



Question one

(9 points)

Choose the correct answer in the following statements, Then complete the table (use capital letters)

1	2	3	4	5	6

1) $\int_0^{\pi} x^2 \cos x \, dx$

A) $\frac{\pi}{2}$

B) 0

C) -2π

D) $\frac{-3\pi}{2}$

2) The sequence $\left\{ \frac{\ln n}{n^n} \right\}$

A) Diverges

B) Converges to 0

C) Converges

D) Converges to 1

3) $\int \frac{1}{1 + \cos x} \, dx =$

A) $\tan\left(\frac{x}{2}\right) + c$

B) $\frac{1}{2}\tan\left(\frac{x}{2}\right) + c$

C) $x + \frac{1}{2}\tan\left(\frac{x}{2}\right) + c$

D) $x + \sec\left(\frac{x}{2}\right) + c$

4) $\int_0^{\pi} \cos 3x \cos 4x \, dx$
 A) 2 B) 1 C) 0 D) $-\pi$

5) $\{(1 - \frac{1}{n})^n\}$
 A) Diverges B) Converges to e^1
 C) Converges to e^2 D) Converges to e^{-1}

6) The integral $\int_1^2 \frac{dx}{x(\ln x)^a}$ converges if a
 A) $a \leq 1$ B) $a < 1$ C) $a \geq 1$ D) $a > 1$

Question two (5 points)

Expand the following quotient by partial fractions (without finding the undetermined coefficients)

$$\frac{x^4 + 4}{(x - 1)(x^2 + 5)^2(x^2 - 2x + 1)}$$

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

b. $\int_0^{\frac{\pi}{2}} 4 \tan^3 x \, dx$

Decide whether the following converge or diverge

a. $\int_{\pi}^{\infty} \frac{2+\cos x}{x}$

b. $\left\{ \frac{n+(-1)^n}{n} \right\}$

GOOD LUCK