The following were changed at the resolution center at the convention: 26 A or B

1) $\int_9^{16} \frac{1}{\sqrt{x-4}}dx \Rightarrow \int_5^{12} u^{-1/2}du \Rightarrow 4\sqrt{3}-2\sqrt{5}$ A

2) $y_{ave} = \frac{1}{3-1}\int_1^3 (2+x-x^{-2})dx = \frac{1}{2}(6+9/2+1/3-2-1/2-1) =$ 11/3 A

3) $\int_0^5 (|2-x|)dx = \int_0^2 (2-x)dx - \int_2^5 (2-x)dx =$ [(4 - 2) - (10 - 25/2 -(4 - 2)] = 13/2 D

4) $\int_0^4 \sqrt{x^2+1}dx \approx .5[1+2\sqrt{2}+2\sqrt{5}+2\sqrt{10}+\sqrt{17}]$ where Δx = (4-0)/2(4) = .5 C

5) $\int_1^9 e^{\sqrt{x}}dx = 2\int_1^3 ue^u du =$ 2[3e^3 - e^3 - (e - e)] = 4e^3 D

6) V = $2\pi\int_0^e xe^x dx = 2\pi[xe^x - e^x]|_0^e = 2\pi[e^{e+1}-e^e+1]$ E

7) $\int_1^{e^\pi} (e^\pi/x - \ln x + e^{-\pi})dx$ = e$^\pi$ - e$^{-\pi}$ = 2[(e$^\pi$ - e$^{-\pi}$)/2] = 2sinh π B

8) y ' = cos(πx^3) & $y'_{x=2}$ = cos(8π) = 1; so at (2, 0) , tangent line equation is x - y = 2 C

9) $\int_{\pi/2}^{3\pi/4} \sin^2 2t dt = \frac{1}{4}\int_\pi^{3\pi/2}(1-\cos 2u)du = \frac{1}{4}(u-\frac{1}{2}\sin 2u)|_\pi^{3\pi/2} = \frac{\pi}{8}$ D

10) $\int \frac{\log_{10}(x^4 10^x)}{x}dx = \frac{4}{\ln 10}\int \frac{\ln x}{x}dx + \int 1dx = \frac{2}{\ln 10}(\ln x)^2 + x + C$ B

11) Improper integral, $\int_0^2 \frac{1}{(2x-1)^{2/3}}dx = \int_0^{1/2} \frac{1}{(2x-1)^{2/3}}dx + \int_{1/2}^2 \frac{1}{(2x-1)^{2/3}}dx$ = 3/2 + 3$\sqrt[3]{3}$/2 D

12) $\frac{du}{dt} = \frac{t+3t^2}{u^2} \Rightarrow$ u^3/3 = t^2/2 + t^3 + C ⇒ C = 216 ⇒ u = (3t^2/2 + 3t^3 + 216)$^{1/3}$ C

13) So the x^{12} term of [x^3/2 - 2]^8 = $\binom{8}{4}\left(\frac{x^3}{2}\right)^4(-2)^4$ = 70t^{12} and the coefficient of x^{13} is 70/13 C

14) $\int \cos x \csc x dx = \int \cot x dx = \ln|\sin x| + C$ B

15) So A = $\frac{1}{2}\int_{-\pi/3}^{\pi/3}[(1+2\cos\theta)^2 - 2^2]d\theta = \int_0^{\pi/3}(4\cos\theta + 4\cos^2\theta - 3)d\theta = \frac{15\sqrt{3}-2\pi}{6}$ D

16) $\int_1^3 \frac{x+1}{x^2+2x+3}dx \Rightarrow \frac{1}{2}\int_6^{18} \ln|u|\,du = \frac{1}{2}(\ln 18 - \ln 6) = \ln\sqrt{3}$ B

17) A(t) = t + cos(2t) $\Rightarrow$ v(t) = $t^2/2$ + (sin(2t))/2 + C_1 $\Rightarrow$ C_1 = 0; x(t) = $t^3/6$ - (cos(2t))/4 + C_2 & C_2 = ¼; so x (π) = $\pi^3/6$ C

18) $\int_0^1 \int_0^{\pi/2} (e^y + \sin x)dxdy = \int_0^1 [\pi e^y/2 - \cos(\pi/2) - (0-1)]dy$ = πe/2 + 1 - π/2 A

19) A = $\int_{-2}^{1} [(3-x^2)-(x+1)]dx$ = 2 - 1/3 - ½ - (-6 + 8/3 - 2) = 9/2 C

20) Given g(x) = $\int_1^{2x^2} (t-4)dt$, g'(x) = $(2x^2 - 4)(4x) = 0 \Rightarrow x = \pm\sqrt{2/3}$ and g''(x) > 0 on $(-\infty, -\sqrt{2/3}) \cup (\sqrt{2/3}, \infty)$ B

21) Using l'Hopital's Rule, $\lim_{x\to 1} \frac{\int_1^x 2(t\ln t - t + e^{t-1} + \pi t)dt}{x^2 - 1} \Rightarrow \lim_{x\to 1} \frac{x\ln x - x + e^{x-1} + \pi x}{x} = \pi$ B

22) $\int \frac{x}{(2x+d)^2}dx = \frac{1}{2}\int \frac{1}{(2x+d)}dx - \frac{1}{2}\int \frac{1}{(2x+d)^2}dx = \frac{1}{4}\ln|2x+d| + \frac{d}{4(2x+d)} + C$ A

23) TD = $\int_{-2}^{3} |4t^3|\,dt = -\int_{-2}^{0} 4t^3 dt + \int_0^3 4t^3 dt$ = 16 + 81 = 97 D

24) Since $f^{-1}(x) = e^x/\pi$, then $\int f^{-1}(x)dx = \int \frac{e^x}{\pi}dx = e^x/\pi + C$ A

25) A = $\int_0^2 (4-x^2)dx$ = 16/3; so A/2 = 8/3 $\Rightarrow$ 8/3 = $\int_c^4 \sqrt{y}dy \Rightarrow$ c = $\sqrt[3]{16}$ C

26) V = $2\int_0^1 [(1-x^4)-(1-x^2)]^2 dx = 2\int_0^1 (x^2 - x^4)^2 dx$ B

27) $\int \sin^3 x \cos^{-4} x dx = \int \sin x \cos^{-4} x dx - \int \sin x \cos^{-2} x dx$ = $(\sec^3 x)/3$ - sec x + C D

28) SA = $2\pi\int_0^1 t^3\sqrt{1+(3t^2)^2}dt = \frac{\pi}{18}\int_1^{10} t^3\sqrt{u}du = \frac{\pi(10^{3/2}-1)}{27}$ E

29) $\int_{-100}^{100} (v + \sin v + v\cos v + \sin^3 v)^5 dv$ = 0 (odd integrand with limits of -a to a $\Rightarrow$ 0 A

30) $\int_0^{1/2} \frac{1}{1-x^2}dx = \tanh^{-1} x \Big|_0^{1/2} = \frac{1}{2}\left[\ln\left|\frac{1+x}{1-x}\right|\right]_0^{1/2} = \ln\sqrt{3}$ C