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TECNOLOGICO DE MONTREY - PREPA TIC - CAMPUS CUMBIRES
Algebraic and Transcendental Functions - Quiz 2 - Final 2

Name: Isela Ordoñez ID: 101510212

1. Calculate the following logarithms, round your answers to 4 decimal places. 20 points.

a) $\ln(10) = 2.3025$
 b) $\log_2(16) = 4$
 c) $\log(1000) = 3$
 d) $\log_7(21) = 1.5645$

2. Expand the following logarithmic expressions as sums and differences of logarithmic terms. 20 points.

a) $\log\left(\frac{xy^2}{z^3}\right) = \log(xy) - \log(z^3)$ *correction*
 b) $\ln\sqrt{\frac{4x^2}{7y^3z}} = \frac{1}{2}(\ln(4x^2) - \ln(7y^3z)) = \frac{1}{2}(\ln(4) + 2\ln(x) - \ln(7) - 3\ln(y) - \ln(z))$

3. Simplify the following logarithmic expressions as a single logarithmic expression. 20 points.

a) $2\ln(3x-4) + \ln(6-5x) - 2\ln x$

$$\ln\left(\frac{(3x-4)^2(6-5x)}{x^2}\right)$$

 b) $\frac{3}{2}\log(x^2-1) - \frac{1}{2}\log(x^3+1)$

$$\frac{\sqrt{x^2-1}}{\sqrt{x^3+1}}$$

4. Solve the following equations, you may leave your answers in terms of logarithms or rounded to 3 decimal places. 40 points.

a) $e^x = 43$
 $x = \ln(43)$

b) $3^{2x+5} = 2^{1-x}$
 $2 \times 15 \ln(3) = 1 - x \ln(2)$
 $(2 \times 15)(1.098) = (1 - x)(0.693)$
 $2.196x + 5.49 = 0.693 - 0.693x$
 $2.196x + 0.693x = -5.49 + 0.693$
 $2.889x = -4.797$
 $x = \frac{-4.797}{2.889}$

c) $\frac{1+5e^x}{4} + 2 = 11$
 $\frac{1+5e^x}{4} = 9$
 $1+5e^x = 36$
 $5e^x = 35$
 $e^x = 7$
 $x = \ln(7)$

d) $e^{2x} - 8e^x + 7 = 0$
 $e^{2x} - 8e^x + 7 = 0$
 $e^x - 7 = 0$
 $e^x = 7$
 $x = \ln(7)$

Handwritten notes:
 $y = \ln x$
 $e^{3x} = 7$
 $3x = \ln(7)$
 $x = \frac{\ln(7)}{3}$
 ~~$e^{2x} - 8e^x + 7 = 0$~~
 ~~$e^x = 7$~~
 ~~$x = \ln(7)$~~

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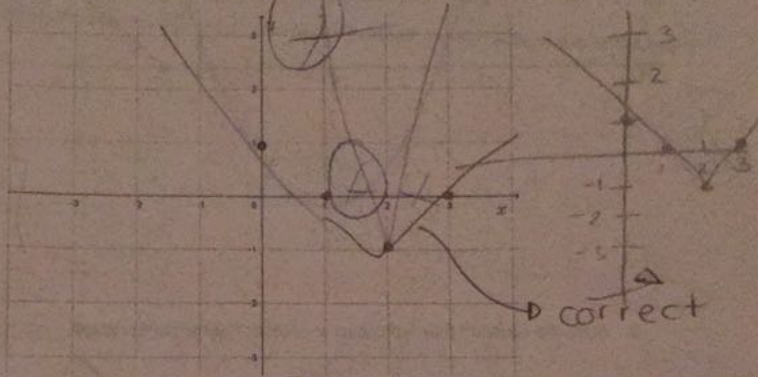
TECNOLOGICO DE MONTERREY - PREPA TEC - CAMPUS CUMBRES

