

No calculators allowed. You must show work at all times in order to receive full credit.

1. (a) Find the following values [if the value does not exist, write "D.N.E."]:

i. $\sin\left(\frac{-\pi}{4}\right)$

ii. $\tan\left(\frac{7\pi}{3}\right)$

iii. $\sec\left(\frac{6\pi}{12}\right)$

- (b) Draw an angle that measures $\frac{11\pi}{6}$.

- (c) Give an example of an angle θ in the first quadrant which has $\sin(\theta) = \sin\left(\frac{19\pi}{20}\right)$.

2. Differentiate (find the derivative of) the following functions:

(a) $f(x) = \cos(e^{4x})$

(b) $g(x) = \tan(\sin(x))$

3. Using any appropriate technique, perform the following integrations:

(a) $\int 5x^3 \sec^2(x^4) dx$

(b) $\int_{-\pi}^{\pi} \cos(t) \sin(t) dt$

(c) $\int_1^e 3z^2 \ln(z) dz$

4. (a) Find the area of the space above the curve $y = \pi \sin(\pi x)$ and below $y = e^x + 10$, from $x = 0$ to $x = 1$.

- (b) Given the integral $\int_1^5 \ln(x) dx$, find the approximate area using the Trapezoidal Rule, with $n = 4$.

5. A continuous income stream occurs over 5 years, with rate of income \$60,000 per year, and an interest rate of 3%.

- (a) Set up an integral to compute the present value of the income stream.

- (b) Solve the integral. Leave your answer in exact form.