Prince Sultan University
Deanship of Educational Services
Department of Mathematics
and General Sciences

COURSE DETAILS:

ORIENTATION MATHEMATICS I	**MATH 001**	**FINAL EXAM A**
Semester:	Spring Semester --Term 182	
Date:	Saturday April 20, 2018	
Time Allowed:	180 minutes (3 hours)	

STUDENT DETAILS:

Student Name:	
Student ID Number:	
Section:	
Instructor's Name:	

INSTRUCTIONS:

- You may use a scientific calculator that does not have programming or graphing capabilities. NO borrowing calculators.
- NO talking or looking around during the examination.
- NO mobile phones. If your mobile is seen or heard, your exam will be taken immediately.
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GRADING:

	Page 1	**Page 2**	**Page 3**	**Page 4**	**Page 5**	**Page 6**	**Total**	**Total**
Questions								
Marks	**10**	**10**	**20**	**16**	**22**	**22**	**100**	**40**

Q1) Which test is used to determine whether a graph is a function or not?

A) The diagonal line test
B) The horizontal line test
C) The vertical line test
D) The even power test

Q2) Given that $f(x)=\frac{x^3+3}{2}$, then the inverse $f^{-1}(x)$ is equal to:

A) $\frac{x^3}{2}+\frac{3}{2}$
B) $2\sqrt[3]{x}-3$
C) $\sqrt[3]{2x-3}$
D) $\frac{1}{2}\left(\sqrt[3]{x}-3\right)$

Q3) Find the slope of the line passing through $(4,2)$ and $(-17,2)$.
A) 1
B) 0
C) -13
D) -21

Q4) If c is a zero of a polynomial function $f(x)$, then

A) $x+c$ is a factor of $f(x)$
B) x^2-c is a factor of $f(x)$
C) x^2+c is a factor of $f(x)$
D) $x-c$ is a factor of $f(x)$

Q5) Which of the following represents the graph 

A) $(3,\infty)\cup(-\infty,7]$
B) $(3,\infty)\cap(-\infty,7]$
C) $[3,\infty)\cap(-\infty,7)$
D) $[3,\infty)\cup(-\infty,7)$

You must write the correct answer to each question in the box below

Question	**1**	**2**	**3**	**4**	**5**
Answer					

Q6) Which expression is equivalent to $\left(\frac{-4x^{2}}{2x^{-1}}\right)^{2}$

A) $\frac{1}{4x^{3}}$

B) $\frac{1}{4x^{6}}$

C) $\frac{-1}{4x^{6}}$

D) $4x^{6}$

Q7) Perform the indicated operations and simplify: $2(4t-1)-(t^{2}+1)-4t(t-5)$

A) $-5t^{2}+28t-3$

B) $-3t^{2}+28t-3$

C) $-5t^{2}+28t-2$

D) $-5t^{2}+12t-3$

Q8). Let $f(x)=2x$, then $\frac{f(x+h)-f(x)}{h}$ is equal to:

A) 1

B) 2

C) h

D) $2h$

Q9) Let $f(x)=8-8x$ and $g(x)=-4x+8$, then $(f+g)(x)$ is

A) $-4x+16$

B) $-4x+8$

C) $4x$

D) $-12x+16$

Q10) The domain of the function $f(x)=\frac{x^{2}}{x^{2}+12}$ is:

A) $(-12,\infty)$

B) $(-\infty,-12)\cup(-12,\infty)$

C) $(-\infty,\infty)$

D) $(-\infty,0)\cup(0,\infty)$

You must write the correct answer to each question in the box below

Question	**6**	**7**	**8**	**9**	**10**
Answer					

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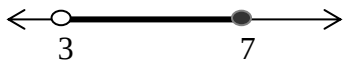
Q5) Which of the following represents the graph 

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Q11) (4+4pts) Expand and simplify the expressions:

a) $\left(x^2+2\right)^3$

b) $\left(\sqrt{5x}-y^2\right)\left(\sqrt{5x}+y^2\right)$

Q12) (4pts) Solve the equation $5(x+3)+9=-2(x-2)-1$

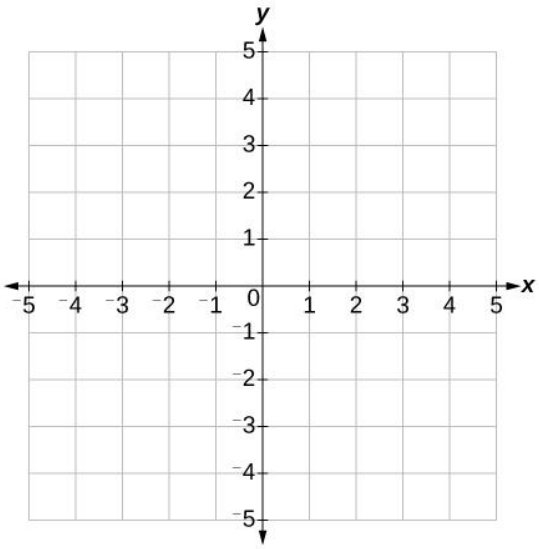
Q13) (4pts) Perform the indicated operation and simplify $\frac{x}{x-3}-\frac{2}{x^2-9}$

Q14) (4pts) Solve the equation $3x^2+5x-7=0$ by using the **"Quadratic Formula"**

Q15) (4pts) Expand the expression $(2-3i)^2$. Write your answer in Standard Form. **Show all your steps.**

Q16) (4pts) Find the distance between the points: $(-2,5)$ and $(10,0)$.

Q17) (4 pts.) Find the vertex, and x and y intercepts of $f(x)=x^2+4x+3$, then sketch the graph.



Q18) (4 pts.) Find the equation of the line that passes through $(3,2)$ and is parallel to the line $4x+3y=-9$

Q19) (6pts) Solve $|2x+3| \geq 5$. Express the solution set in interval notation.

Q20) (4pts) Solve the equation $\sqrt{2x+13} = x+7$

Q21) (6pts) Use the transformations of the graph $f(x) = |x|$, to sketch the graph of $g(x) = 2|x+3|-1$. **Find the *x* and *y* intercepts.**

Q22) (2+4 pts) Given that $f(x) = x^3 - 5x^2 - 4x + 20$

a) Use **synthetic division** and the **Remainder Theorem** to find $f(1)$

b) Given that 5 is a zero of $f(x)$, use **synthetic division** and the **Factor Theorem** to find the other zeros of $f(x)$.

Q24) (6pts) Find **all** (real and imaginary) solutions of the equation $x^7 - x^3 = 0$

Q25) (6pts) Find a 4th degree polynomial function with real coefficients that has $1, -1, 3i$ and $-3i$ as zeros and $f(2) = 39$

Q26) (10 pts) Let $f(x) = -3x^5(x-1)^2(x+2)$

a) Find the end behavior of $f(x)$.

b) Find the *x*-intercepts of $f(x)$. Find the **multiplicity** of each zero and determine whether the graph crosses or touches the *x*-axis at each zero.

c) Find the *y*-intercept of $f(x)$

d) Sketch the graph of $f(x)$