Algebraic and Transcendental Functions - Quiz 2 - Partial 1

Name Karla Ornela ID A01570452

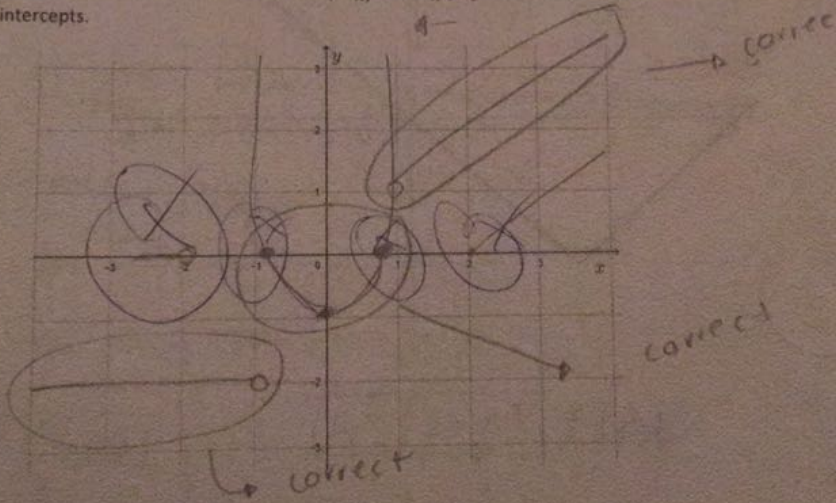
1. Draw the graph of the function $f(x) = |x - 2| - 1$. Show clearly all axes intercepts.

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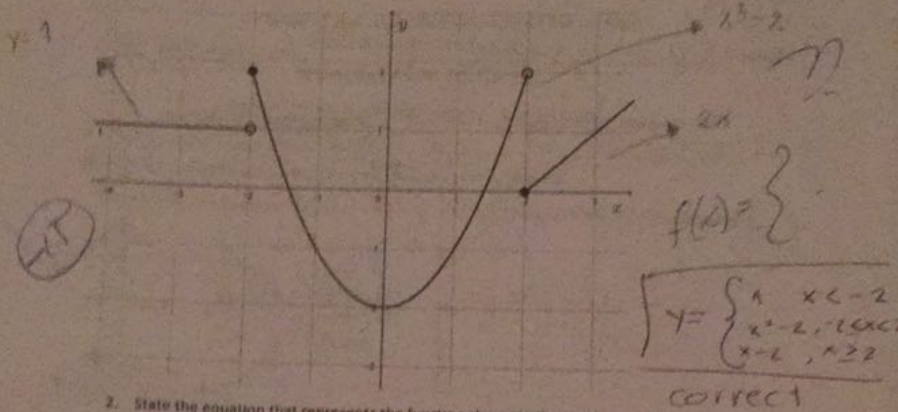


2. Draw the graph of the function $f(x) = \begin{cases} -2, & x < -1 \\ x^2 - 1, & -1 \leq x \leq 1 \\ x, & x > 1 \end{cases}$. Show clearly the all axes intercepts.

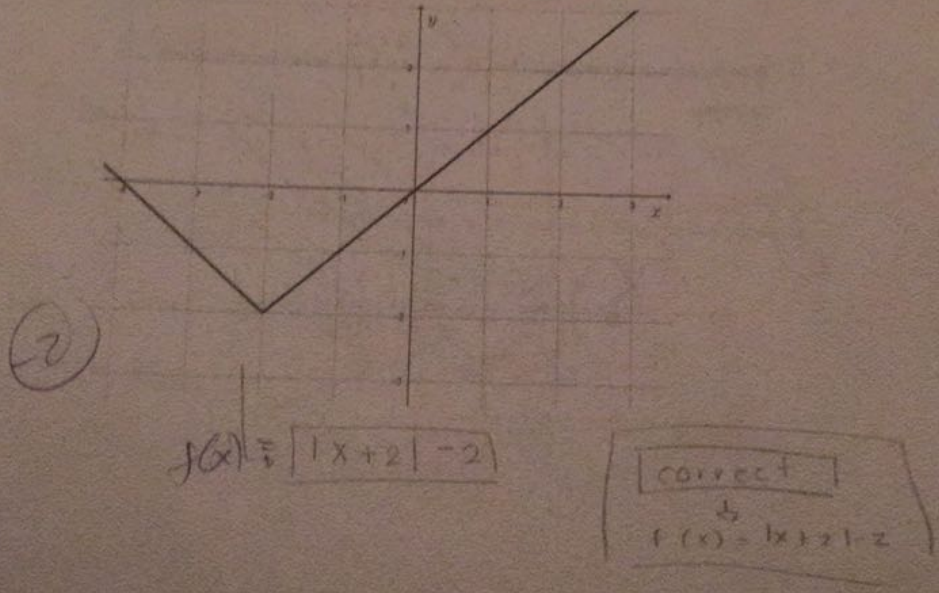
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1. State the equation that represents the function shown in the graph.



