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No.

Date . . .

一. D B D C A C ^B A

二. 1. $\frac{2}{5}$ 2. $3^x \ln 3$ 3. 0 4. $-\cot x - \tan x + C$

5. $\int f(x) dx$ 6. $\frac{3\pi}{2}$ 7. $3x^2 - \frac{1}{2}$ 8. $\pi \int_0^1 (x^2 - x^4) dx$

三. 1. 解 原式 $= \lim_{x \rightarrow 0} \frac{4x^2 - 2x + 1}{3x + 2} = \frac{1}{2}$

2. 解: 证式 $\lim_{x \rightarrow a} \frac{f(x)}{1} = f(a)$

3. 解: $\frac{dy}{dx} = \frac{9t^2}{2t} = \frac{9}{2}t$
 $\frac{dy}{dx^2} = \frac{\frac{9}{2}}{2t} = \frac{9}{4t}$

4. 解: $\int \frac{1}{x} \ln x dx = \int \ln x d \ln x = \frac{1}{2} \ln^2 x + C$

5. 解: $\int x \arctan x dx = \int \arctan x d \frac{x^2}{2}$

$$= \frac{x^2}{2} \arctan x - \int \frac{x^2}{2(1+x^2)} dx$$

$$= \frac{x^2}{2} \arctan x - \frac{1}{2} \int (1 - \frac{1}{1+x^2}) dx$$

$$= \frac{x^2}{2} \arctan x - \frac{1}{2} x + \frac{1}{2} \arctan x + C$$

6. H. $\int_9^{+\infty} \frac{dx}{\sqrt{x} + x\sqrt{x}} = \int_9^{+\infty} \frac{dx}{\sqrt{x}(1+x)}$

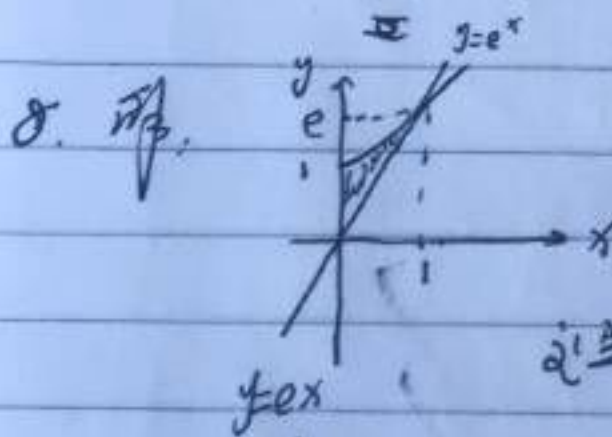
$\frac{x}{\sqrt{x}} = x$
 $\int_3^{+\infty} \frac{2t dt}{t(1+t^2)} = 2 \int_3^{+\infty} \frac{dt}{1+t^2}$

$= 2 \arctan t \Big|_3^{+\infty} = 2 \left(\frac{\pi}{2} - \arctan 3 \right)$

7. $\int_{-\frac{\pi}{4}}^{\frac{\pi}{2}} \sqrt{\cos x - \cos^3 x} dx$

$= \int_{-\frac{\pi}{4}}^{\frac{\pi}{2}} \sqrt{\cos x} \cdot |\sin x| dx = - \int_{-\frac{\pi}{4}}^0 \sqrt{\cos x} \sin x dx$

$+ \int_0^{\frac{\pi}{2}} \sqrt{\cos x} \sin x dx = \frac{2}{3} [\cos^{\frac{3}{2}} x]_{-\frac{\pi}{4}}^0 - \frac{2}{3} [\cos^{\frac{3}{2}} x]_{\frac{\pi}{2}}^0$
 $= \frac{1}{3} (4 - \sqrt{2})$



$\begin{cases} y = e^x \\ y = ex \end{cases} \Rightarrow (1, e)$

$\therefore A = \int_0^1 (e^x - ex) dx = \left[e^x - \frac{1}{2} ex^2 \right]_0^1 = \frac{e}{2} - 1$

9. H. $f(x) = \arctan x + \arctan \frac{1}{x}$

$\therefore f'(x) = \frac{1}{1+x^2} - \frac{1}{1+x^2} = 0 \quad \therefore f(x) = C$

At $x=0$ $\frac{\pi}{2} = C \quad \therefore f(x) = \frac{\pi}{2}$