MATH 331 (SB)
First Exam S.W.P (A)
Sat. 14/3/1429H

Name:

C.N:

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0.0.1 :Write the following:(1mark)

Definition 1 *The period of the graphs of*

$$y = A\sin(Bx - C) + D \ and \ y = A\cos(Bx - C) + D \tag{1}$$

is $\left|\frac{2\pi}{B}\right|$.

0.0.2 :Define the function $f(x) = x^3 + 2x^2 - 5x$ and $g(x) = x^3 + x$, then

a) Evaluate the following:

1. $f + g$, $f(-2)$, $f(g(1))$.
2. The derivative of $f(x)$.
3. The integration of $\left(g(x) + xe^{x^2} - \tan x\right)$.
4. $\lim_{x \to 1} f(x + 2)$.

b) Find the roots of the functions f and g. and determine how many times each of them intersects the x-axis.

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c) Find the greatest common divisor of the functions f and g

0.0.3 : Solve each of the following:

1. $\cos^2 x = \frac{1}{2}$

2. $(e^t y + t e^t y) \, dt + (t e^t + 2) dy = 0$

   [Hint: rewrite the ODE into the form $\frac{dy}{dt} = f(t, y)$]

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then plot three solutions generated with constants (1,2,3) in different colors.

Now, solve the ODE again with the initial value $y(0) = -1$

3. The system

$$x - y = 5, 2x + y = 1$$

0.0.4   :approximate the following definite integral using the *midpoint* method (use Help).

$\int_0^{\frac{\pi}{2}} x \cos x dx$

0.0.5   :Plot the following:

1. $(x - 4)^2 + y^2 = 16$ with $-5 \leq x \leq 10, -5 \leq y \leq 10$.