2. State the equation that represents the function shown in the graph.



Name Katya Orpeta

ID 6015

Fill in the blanks. (30 points)

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PREPA TEC - CAMPUS CUMBRES

DEPARTAMENTO DE MATEMÁTICAS

Algebraic and transcendental functions - Quiz 1 - Partial 1

Name Katya Orpeta

ID A01570452

Solve the following problems showing a clear procedure (20 points each).

1. Consider the function $f(x) = x^2 - 5x + 3$. find the following (write simplified answers):

a) $f(3)$ $3^2 - 5(3) + 3 = 9 - 15 + 3 = -3$

b) $f(-2)$ $(-2)^2 - 5(-2) + 3 = 4 + 10 + 3 = 17$

c) $f(x+h)$
 $(x+h)^2 - 5(x+h) + 3$
 $x^2 + 2xh + h^2 - 5x - 5h + 3$

d) $\frac{f(x+h) - f(x)}{h}$
 $\frac{(x+h)^2 - 5(x+h) + 3 - (x^2 - 5x + 3)}{h}$
 $\frac{x^2 + 2xh + h^2 - 5x - 5h + 3 - x^2 + 5x - 3}{h}$
 $\frac{2xh + h^2 - 5h}{h} = 2x + h - 5$

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2. Let $f(x) = \sqrt{1-x^2}$ and $g(x) = 1+x$ be two functions, find the following (simplify your answers):

a) $f \circ g(x)$ $\rightarrow \sqrt{1 - (1+x)^2}$

b) $g \circ f(x)$ $\rightarrow 1 + \sqrt{1-x^2}$

c) $f \circ f(x)$ $\rightarrow \sqrt{1 - (\sqrt{1-x^2})^2} = \sqrt{1 - (1-x^2)} = \sqrt{x^2} = |x|$

d) $g \circ g(3)$ $\rightarrow 1 + 1 + 3 = 2 + 3 = 5$

Correct $\sqrt{x^2 - 2x}$

3. Find the inverse of $f(x) = \frac{1-x}{2x+5}$

$$f(x) = \frac{1-x}{2x+5}$$

$$x = \frac{1-y}{2y+5}$$

$$f^{-1}(x) = \frac{1-5x}{2}$$

$$(2y+5)x = 1-y$$

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

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

$$y = \frac{1-5x}{2}$$

4. Determine whether $f(x) = \sqrt{x^2-5}$ and $g(x) = \sqrt{x+5}$ are inverse of each other.

$$x = \sqrt{y^2-5}$$

$$x^2 = y^2 - 5$$

$$x^2 + 5 = y^2$$

$$\sqrt{x^2+5} = y$$

$$x = \sqrt{y+5}$$

$$x^2 = y+5$$

$$x^2 - 5 = y$$

X inverse??

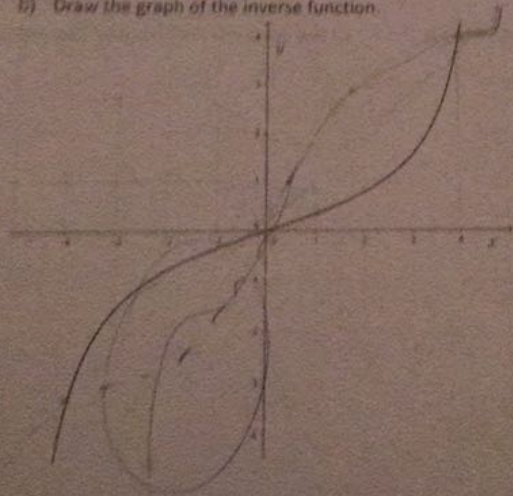
NOT
inverse
correct

5. Consider the graph of the function given below.

a) Is the function one-to-one? Justify your answer.

YES, it does have only one value for y 's

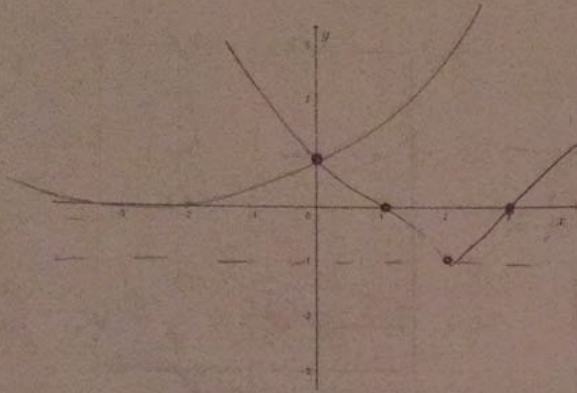
b) Draw the graph of the inverse function.



