NAME ____________________  Instructor: ____________________

Show all work for full credit. No books, notes or calculators are permitted. The point value of each problem is given in the left-hand margin.

1. Evaluate the following integrals.

(12) a) \( \int \cos x \ln(\sin x) \, dx \)

(12) b) \( \int \tan(x) \sec^3(x) \, dx \)
2. Evaluate the following integrals (you can use the integration tables, remember to write the number of the formula you use).

\(\int e^x \sec^3(e^x) \, dx\)

\(\int \sin^4(5x) \, dx\)
3. Evaluate the integral USING the proper Trigonometric Substitution.

\[ \int \frac{dx}{\sqrt{1 + x^2}} \]
4. Evaluate the integral USING Partial Fractions. \[ \int \frac{x^4 - 2}{x^3 - x^2} \, dx \]
5. Evaluate the following limits or indicate that they diverge.

(7) a) \[ \lim_{x \to 0^+} \frac{e^x - (1 + x)}{x^2} \]

(7) b) \[ \lim_{x \to \infty} (x)^{1/x} \]
6. Determine whether each integral is convergent or divergent. Evaluate if convergent.

\[ \int_{-1}^{0} \frac{dx}{\sqrt{x} + 1} \]