Math Questions

1.) Currently the population of Tallahassee is 20,000 people at time $t = 0$. The population is increasing at the rate of 7.5 percent per year. Find the formula that would satisfy this problem.

A) $Q(t) = 20000 + 0.075t$

B) $Q(t) = 20000 * e^{0.075*t}$

C) $Q(t) = 20000 * (7.5)^t$

D) $Q(t) = 20000(1 + 0.075)^t$

E) None of the Above

2.) Find the period of the following function.

$y = 3.5 + \cos(4x)$

A) $\frac{3.5\pi}{4}$

B) $\frac{4\pi}{3.5}$

C) 3.5π

D) $\frac{\pi}{2}$

E) None of the Above

3.) Find the formula for the derivative of the following formula.

$g(t) = \frac{t^3 + 5}{t}$

A) $g'(t) = 3t^2$

B) $g'(t) = 3 - t + 5/t^2$

C) $g'(t) = \frac{2t^3 + 5}{t^2}$

D) $g'(t) = \frac{2t^3 - 5}{t^2}$

E) None of the Above

4. Find the derivative of the following function.

$f(x) = \ln(\sin x + \cos x)$

A) $f'(x) = \cos x - \sin x$

B) $f'(x) = \dfrac{1}{\cos x + \sin x}$

C) $f'(x) = 1$

D) $f'(x) = \dfrac{\cos x - \sin x}{\cos x + \sin x}$

E) None of the Above

5.) Find the ANTI-derivative of the following function with respect to z.

$g(z, y) = \sqrt{z} + y^2$

A.) $G(z) = \dfrac{1}{2} z^{-0.5} + 2y + C$

B.) $G(z) = \dfrac{1}{2\sqrt{z}} + \dfrac{1}{2} y^3 + C$

C.) $G(z) = \dfrac{2}{3} z^{\frac{3}{2}} + zy^2 + C$

D.) $G(z) = -\dfrac{2}{3}\sqrt{z^3} + C$

E.) None of the Above

6.) Find the indefinite integral of:

$\int (t^2 + \frac{1}{t^2}) dt$

A) $\int (t^2 + \frac{1}{t^2}) dt = 2t - \frac{2}{t^3} + C$

B) $\int (t^2 + \frac{1}{t^2}) dt = \frac{1}{3} t^3 - \frac{1}{t} + C$

C) $\int (t^2 + \frac{1}{t^2}) dt = t^3 - \frac{1}{t} + C$

D) $\int (t^2 + \frac{1}{t^2}) dt = \frac{1}{3} t^3 + \frac{1}{t} + C$

E) None of the Above

7.) Find the integrals of the following problem.

$$f(x)=\int_{2}^{9} x\cos(x)dx$$

A) $F(x)=9\sin 9+\cos 9-2\sin 2-\cos 2$

B) $F(x)=9\sin 9-2\sin 2$

C) $F(x)=9\sin 9+\cos 9-2\sin 2+\cos 2$

D) $F(x)=\dfrac{81\sin 9-4\sin 2}{2}$

E) None of the Above

8.) Find the domain and range of the following function.

$y = x^2 + 2$

A) Domain: $x \geq 2$ & Range: $y \geq 2$

B) Domain: $-\infty \leq x \leq \infty$ & Range: $y \geq 2$

C) Domain: $-\infty \leq x \leq \infty$ & Range: $y \leq 2$

D) Domain: $-\infty \leq x \leq \infty$ & Range: $y > 2$

9.) If $f(x) = x^2 + 1$, find and simplify f(t+1).

A) $f(t=1) = t^2 + 1$

B) $f(t=1) = t^2 + 2t + 1$

C) $f(t=1) = t^2 + 2t + 2$

D) $f(t=1) = t^2 + 2t$

10.) What is the amplitude of the following function?

$y = 6 + 4\cos(7x)$

A) 7

B) 6/7

C) 4/7

D) 4