

King Fahd University of Petroleum and Minerals



Dammam Community College

Term 171

Code A

PREPARATORY YEAR - Math 012

Class Test 1
Oct. 17, 2017

Time allowed: 60 Minutes

Name: _____ ID. _____ Sec # _____

Read the following instructions:

1. This test consists of eight questions.
2. You must show all necessary steps of your solution to earn full credit.
3. The use of calculators is not allowed.
4. This test worth 8% of the total marks allocated to this course.

<u>Question</u>	<u>Marks</u>
1.	/4
2.	/4
3.	/4
4.	/4
5.	/4
6.	/4
7.	/4
8.	/4
<u>Total Marks</u>	/32

Question 1: If $f(x) = \sqrt{2+x}$, $x \geq -2$. Find $f^{-1}(x)$ and its domain. (4 Points)

Solution:

$$\text{Let } y = \sqrt{2+x} \rightarrow \left(\frac{1}{2}\right)$$

$$y^2 = 2+x \quad \left(\frac{1}{2}\right)$$

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

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

$$\Rightarrow D_{f^{-1}} = R_f \rightarrow \left(\frac{1}{2}\right)$$

$$R_f = [0, \infty) \quad \left(\frac{1}{2}\right)$$

$$\Rightarrow D_{f^{-1}} = [0, \infty) \quad \left(\frac{1}{2}\right)$$

Question 2: Let $f(x) = \left(\frac{1}{4}\right)^{x+2} - 8$.

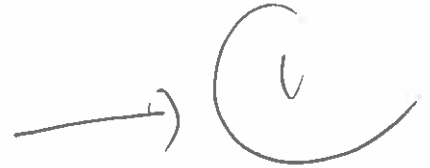
(4 Points)

a) Find the horizontal asymptote of the function $f(x)$.

As $x \rightarrow +\infty$ ($0 < a < 1$)

$\Rightarrow f(x) \rightarrow -8$

\Rightarrow H. A $\boxed{y = -8}$



b) Find the x -intercept and y -intercept of the function $f(x)$.

X-Intercept, put $y = 0$

$$0 = \left(\frac{1}{4}\right)^{x+2} - 8 \rightarrow \left(\frac{1}{4}\right)$$

$$= \left(2^{-2}\right)^{x+2} = 8 \rightarrow \left(\frac{1}{4}\right)$$

$$= 2^{-2x-4} = 2^3 \rightarrow \left(\frac{1}{4}\right)$$

$$\therefore -2x - 4 = 3 \Rightarrow \boxed{x = -7/2}$$

Y-Intercept, put $x = 0$

$$\therefore y = \left(\frac{1}{4}\right)^2 - 8 = \frac{1}{16} - 8 = \frac{1 - 128}{16}$$

$$= \frac{-127}{16} \neq \left(\frac{1}{4}\right)$$

Question 3: Find the domain in interval notation of the function:

$$f(x) = \log_2(x^2 + x - 2)$$

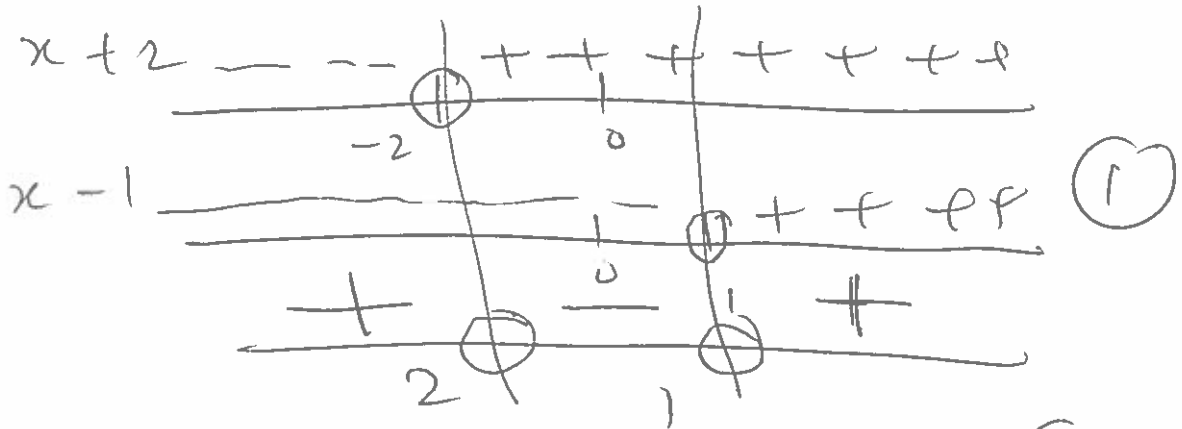
(4 Points)

