Matthew Mendoza **Math-45-Krauel-F20**

Assignment Math45-Module-07-Exercises due 10/01/2020 at 11:59pm PDT

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1. (1 point) Select the following which are homogeneous functions.

- A. $f(x,y) = \sqrt{x^3+y^3}$
- B. $f(x,y) = x^3y^3$
- C. $f(x,y) = x^2y^3 - y^5 + x^4y$
- D. $f(x,y) = x^3y^4 + x^3 + y^4$
- E. $f(x,y) = \dfrac{x}{y}$
- F. $f(x,y) = x + \sqrt{y}$
- G. $f(x,y) = x^2\sin(y^2)$
- H. $f(x,y) = x^3 + y^4$
- I. $f(x,y) = x^3 + y^3$
- J. None of the above

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2. (1 point) Consider the function $f(x,y) = x^2y^5 - x^5y^2$.

The function $f(x,y)$ is homogeneous of degree _____.

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3. (1 point) Select the following which are 1st-order homogeneous differential equations.

- A. $y' = x^3 + y^4$
- B. $y' = x^2y^3 - y^5 + x^4y$
- C. $y' = \dfrac{x^3y^3}{x^2y^4}$
- D. $y' = \dfrac{x^3+y^3}{xy^2}$
- E. $x^2\,dx + y^3\,dy = 0$
- F. $x^2\,dx + xy\,dy = 0$
- G. $y' = x^3 + y^3$
- H. $y' = x^3y^3$
- I. None of the above

Making the appropriate substitution, the differential equation $\dfrac{dy}{dx} = \dfrac{x^2}{x^2+y^2}$ can be reduced to which of the following expressions? (Note: to solve the DE, one would then solve the separable equation, and make the required substitution back to x and y terms.)

- A. $\dfrac{1+u^2}{1+u+u^3}\,du = \dfrac{1}{x}\,dx$
- B. $\dfrac{1+u+u^3}{1+u^2}\,du = \dfrac{1}{x}\,dx$
- C. $\dfrac{1-u-u^3}{1+u^2}\,du = \dfrac{1}{x}\,dx$
- D. $\dfrac{1+u^2}{1-u-u^3}\,du = x\,dx$
- E. $\dfrac{1+u^2}{1-u-u^3}\,du = \dfrac{1}{x}\,dx$

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5. (1 point)
Enter a value for π
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