Name Fátima Olvera ID A01570452

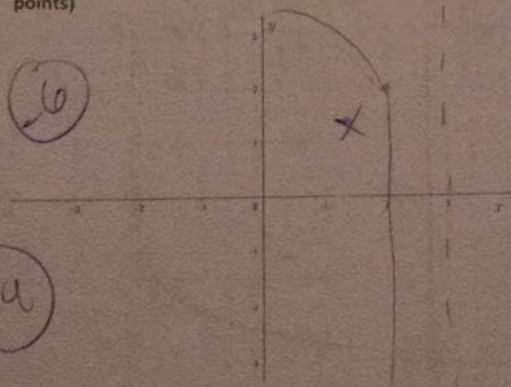
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1. Draw the graph of the function $f(x) = e^{x+2} - 1$ and fill in the blanks. (30 points)



Domain: \mathbb{R}
 Range: $(-1, \infty)$
 Horizontal asymptote: $y = -1$
 Vertical asymptote: none
 Characteristic point: $(-2, 0)$
 y-intercept: $e^2 - 1$

2. Draw the graph of the function $f(x) = -\log_2(x - 1) + 2$ and fill in the blanks. (30 points)



Domain: $(-\infty, 3)$
 Range: \mathbb{R}
 Horizontal asymptote: None
 Vertical asymptote: $x = 3$
 Characteristic point: $(2, 2)$
 y-intercept: $(2, 2)$

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3. For each of the four graphs shown, match the corresponding function and write the letter below the graph (not all functions are plotted). (40 points)

A) $f(x) = \log_3(-x)$

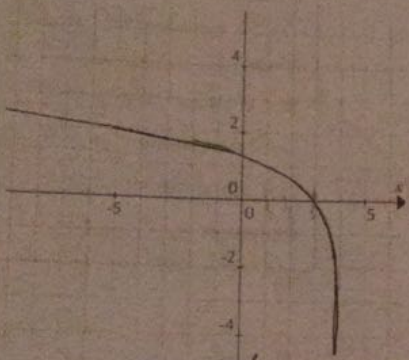
B) $f(x) = 4^{x-2}$

C) $f(x) = -\log_3(-x)$

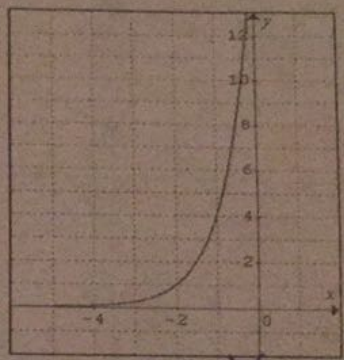
D) $f(x) = \log_3(4-x)$

E) $f(x) = 4^x$

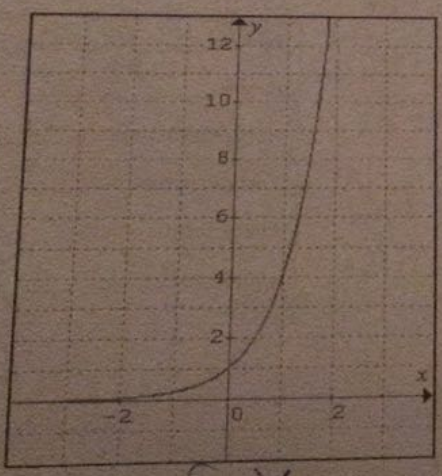
F) $f(x) = 4^{-x}$



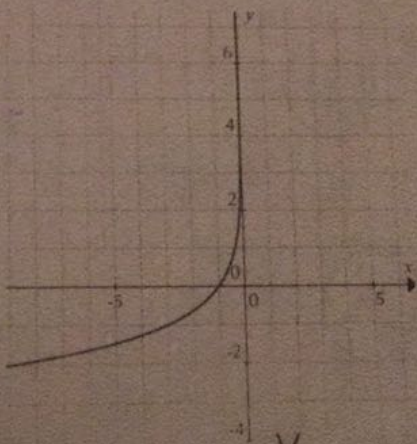
FX



DX



CX



AX