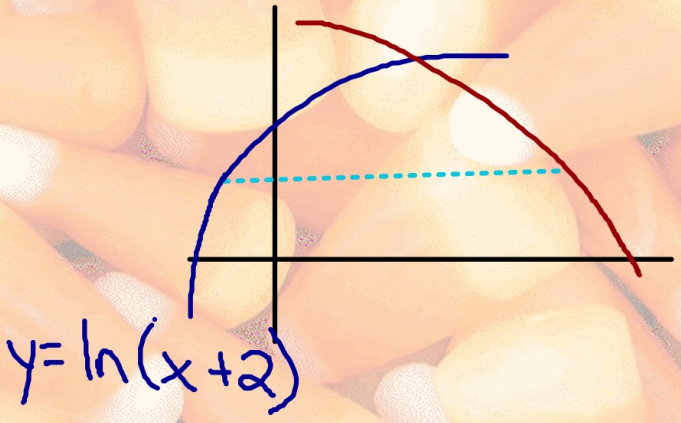
October 21

When do you need to find the area in terms of y instead of x?



October 21

Students will verbally explain how to find the area bounded by two functions

(using the words:
above, below, right, left...)

3. If $f(x)=(2x+1)^4$, then the 4th derivative of $f(x)$ at $x=0$ is

(A) 0 (B) 24 (C) 48 (D) 240 (E) 384

$f'(x)=4(2x+1)^3(2)=8(2x+1)^3$

$f''(x)=24(2x+1)^2(2)=48(2x+1)^2$

$(=4(3)(2x+1)^2(2)(2))$

$f'''(x)=96(2x+1)(2)=192(2x+1)$

$f^{(4)}(x)=96(2)(2)=384$

4. If $y=\frac{3}{4+x^2}$, then $\frac{dy}{dx}=$

(A) $\frac{-6x}{(4+x^2)^2}$ (B) $\frac{3x}{(4+x^2)^2}$ (C) $\frac{6x}{(4+x^2)^2}$ (D) $\frac{-3}{(4+x^2)^2}$ (E) $\frac{3}{2x}$

$y'=\frac{0-2x(3)}{(4+x^2)^2}$

5. If $\frac{dy}{dx} = \cos(2x)$, then $y =$

(A) $-\frac{1}{2}\cos(2x) + C$ (B) $-\frac{1}{2}\cos^2(2x) + C$ (C) $\frac{1}{2}\sin(2x) + C$

(D) $\frac{1}{2}\cos^2(2x) + C$ (E) $-\frac{1}{2}\sin(2x) + C$

$\int \cos(2x)\,dx$ $\int \cos(u)\frac{du}{2}$

$u = 2x$

$du = 2\,dx$

$\frac{du}{2} = dx$

$\frac{1}{2}\int \cos(u)\,du$

$= \frac{1}{2}\sin(u) + C$

$= \frac{1}{2}\sin(2x) + C$

8. The slope of the line tangent to the graph of $y = \ln\left(\frac{x}{2}\right)$ at $x = 4$ is

(A) $\frac{1}{8}$ (B) $\frac{1}{4}$ (C) $\frac{1}{2}$ (D) 1 (E) 4

$y' = \frac{1}{\frac{x}{2}}\left(\frac{1}{2}\right)$

$y'(4) = \frac{1}{\frac{4}{2}}\left(\frac{1}{2}\right) = \frac{1}{2}\left(\frac{1}{2}\right) = \frac{1}{4}$

9. The position of a particle moving along a straight line at any time t is given by $s(t) = t^2 + 4t + 4$. What is the acceleration of the particle when $t = 4$?

(A) 0 (B) 2 (C) 4 (D) 8 (E) 12

$$s'(t) = v(t) = 2t + 4$$

$$s''(t) = v'(t) = a(t) = 2$$

10. If $\int_{-2}^{2} (x^7 + k)\,dx = 16$, then $k =$

(A) -12 (B) -4 (C) 0 (D) 4 (E) 12

$$\int_{-2}^{2} x^7 + K\,dx = \frac{x^8}{8} + Kx \Big|_{-2}^{2}$$

$$\frac{2^8}{8} + 2K - \left(\frac{(-2)^8}{8} + -2K\right) = 16$$

$$2K + 2K = 16$$

$$4K = 16$$

$$K = 4$$

Sets 6, 7, 8

10 - 14 (corrections)