$
$$y = 2(\sin t - t \cos t) \quad \text{for } 0 \le t \le \pi$$

is

(A) $6\sqrt{2}$ (B) 2π (C) 8 (D) π^2 (E) $4\sqrt{\pi}$

8. The polar equation of the circle of radius 5, whose center has Cartesian coordinates (4, –3) is given by

(A) $r = 5 \sin\theta$

(B) $r^2 = 4 \cos\theta - 3 \sin\theta$

(C) $r = 2 \cos\theta - \sqrt{3} \sin\theta$

(D) $r^2 = -3 \cos\theta + 4 \sin\theta$

(E) $r = 8 \cos\theta - 6 \sin\theta$

9. The polar equation $r = 2 \sin\theta \tan\theta$ represents a curve whose Cartesian equation is

(A) $x^2 y^2 + x^4 = y^3$

(B) $\sqrt{x^2 + y^2} = 2 y^2/x$

(C) $x^3 + xy^2 = 2y^2$

(D) $x^2 y^2 + y^4 = x^2$

(E) $\sqrt{x^2 + y^2} = y$

10. The graph of the polar equation $r = \cos 2\theta$ most closely resembles

(A)

(B)

(C)

(D)

(E)

11. The area of the region that is bounded by the curve

$$r = 4\cos\theta$$

is

(A) $8\sqrt{2}$ (B) 12 (C) $2\pi^2$ (D) $2\pi + 4\sqrt{2}$ (E) 4π