EMCF 22

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NOTE: On all problems, choice F is "None of the above".

1. If $x = 2t - 1$ and $y = 3 - 4t^2$, then $\frac{dy}{dx}$ is

A. $4t$ B. $-4t$ C. $-\frac{1}{4t}$ D. 2(x+1) E. $-4(x+1)$

2. Find the slope of the curve $r = \cos(2\theta)$ at $\theta = \frac{\pi}{6}$.

A. $\frac{\sqrt{3}}{7}$ B. $\frac{1}{\sqrt{3}}$ C. 0 D. $\sqrt{3}$ E. $-\sqrt{3}$

3. Find the arc length of the curve 3y = 4x from (3,4) to (9, 12).

A. 13 B. 10 C. 8 D. 14 E. 15

4. Find the arc length of the curve $y = \sqrt{4 - x^2}$, $-2 \le x \le 2$. Think !

A. π B. 2π C. π/2 D. 3π/2 E. 3π/4

5. Find the arc length of the curve $y = \frac{2}{3}(x-4)^{\frac{3}{2}}$, $7 \le x \le 12$.

A. 19 B. 65/2 C. 55/2 D. 19/2 E. 38/3

6. Find the arc length of the curve $x = 2t^2 - 1$, $y = 4t^2 + 3$, $0 \le t \le 1$.

A. $4\sqrt{5}$ B. $8\sqrt{5}$ C. $2\sqrt{5}$ D. $4\sqrt{3}$ E. $16\sqrt{3}$

7. Find a definite integral representing the length of the parametric curve $x = t^3,\ y = t^4,\ 0 \le t \le 1$.

A. $\int_0^1 \left(t^3 + t^4\right) dt$ B. $\int_0^1 \sqrt{t^3 + t^4}\ dt$ C. $\int_0^1 \sqrt{3t^2 + 4t^3}\ dt$

D. $\int_0^1 \sqrt{9t^4 + 16t^6}\ dt$ E. $\int_0^1 \sqrt{4t^4 + 9t^6}\ dt$

8. Find a definite integral representing the length of the polar curve $r = 3\sin\theta,\ 0 \le \theta \le \pi$.

A. $\int_0^\pi \sqrt{9\sin^2\theta}\, d\theta$ B. $\int_0^\pi \sqrt{3\sin\theta + 3\cos\theta}\, d\theta$ C. $\int_0^\pi 3\, d\theta$

D. $\int_0^\pi \sqrt{9\sin^2\theta - 9\cos^2\theta}\ d\theta$ E. $\int_0^\pi \sqrt{9\cos^2\theta}\, d\theta$

9. B

10. B