



Group ( ) Section ( )



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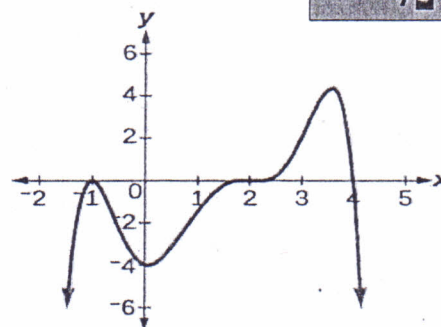
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الاسم:

1) Using the given graph of  $f(x)$ , complete the following

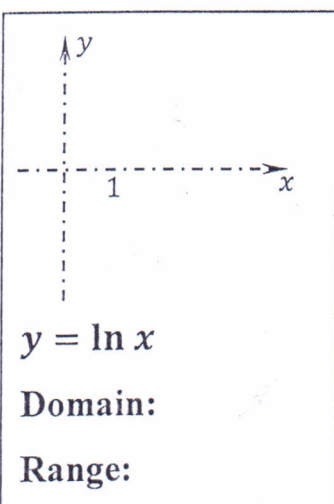
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- The  $y$  intercept is the point ( , )
- $f(x)$  has a root of multiplicity 1 at  $x = ( )$
- $f(x)$  has a root of multiplicity 2 at  $x = ( )$
- $f(x)$  has a root of multiplicity 3 at  $x = ( )$
- The degree of  $f(x)$  equal ( )

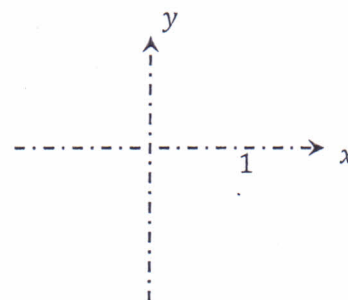


2) Find the domain and the range of the function  $z = \ln(1 - x^2 - y^2)$

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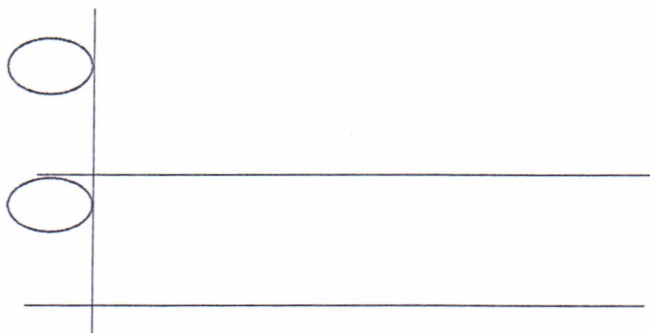


Solution



3) a) Prove that  $f(x) = x^3 + 5x^2 + 8x + 4$  has a root of multiplicity 2 at  $x = -2$

Solution



b) Use the partial fractions decomposition to factorize the following fractions

$$\frac{3x^2 + 13x + 11}{x^3 + 5x^2 + 8x + 4} =$$

Finally  $\frac{3x^2 + 13x + 11}{x^3 + 5x^2 + 8x + 4} = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$

4) Evaluate the value of

$$\lim_{x \rightarrow \infty} (1 - \tanh x)^{[1/(2x)]}$$

Solution

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5) Find the first three non zero terms of the Maclaurin series of  $f(x) = e^{\tan 2x}$

Solution

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$f(x) = e^{\tan 2x}$	$f( ) =$
$f'(x) =$	$f'( ) =$
$f''(x) =$	$f''( ) =$

$$f(x) =$$

Table of Derivatives

$f(x)$	$a^x$	$e^x$	$\ln x$	$\tan x$	$\tanh x$	$\cos x$	$\cosh x$	$\sec^{-1} x$	$\cosh^{-1} x$	$\sinh^{-1} x$
$f'(x)$	$a^x \ln a$	$e^x$	$1/x$	$\sec^2 x$	$\operatorname{sech}^2 x$	$-\sin x$	$\sinh x$	$\frac{1}{x\sqrt{x^2-1}}$	$\frac{1}{\sqrt{x^2-1}}$	$\frac{1}{\sqrt{1+x^2}}$

6) Find  $f_x$  and  $f_y$  for  $f(x, y) = \cosh^{-1}(y^2 + \cos x) + y^x$

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Solution

$$\frac{\partial f}{\partial x} = f_x =$$

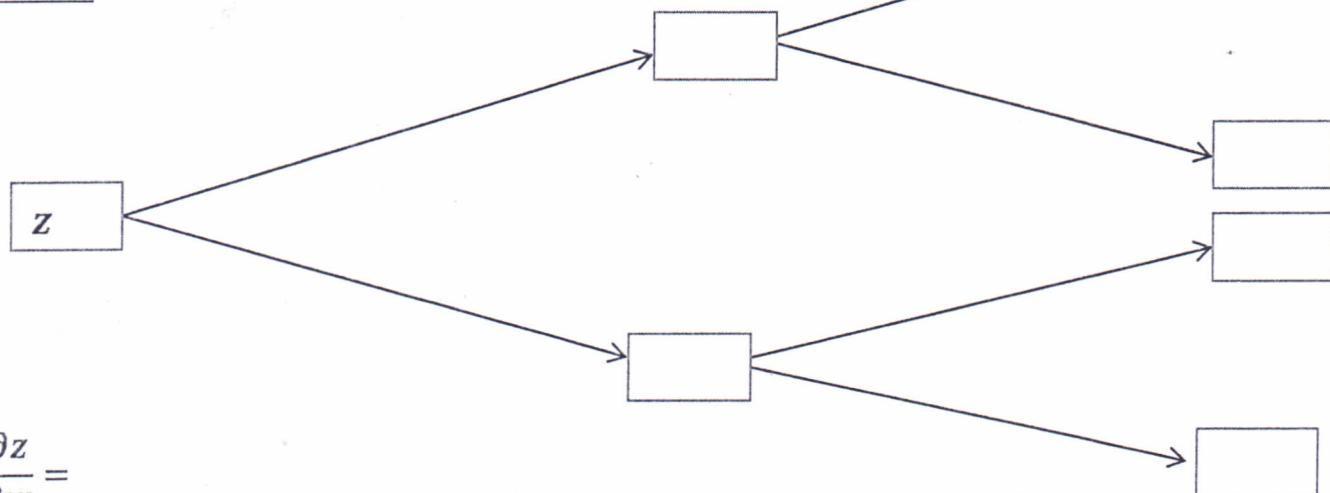
$$\frac{\partial f}{\partial y} = f_y =$$

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7) Find  $\frac{\partial z}{\partial w}$  for the function:  $z = \sec^{-1}(e^x) + x \tan y$ , where

$$x = u^3 + \sinh^{-1} w \quad \text{and} \quad y = u + w^w.$$

Solution



$$\frac{\partial z}{\partial w} =$$