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The University of Jordan

DEPARTMENT OF MATHEMATICS

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Calculus I

EXAM 1A / 1st SEMESTER 2016-2017

Date: 05/11/2016

(.....) :وقت المحاضرة (.....) :الرقم الجامعي ..... :الاسم

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Instructions: *The test one two-sided page; make sure you do both sides. You* ***CANNOT*** *use a calculator on any part of this exam. The point value of each problem is indicated in brackets. Finally, before you start to work a problem, be sure that you understand what is being asked.*

For questions 1 to 8, fill in the blank with the correct answer. **Only correct answers count.** [1.5 pts each]

1. $\tan\left(\frac{7\pi}{6}\right) =$ ..... $\frac{1}{\sqrt{3}}$

2. If $1+\log_2(x-4)=\log_2(x+3)$, then $x =$ 11

3. If $f(x)=\frac{\cos^{-1}(1-x)}{x-2}$, then $\text{Dom}(f) =$ ..... [0,2)

4. If $f(x)=\sqrt{25-x^2}+2$, then $\text{Range}(f) =$ ..... [2,7]

5. $\sin^{-1}\sin\left(\frac{9\pi}{8}\right) =$ ..... $-\frac{\pi}{8}$

6. $\sin\left(2\tan^{-1}\left(\frac{2}{3}\right)\right) =$ ..... $\frac{12}{13}$

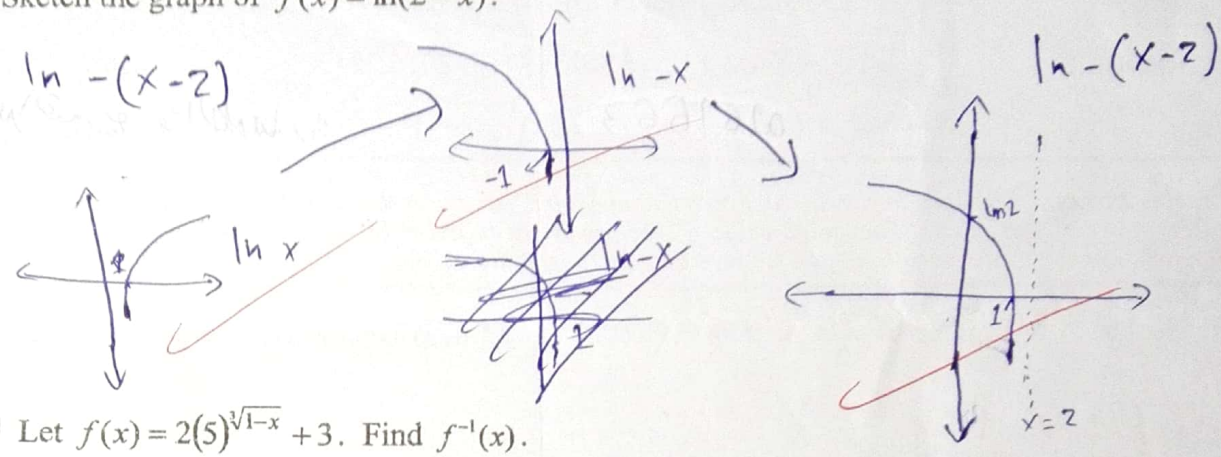
7. If $f(x)=\ln x$, then $\text{Dom}(f\circ f) =$ ..... $(1,\infty)$

8. The function $f(x)=e^{(1+x)}-e^{(1-x)}$ is symmetric about the ..... Origin

For question 9, 10, and 11, sufficient work must be shown to receive credit.

9. [3 pts] Sketch the graph of $f(x) = \ln(2-x)$.

$f(x) = \ln -(x-2)$



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10. [3 pts] Let $f(x) = 2(5)^{\sqrt[3]{1-x}} + 3$. Find $f^{-1}(x)$.

$x = 2(5)^{\sqrt[3]{1-y}} + 3$

$2(5)^{\sqrt[3]{1-y}} = x-3$

$\log_5 5^{\sqrt[3]{1-y}} = \log_5 \frac{x-3}{2}$ → log تأخذ للطرفين

$\sqrt[3]{1-y} = \log_5 \frac{x-3}{2}$

$1-y = \left(\log_5 \frac{x-3}{2}\right)^3$

$y = 1 - \left(\log_5 \frac{x-3}{2}\right)^3$

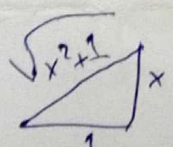
$f^{-1}(x) = 1 - \left(\log_5 \frac{x-3}{2}\right)^3$

11. [2 pts] If $h(x) = \arctan x$ for $x \geq 0$, $g(x) = \cos x$, and $f(x) = (1-x^2)^{-1}$, then $(f \circ g \circ h)(x) = 1 + x^p$. Find the value of the number p.

$f(g(h))$

$h = \tan^{-1} x$

$g(h) = \cos(\tan^{-1} x)$



$g(h) = \frac{1}{\sqrt{x^2+1}}$

$f(g(h)) = f\left(\frac{1}{\sqrt{x^2+1}}\right) = \left(1 - \left(\frac{1}{\sqrt{x^2+1}}\right)^2\right)^{-1}$

$= \frac{1}{1-\frac{1}{x^2+1}} = \frac{1}{\frac{x^2+1-1}{x^2+1}} = \frac{x^2+1}{x^2}$

$= 1 + x^{-2}$

$P = -2$

Good luck