11.5

بسم الله الرحمن الرحيم

الجامعة الأردنية	الامتحان الأول: تفاضل وتكامل -1	الأربعاء 2013/11/6
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(24)

(41)

In questions 1 to 7 fill in the blanks (2 marks each):

(9)

[1] The domain for $f(x) = \frac{1}{\sin^{-1}(3x+3)}$ is ...$[-\frac{4}{3}, -\frac{2}{3}]$...

[2]Write using one logarithm to the base 3:

$\log_3 10 + \log_9 16 =$ ....$\log_3 40$...

[3] $\cos(\tan^{-1} \frac{-2}{5}) =$ ....$\frac{5}{\sqrt{29}}$.....

[4] The graph of $y = x \cos x$ is symmetric around ....origin....

[5] $\lim_{x \to 4^-} \frac{x^2-2x-8}{|x-4|} =$ ....0 (zero)...

[6] The vertical asymptotes for $y = \frac{x^2+2x}{|x|(x-2)(x+2)}$ is (are) ....$x = 0$, $x = 2$, $x = -2$

[7] $\cos^{-1}(\cos \frac{7\pi}{6}) =$ .....$\frac{-\pi}{6}$.....

In questions 8 and 9 solve and show your work

[8] (3 marks) Let $f(x) = \frac{e^x}{1-4e^x}$

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(a) Find domain (f)

$1 - 4e^x \neq 0$

$1 \neq 4e^x$

$\frac{1}{4} \neq e^x$

$\ln \frac{1}{4} \neq x$

$D_f = \mathbb{R} - \{\ln \frac{1}{4}\}$

(b) Find f^{-1}.

$y = \frac{e^x}{1-4e^x}$

$y - 4e^x y = e^x$

$y = e^x + 4e^x y$

$y = e^x(1 + 4y)$

$e^x = \frac{y}{1+4y}$

$x = \ln\left(\frac{y}{1+4y}\right)$

$f^{-1}(x) = \ln\left(\frac{x}{1+4x}\right)$

(c) Find Range (f)

$R_f = D_{f^{-1}} \Rightarrow \frac{x}{1+4x} > 0 \Rightarrow x > 1 + 4x$

$\Rightarrow x - 4x > 1 \Rightarrow x(1-4) > 1 \Rightarrow 3x > 1 \Rightarrow x > \frac{1}{3}$

$(\frac{1}{3}, \infty)$

[9] (3 marks) Sketch the graph of $y = -3x^2 + 6x + 3$

0.5