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 172	
Date:	Saturday May 5, 2018	
Time Allowed:	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.
- Show all your work and be organized.
- You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.

GRADING:

	Page 1	Page 2	Page 3	Page 4	Page 5	Page 6	Total	Total
Questions								
Marks	**10**	**10**	**10**	**22**	**24**	**24**	**100**	**40**

1) Find the set $S=\left\{\sqrt{2},-4,\pi,,\sqrt{5}\right\}\cap\left\{-4,-2,5,\pi\right\}$.

A) $S=\{\sqrt{2},-2,4,\pi,-\pi\}$

B) $S=\{-2,4,\pi\}$

C) $S=\{-4,\pi\}$

D) $S=\{-2,4,\pi,-\pi\}$

2) Simplify the exponential expression $\left(\frac{\left(2a^{-2}b^{3}\right)^{-2}a^{2}b^{2}}{a^{-2}b^{-1}}\right)^{3}$

A) $\frac{a^{16}}{12b^{64}}$

B) $\frac{a^{24}}{64b^{9}}$

C) $\frac{16a^{4}}{b^{16}}$

D) $256a^{4}b^{16}$

3) Add the expression $\frac{4}{x^{2}-1}+\frac{3}{x-1}$

A) $\frac{x}{x^{2}-1}$

B) $\frac{2x}{x+1}$

C) $\frac{3}{x-1}$

D) $\frac{3x+7}{(x-1)(x+1)}$

4) The solution of the linear equation $-4x+5+2\left(x+1\right)=-5x+4$ is

A) -1

B) $3/4$

C) $7/3$

D) $-7/4$

5) The value of *x* satisfying the condition $y_1=\frac{x+6}{5}$, $y_2=\frac{x+8}{7}$ and $y_1-y_2=0$ is

A) 1

B) 28

C) $21/2$

D) -1

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

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

6) The solution of the equation $(x-5)^2 = -4$ is

A) $2 \pm 5i$

B) $5 \pm 2i$

C) $-5 \pm 2i$

D) $-2 \pm 5i$

7) An even function is:

A) symmetrical about the *y*-axis

B) symmetrical about the *x*-axis

C) symmetrical about the origin

D) none of the above

8) The inverse function for $f(x) = \dfrac{3}{x+2}$ is

A) $f^{-1}(x) = 3x - 2$

B) $f^{-1}(x) = \dfrac{x-3}{2}$

C) $f^{-1}(x) = 3 - 2x$

D) $f^{-1}(x) = \dfrac{3}{x} - 2$

9) The radius of a circle whose equation $x^2 + y^2 - 4x + 2y + 1 = 0$ is

A) 4

B) 3

C) 2

D) $\sqrt{5}$

10) The domain of $f(x) = \dfrac{1}{x^2 + 4x}$ is

A) $(-\infty, -4) \cup (-4, 0) \cup (0, \infty)$

B) $(-\infty, -4] \cup [-4, \infty)$

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

D) $(-4, \infty)$

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

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

11) If $f(x)=x^2+1$ and $g(x)=x-1$, then $(f\circ g)(-2)=$

A) -5
B) 10
C) 4
D) -4

12) The midpoint between the two points $(2,-8)$ and $(10,-2)$ is

A) $(6,-5)$
B) $(5,-1)$
C) $(1,-4)$
D) $(12,-10)$

13) The distance between the two points $(4,5)$ and $(11,2)$ is

A) 10
B) $\sqrt{10}$
C) $\sqrt{40}$
D) $\sqrt{58}$

14) If $f(x)=(x-2)^2(x-1)$, then the graph of $f(x)$ at $x=2$ will:

A) pass through the *x*-axis at that point
B) touch the *x*-axis and turn at that point
C) pass through the *x*-axis and touch and turn at that point
D) none of the above

15) The graph of $f(x)=-x^2+2x-3$ has a

A) Minimum at $(1,-2)$
B) Maximum at $(-3,-1)$
C) Maximum at $(1,-2)$
D) Minimum at $(-2,1)$

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

Question	**11**	**12**	**13**	**14**	**15**
Answer					

1) [4 pts] Simplify the algebraic expression $-2(3y-x)^2-3(4xy)$

2) [4 pts] Factor completely $40x^3y-5y^4$

3) [4 pts] Perform the indicated operation $\dfrac{x^3-3x^2}{x^2-5x+6}\div\dfrac{3x+6}{x^3-4x}$

4) [10 pts] Solve the following equations:

a) $3x^{\frac{2}{3}}-5x^{\frac{1}{3}}+2=0$

b) $\sqrt{x+3}=x+3$

5) [6 pts] Solve the inequality $4+\left|3+\frac{x}{3}\right|\le 9$

6) [6 pts] Begin by graphing $f(x)=\sqrt{x}$. Then use transformations to graph $g(x)=\sqrt{x-1}-3$.
Find the domain, range and intercepts.

7) [6 pts] Find the domain and range of the graph of $f(x)=-2(x-3)^2+1$

8) [6 pts] Use end behavior, multiplicity and intercepts to draw the graph of $f(x)=x^3+2x^2-x-2$

9) [6 pts] Use synthetic division and the Remainder Theorem to find $f(2)$ given that $f(x) = x^3 + 1$.

10) [6 pts] Use the Factor Theorem to solve the equation $2x^3 + 3x^2 - 11x - 6 = 0$ given that 2 is a zero of this equation.

11) [6 pts] Find a third degree polynomial that has 2 and $-6i$ as zeros and $f(3) = 135$.

12) [6 pts] Solve the rational inequality $\frac{x-3}{x-1} \geq 0$, and graph the solution on a number line.