

第五章自测题

总分: 125

*此封面页请勿删除，删除后将无法上传至试卷库，添加菜单栏任意题型即可制作试卷。本提示将在上传时自动隐藏。

1

设函数 $y = \int_0^x (t-1)dt$ ，则 y 有

- ☐ A 极小值 $\frac{1}{2}$
- ☒ B 极小值 $-\frac{1}{2}$
- ☐ C 极大值 $\frac{1}{2}$
- ☐ D 极大值 $-\frac{1}{2}$

2

$$\int_{-1}^1 \frac{1}{x^2} dx =$$

A -2

B 2

C 0

D 发散

3

下列广义积分中收敛的是

A $\int_{\varepsilon}^{+\infty} \frac{\ln x}{x} dx$

B $\int_{\varepsilon}^{+\infty} \frac{1}{x(\ln x)^2} dx$

C $\int_{\varepsilon}^{+\infty} \frac{1}{x \ln x} dx$

D $\int_{\varepsilon}^{+\infty} \frac{1}{x \sqrt{\ln x}} dx$

4.

若 $a = \int_0^2 x^2 dx$, $b = \int_0^2 x^3 dx$, $c = \int_0^2 \sin x dx$,

则 a, b, c 的关系是

A

$$a < c < b$$

B

$$a < b < c$$

C

$$c < b < a$$

D

$$c < a < b$$

5

下列各题中，选取 u 和 dv 不合理的是（ ）

- A $\int_1^2 x \ln x dx$, 取 $u = \ln x$, $dv = x dx$
- B $\int_0^\pi x^2 \sin x dx$, 取 $u = \sin x$, $dv = x^2 dx$**
- C $\int_0^1 x \arctan x dx$, 取 $u = \arctan x$, $dv = x dx$
- D $\int_0^1 e^{ax} \cos nx dx$, 取 $u = e^{ax}$, $dv = \cos nx dx$

6.

计算 $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} (1 - \cos x) dx =$

A

$\pi + 2$

B

$\pi - 2$

C

π

D

-2

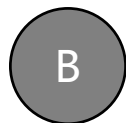
7.

若 $f(x) = \begin{cases} x^3 + \sin x & -1 \leq x \leq 1 \\ 2 & 1 < x \leq 2 \end{cases}$

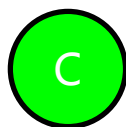
则 $\int_{-1}^2 f(x) dx =$



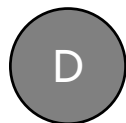
0



1



2



3

8.

若 $f(x)$ 在 \mathbb{R} 上可导, $f(x) = x^2 + 2f'(2)x + 3$

则 $\int_0^3 f(x) dx =$

☐ A 16

☒ B -18

☐ C -24

☐ D 54

9.

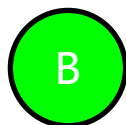
若 $f(x) = x^2 + 2\int_0^1 f(x)dx$

则 $\int_0^1 f(x)dx =$



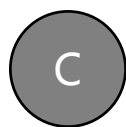
A

-1



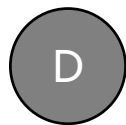
B

-1/3



C

1/3



D

1

10

如果 $f(x)$ 在 $[-1,1]$ 上连续，

且平均值为 2，则 $\int_{-1}^1 f(x) dx =$

A

1

B

-1

C

4

D

-4

11

$$\frac{d}{dx} \int_a^x \sin t^2 dt =$$

A

$$\sin x^2 - \sin a^2$$

B

$$2x \cos x^2$$

C

$$\sin x^2$$

D

$$2x \sin x^2 +$$

12

$$\frac{d}{dx} \int_a^b \arcsin x dt =$$

A

0

B

$$\frac{b-a}{\sqrt{1-x^2}}$$

C

$$\arcsin x$$

D

$$\arcsin b - \arcsin a$$

13.

设 $f(x)$ 是连续函数，且

$$F(x) = \int_x^{e^{-x}} f(t) dt, \text{ 则 } F'(x) =$$

☒ A $-e^{-x} f(e^{-x}) - f(x)$

☐ B $-e^{-x} f(e^{-x}) + f(x)$

☐ C $e^{-x} f(e^{-x}) - f(x)$

☐ D $e^{-x} f(e^{-x}) + f(x) +$

14.