Solution

Domain of $f(x)$: $x^2 + x - 2 > 0$ (1)

$$(x + 2)(x - 1) = 0$$
 (1)

$$\boxed{x = -2} \text{ or } \boxed{x = 1}$$
 (1)



$$\therefore D_f = (-\infty, 2) \cup (1, \infty)$$
 (1)

Question 4: Simplify the given expression:

$$(\log_3 5)(\log_5 7)(\log_7 81)(\sqrt{2})^{-\log_2 \left(\frac{1}{25}\right)}$$

(4 Points)

$$= \frac{\cancel{\log 5}}{\log 3} \cdot \frac{\cancel{\log 7}}{\cancel{\log 5}} \cdot \frac{\log 81}{\cancel{\log 7}} \cdot (2^{\frac{1}{2}})^{-\log_2 5^{-2}} \rightarrow \textcircled{1}$$

$$= \frac{\log 3^4}{\log 3} \cdot (2^{\frac{1}{2}})^{2 \log_2 5} \rightarrow \textcircled{1}$$

$$= \frac{4 \cancel{\log 3}}{\cancel{\log 3}} \cdot 2^{\log_2 5} \rightarrow \textcircled{1}$$

$$= 4 \cdot 5 = 20 \rightarrow \textcircled{1}$$

Question 5:

A) Find the angle of at least positive measure that is coterminal with the angle -792°
(2 Points)

$$\begin{aligned} \text{Coter } (\theta) &= -792^\circ + n(360^\circ) \quad (4) \\ &= -792^\circ + 3(360^\circ) \quad (1) \\ &= -792^\circ + 1080^\circ \quad (1) \\ &= 288^\circ \quad (1) \end{aligned}$$

B) Perform the calculation $180^\circ - 124^\circ 51'$

(2-points)

$$\begin{array}{r} 180^\circ \\ - 124^\circ 51' \\ \hline \end{array} \rightarrow \begin{array}{r} 179^\circ 60' \\ - 124^\circ 51' \\ \hline 55^\circ 9' \end{array} \quad (1)$$
$$\therefore 180^\circ - 124^\circ 51' = 55^\circ 9' \quad (1)$$

Question 6: Find the solution set of the equation

$$e^{2x} - 5e^x + 6 = 0$$

(4 Points)

$$\therefore \text{Let } u = e^x \quad \left(\frac{1}{2}\right)$$

$$= u^2 - 5u + 6 = 0 \quad \left(\frac{1}{2}\right)$$

$$(u - 3)(u - 2) = 0 \quad \left(\frac{1}{2}\right)$$

$$u - 3 = 0 \text{ or } u - 2 = 0 \quad \left(\frac{1}{2}\right)$$

$$u = 3 \text{ or } u = 2 \quad \left(\frac{1}{2}\right)$$

$$e^x = 3 \text{ or } e^x = 2 \quad \left(\frac{1}{2}\right)$$

$$x = \ln 3 \text{ or } \therefore x = \ln 2 \quad \left(\frac{1}{2}\right)$$

$$\therefore \text{S.S} = \{\ln 2, \ln 3\} \quad \left(\frac{1}{2}\right)$$

Question 7: If the terminal side of an angle θ in the standard position passes through the point $(0, -5)$. Find the following trigonometric functions:

(4 Points)

A) $\sin(\theta) = \frac{y}{r} = \frac{-5}{\sqrt{0^2 + (-5)^2}} = \frac{-5}{5} = -1$

B) $\sec(\theta) = \frac{r}{x} = \frac{5}{0} = \text{undefined}$

Question 8: If $\tan 40^\circ = 0.84$, find the value of
 $3 \tan 140^\circ + 5 \cot 410^\circ =$

(4-points)

$$\begin{aligned}
 &= 3 \tan(180^\circ - 40^\circ) + 5 \cot(50^\circ) \rightarrow \textcircled{1/2} \\
 &= -3 \tan(40^\circ) + 5 \tan(90^\circ - 50^\circ) \rightarrow \textcircled{1} \\
 &= -3 \times 0.84 + 5 \times 0.84 \rightarrow \textcircled{2/2} = 410^\circ - 360^\circ \\
 &= -2.52 + 4.20 \rightarrow \textcircled{1/2} = 50^\circ \\
 &= 1.68 \rightarrow \textcircled{1}
 \end{aligned}$$