Test 11

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1) $\frac{dy}{du}\cdot\frac{du}{dx}$, $\cos(u) = -\sin(u)du =$

$-\sin(7x^2)\cdot 14x = -14x\sin(7x^2) =$ (D)

2) $d\frac{u}{v} = \frac{v\,du - u\,dv}{v^2} = \frac{e^x+2)(\cos x) - (\sin(x)+1)(e^x)}{(e^x+2)^2}$ (B)

3) $\frac{4x-4}{x^2-2x+1} = \frac{4(x-1)}{(x-1)(x-1)} = \frac{4}{x-1}$ (D)

4) $\cos(150) = -.866 = -\frac{\sqrt{3}}{2} =$ (C)

5) 3 to the right
2 up = (A)

6) $\frac{f(x)-f(a)}{x-a} = \frac{5x^2-5a^2}{x-a} = \frac{5(x^2-a^2)}{x-a}$ $\frac{5(x-a)(x+a)}{x-a}$

$5(3+3) = 45$

30

~~2~~

7) $\frac{ds}{dv}\cdot\frac{dv}{dt}$ $\frac{2}{v}dv$ $\frac{2}{v}\cdot\frac{te^t-e^t}{t^2} = \frac{2}{v}\cdot\frac{e^t(t-1)}{t^2}$ $v=\frac{e^t}{t}$

$\frac{2t}{e^t}\cdot\frac{e^t(t-1)}{t^2} = \frac{2(t-1)}{t}$

8) $\int\left(\frac{6}{x} - e^x\right)dx = 6\ln|x| - e^x + C$

9) $(x^3+2x)\ln x \to (3x^2+2)\ln x + \frac{x^3+2x}{x}$

$(3x^2+2)\ln x + x^2+2 \to (3\cdot 1^2+2)\ln 1 + 1^2+2$

$5\cdot 0 + 1+2 =$ (3)

10) zeros $= -1$
asymptotes $= -2, 3, 0$ / on graph paper

11) also on graph paper

12) $\frac{2}{n} \to \left(\frac{2}{n}\right)^2$

$2\left(\frac{2}{n}\right) \to 2\left(\frac{2}{n}\right)^2$

$\frac{2}{n}\left(1^2\left(\frac{2}{n}\right)^2 + 2^2\left(\frac{2}{n}\right)^2 + 3^2\left(\frac{2}{n}\right)^2 + n^2\left(\frac{2}{n}\right)^2\right)$

$\frac{8}{n^3}\left(\frac{n(n+1)(2n+1)}{6}\right) = \frac{4}{3}\,\frac{n(n+1)(2n+1)}{n^3}$

$\frac{4}{3}\left(\frac{2n^3+3n^2+n}{n^3}\right) = \frac{4}{3}\left(\frac{2n^3}{n^3} + \frac{3n^2}{n^3} + \frac{n}{n^3}\right)$

$\frac{4}{3}\cdot 2$ (8/3)

Test 11 **SHOW YOUR WORK** **Name:** _____

1. Let $y = \cos u$ and $u = 7x^2$. Then $\dfrac{dy}{dx}$ equals

A. $-\sin(7x^2)$ B. $\cos(14x)$ C. $14x \sin(7x^2)$ D. $-14x \sin(7x^2)$

2. If $f(x) = \dfrac{\sin x + 1}{e^x + 2}$, then $f'(x)$ equals

A. $\dfrac{(\sin x + 1)e^x - (e^x + 2)\cos x}{(e^x + 2)^2}$

B. $\dfrac{(e^x + 2)\cos x - (\sin x + 1)e^x}{(e^x + 2)^2}$

C. $\dfrac{(e^x + 2)(-\cos x) - (\sin x + 1)e^x}{(e^x + 2)^2}$

D. $\dfrac{\cos x}{e^x}$

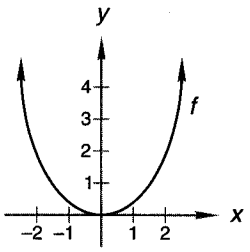
3. What is $\lim\limits_{x \to 1} \dfrac{4x - 4}{x^2 - 2x + 1}$?

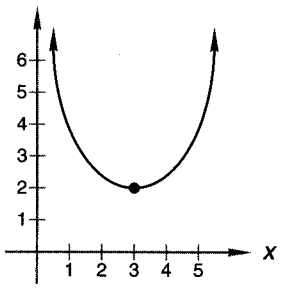
A. 0 B. 2 C. 1 D. The limit does not exist.

4. Which of the following equals $\cos^{-1} -\dfrac{\sqrt{3}}{2}$?

A. 210° B. 30° C. 150° D. −30°

5. The graph of a function f is shown to the right. Which of the following is the graph of $g(x) = f(x - 3) + 2$?



A.


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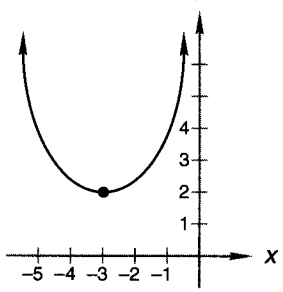
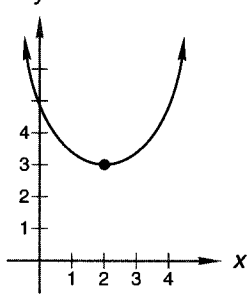
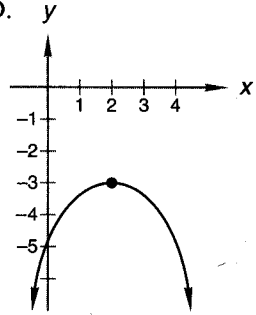


C.


D.


6. Use the definition $f'(a) = \lim\limits_{x \to a} \dfrac{f(x) - f(a)}{x - a}$ to find $f'(3)$ where $f(x) = 5x^2$.

7. If $s = 2 \ln v$ and $v = \dfrac{e^t}{t}$, what is $\dfrac{ds}{dt}$?

8. Integrate: $\displaystyle\int \left(\frac{6}{x} - e^x\right) dx$

9. Find $f'(1)$ where $f(x) = (x^3 + 2x) \ln x$.

10. Sketch the graph of $y = \dfrac{(x^2 + 1)(x + 1)^2}{x^2(x - 3)^2(x + 2)}$. Clearly indicate all zeros and asymptotes.

11. Graph $y = \sin x$ for $-2\pi \le x \le 2\pi$. On the same set of axes, graph $y = \csc x$.

12. Find the exact area under $y = x^2$ on the interval $[0, 2]$ by using an infinite number of circumscribed rectangles. (*Hint:* $1^2 + 2^2 + 3^2 + \cdots + n^2 = \frac{n(n+1)(2n+1)}{6}$.)