Warmup5 Week of Oct 1st

1. Consider the integral $\displaystyle\int_0^\infty \frac{dx}{x^2 - \sin(\pi x/2)}$.
How many integrals should you consider to determine if it is convergent?

1. 1 integrals
2. 2 integrals.
3. 3 integral.
4. 4 integrals

2. In doing a partial fraction expansion of $\frac{x^3}{(x+1)^2(x^2+1)^2}$:

1. We'd have to first divide the numerator by the denominator.
2. We'd try $\frac{A}{(x+1)} + \frac{B}{(x^2+1)}$ on the right hand side.
3. We'd try $\frac{A}{(x+1)} + \frac{B}{(x+1)^2} + \frac{Cx+D}{(x^2+1)}$ on the right hand side.
4. We'd try $\frac{A}{(x+1)} + \frac{B}{(x+1)^2} + \frac{C}{(x^2+1)} + \frac{D}{(x^2+1)^2}$ on the right hand side.
5. We'd try $\frac{A}{(x+1)} + \frac{B}{(x+1)^2} + \frac{Cx+D}{(x^2+1)} + \frac{Ex+F}{(x^2+1)^2}$ on the right hand side.

3. Which of the following is a solution to the first order differential equation $\dfrac{dy}{dx} = \sqrt{y}$ with the initial condition y(0)=0?

1. $y = \dfrac{x^2}{4}$
2. $y = \sqrt{x}$
3. $y = \begin{cases} \frac{x^2}{4} & \text{if } x \geq 0 \\ 0 & \text{if } x < 0 \end{cases}$

4. Which of the following about Euler's method is false?

1. Accuracy of the approximate solution can be improved by using a smaller step size.
2. Errors will build up as we iterate the approximation procedure in Euler's method.
3. Each step of Euler's method amounts to a linear approximation of the solution.
4. If we apply Euler's method to the equation $y' = 1$, $y(0) = 0$ using different step sizes, we will get different approximate values of $y(1)$.

5. To use the method described in section 9.2, you need to find the integral of P in order to get the integrating factor v. What happens if you can't evaluate the integral of P?

1. The solution still exists, but it is given by the integral (eqn 3 p523) that involves a function defined by an integral.

2. Even though you may not be able to evaluate the integral of P, you can always calculate the integral (eqn 3 p523).

3. You need to reduce the equation to a different standard form.

4. The solution does not exist.

5. The solution exists if you can evaluate the integral (eqn 3 p523), and otherwise it does not exist.