## 第三单元测试题

一、 求下列不定积分:

1. 
$$\int \frac{dx}{(1+x^2)x^2}$$
 2. 
$$\int \frac{e^{2t}-1}{e^t-1} dt$$
 3. 
$$\int \frac{dx}{\sin x \cos x}$$

$$\int \frac{e^{2t}-1}{e^t-1} dt$$

$$3. \qquad \int \frac{dx}{\sin x \cos x}$$

4. 
$$\int \frac{\cos\sqrt{x}}{\sqrt{x}} dx$$
 5. 
$$\int \frac{1-x}{\sqrt{9-x^2}} dx$$
 6. 
$$\int \sin 5x \sin 7x dx$$

5. 
$$\int \frac{1-x}{\sqrt{9-x^2}} dx$$

6. 
$$\int sin5xsin7xdx$$

7. 
$$\int cos^3 x dx$$

8. 
$$\int tan^3xsecxdx$$

7. 
$$\int \cos^3 x dx$$
 8.  $\int \tan^3 x \sec x dx$  9.  $\int \frac{x \tan \sqrt{1+x^2}}{\sqrt{1+x^2}} dx$ 

$$10. \int \frac{dx}{\sqrt{x} + \sqrt[4]{x}}$$

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 11.  $\int \frac{\sqrt{x^2 - 9}}{x} dx$  12.  $\int \frac{dx}{1 + \sqrt{1 - x^2}}$ 

$$12. \int \frac{dx}{1 + \sqrt{1 - x^2}}$$

13. 
$$\int ln^2x dx$$

14. 
$$\int x \sin x \cos x dx$$

13. 
$$\int ln^2xdx$$
 14.  $\int x\sin x\cos xdx$  15.  $\int e^{-2x}\sin\frac{x}{2}dx$ 

16. 
$$\int \frac{x+1}{(x-1)^3} dx$$

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 17.  $\int \frac{1}{x(x^2+1)} dx$  18.  $\int \frac{x^2 dx}{(x-1)^{100}}$ 

18. 
$$\int \frac{x^2 dx}{(x-1)^{100}}$$

19. 
$$\int \ln(x + \sqrt{1 + x^2}) dx$$
 20. 
$$\int \frac{\sin x \cos^3 x}{1 + \cos^2 x} dx$$

$$20. \int \frac{\sin x \cos^3 x}{1 + \cos^2 x} dx$$

二、设 f(x) 的原函数 F(x)>0,且 F(0)=1.当  $x \ge 0$ 时,有  $f(x)F(x)=\sin^2 2x$ ,试求 f(x)