

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

- A.  $f(x,y) = \sqrt{x^3 + y^3}$
- B.  $f(x,y) = x^3 y^3$
- C.  $f(x,y) = x^2 y^3 - y^5 + x^4 y$
- D.  $f(x,y) = x^3 y^4 + x^3 + y^4$
- E.  $f(x,y) = \frac{x}{y}$
- 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

Answer(s) submitted:

- ( A, B, D, E, G, H, I )

(incorrect)

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

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

Answer(s) submitted:

- 7

(correct)

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

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

Answer(s) submitted:

- ( F, G )

(incorrect)

Making the appropriate substitution, the differential equation  $\frac{dy}{dx} = \frac{x^2}{x^2 + y^2}$  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.  $\frac{1+u^2}{1+u+u^3} du = \frac{1}{x} dx$
- B.  $\frac{1+u+u^3}{1+u^2} du = \frac{1}{x} dx$
- C.  $\frac{1-u-u^3}{1+u^2} du = \frac{1}{x} dx$

- D.  $\frac{1+u^2}{1-u-u^3} du = x dx$

- E.  $\frac{1+u^2}{1-u-u^3} du = \frac{1}{x} dx$

*Answer(s) submitted:*

- E

(correct)

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**5.** (1 point)

Enter a value for  $\pi$

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*Answer(s) submitted:*

- pi

(correct)