设 $f(x)$ 是连续函数, $a \neq 0$, 且

$$F(x) = \frac{x^2}{x-a} \int_a^x f(t) dt, \text{ 则 } \lim_{x \rightarrow a} F(x) =$$

A

$$a^2$$

B

$$a^2 f(a)$$

C

$$0$$

D

不存在

15.

$$\lim_{x \rightarrow 0} \frac{\int_0^{\sin 2x} \ln(1+t) dt}{1 - \cos x} =$$

A

1

B

2

C

4

D

8

16

设 $F(x) = \int_0^x \frac{1}{1+t^2} dt + \int_0^{\frac{1}{x}} \frac{1}{1+t^2} dt$,

则

A

$$F(x) \equiv 0$$

B

$$F(x) \equiv \frac{\pi}{2}$$

C

$$F(x) \equiv \arctan x$$

D

$$F(x) \equiv 2 \arctan x$$

17.

设 $\int_0^x f(t) dt = 2x^3$,

则 $\int_0^{\frac{\pi}{2}} \cos x f(-\sin x) dx =$

A $\frac{\pi^2}{4}$

B $-\frac{\pi^2}{4}$

C 2

D -2

18.

$$\int_{-a}^a x[f(x) + f(-x)]dx =$$

- ☐ A $4 \int_0^a x f(x) dx$
- ☐ B $2 \int_0^a x[f(x) + f(-x)] dx$
- ☒ C 0
- ☐ D 以上都不正确

19

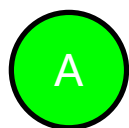
将和式的极限 $\lim_{n \rightarrow \infty} \left(\frac{1}{n+1} + \frac{1}{n+2} + \dots + \frac{1}{n+n} \right)$

表示成定积分为

- A $\int_0^1 \frac{1}{x} dx$
- B $\int_0^1 \frac{1}{1+x} dx$**
- C $\int_0^1 \left(\frac{1}{x} \right)^2 dx$
- D $\int_0^1 \left(\frac{x}{n} \right) dx$

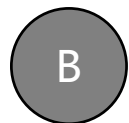
20

$$\int_0^2 (1-x) dx =$$



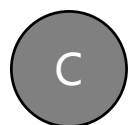
A

1



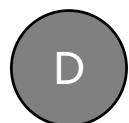
B

2



C

3



D

4

21

$$\int_0^1 (e^x + e^{-x}) dx =$$

A $e + \frac{1}{e}$

B $e - \frac{1}{e}$

C $\frac{2}{e}$

D $2e$

22

曲线 $y = \cos x$, $x \in [0, \frac{3\pi}{2}]$ 与坐标轴围成图形的面积为

A 4

B 3

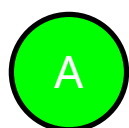
C 2

D 1

23

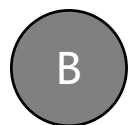
若 $m = \int_0^1 e^x dx$, $n = \int_1^e \frac{1}{x} dx$

则m与n的大小关系是



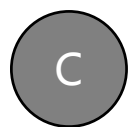
A

$$m > n$$



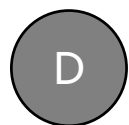
B

$$m < n$$



C

$$m = n$$



D

无法确定

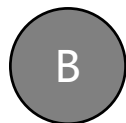
24

$$\int_{-2}^2 \max\{x^3, x^2, 1\} dx =$$



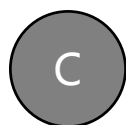
A

0



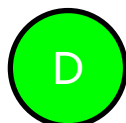
B

4



C

16/3



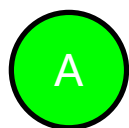
D

97/12

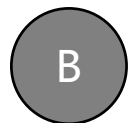
25

$$y = y(x) \text{ 由 } \int_0^y e^t dt + \int_0^x \cos t dt = 0$$

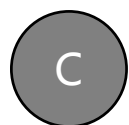
确定，则 $\left. \frac{dy}{dx} \right|_{y=-1}^{x=0} =$



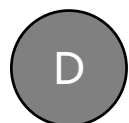
-e



e



-1



1