Question 1

Not yet answered

Marked out of 20

If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{\text{a}}}{\boxed{\text{b}}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$. $\exp x = e^x$.
Let us calculate the integral $\int_0^1 8^{-x} dx$ based on the definition. Let us take $I = [0, 1], P_n = \{[0, \frac{1}{n}), [\frac{1}{n}, \frac{2}{n}), \cdots [\frac{n-1}{n}, 1]\}$ and $f(x) = 8^{-x}$.
With $n = 3$, calculate $\underline{S}_I(f, P_n) = \frac{\boxed{\text{a}}}{\boxed{\text{b}}}$ and $\overline{S}_I(f, P_n) = \frac{\boxed{\text{c}}}{\boxed{\text{d}}}$.

a: b: a: b:

Question 2

Not yet answered

Marked out of 10

If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{\text{a}}}{\boxed{\text{b}}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$. $\exp x = e^x$.
Calculate the following definite integral.
$\int_0^2 (x^3 + 4x^2 - 4) dx = \frac{\boxed{\text{a}}}{\boxed{\text{b}}}$.

a: b:

Question 3

Not yet answered

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If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{\text{a}}}{\boxed{\text{b}}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$.
$\int_0^{\frac{\pi}{4}} \sin(2(x - \pi)) dx = \frac{\boxed{\text{a}}}{\boxed{\text{b}}}$.

a: b:

Question 4

Not yet answered

Marked out of 20

If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{\text{a}}}{\boxed{\text{b}}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$. $\exp x = e^x$.

$\int_0^2 xe^{x^2}dx = \frac{\boxed{\text{a}}}{\boxed{\text{b}}}e^4 + \frac{\boxed{\text{c}}}{\boxed{\text{d}}}$.

$\boxed{\text{a}}$: $\boxed{\text{b}}$: $\boxed{\text{c}}$: $\boxed{\text{d}}$:

Question 5

Not yet answered

Marked out of 10

If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{\text{a}}}{\boxed{\text{b}}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$. $\exp x = e^x$.

$\int_0^2 xe^{-x}dx = \boxed{\text{a}}e^{-2} + \boxed{\text{b}}$.

$\boxed{\text{a}}$: $\boxed{\text{b}}$:

Question 6

Not yet answered

Marked out of 10

If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{\text{a}}}{\boxed{\text{b}}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$. $\exp x = e^x$.

$\int_0^{\frac{1}{2}} \frac{1}{\sqrt{1-x^2}}dx = \frac{\boxed{\text{a}}}{\boxed{\text{b}}}\pi$.

$\boxed{\text{a}}$: $\boxed{\text{b}}$:

Question 7

Not yet answered

Marked out of 10

If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{\text{a}}}{\boxed{\text{b}}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$. $\exp x = e^x$.

$\int_2^3 \frac{1}{x^2-x}dx = \log \frac{\boxed{\text{a}}}{\boxed{\text{b}}}$.

$\boxed{\text{a}}$: $\boxed{\text{b}}$:

Question 8

Not yet answered

Marked out of 15

If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{a}}{\boxed{b}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$. $\exp x = e^x$.

$\int_1^\infty xe^{-x^2}dx = \frac{\boxed{a}}{\boxed{b}}e^{\boxed{c}}$.

$\boxed{a}$: $\boxed{b}$: $\boxed{c}$:

Question 9

Not yet answered

Marked out of 5

If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{a}}{\boxed{b}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$. $\exp x = e^x$.

Choose all convergent improper integrals.

- ☐ $\int_0^\infty e^{-x}dx$
- ☐ $\int_0^\infty e^{x}dx$
- ☐ $\int_0^\infty x^{100}e^{-x}dx$
- ☐ $\int_0^\infty e^{-x^2}dx$
- ☐ $\int_0^\infty e^{x^2}dx$
- ☐ $\int_1^\infty x^{-\frac{3}{2}}dx$
- ☐ $\int_0^1 x^{-\frac{3}{2}}dx$
- ☐ $\int_{-\infty}^\infty \frac{1}{x^2+1}dx$

Question 10

Not yet answered

Marked out of 20

If not specified otherwise, fill in the blanks with **integers (possibly 0 or negative)**. A fraction should be **reduced** (for example, $\frac{1}{2}$ is accepted but not $\frac{2}{4}$), and if it is negative and the answer boxes (such as $\frac{\boxed{a}}{\boxed{b}}$) have ambiguity, the negative sign should be put on the numerator (for example $\frac{-1}{2}$ is accepted but $\frac{1}{-2}$ is not). $\log x = \log_e x$, not $\log_{10} x$. $\exp x = e^x$.

Using the Taylor formula $\cos(2x) = \boxed{a} + \boxed{b}x + \boxed{c}x^2 + o(x^2)$ as $x \to 0$, determine whether the improper integral $\int_0^1 \frac{x^{\frac{1}{2}}}{\cos(2x)+x^2-1}$

- ○ converges
- ○ diverges.

$\boxed{a}$: $\boxed{b}$: $\boxed{c}$: