Prince Sultan University

Deanship of Educational Services

Department of Mathematics
and General Sciences

COURSE DETAILS:

ORIENTATION MATHEMATICS I	**MATH 001**	**MAJOR EXAM I A**
Semester:	Spring Semester --Term 172	
Date:	Monday February 26, 2018	
Time Allowed:	90 minutes	

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**	**Total**	**Total**
Questions							
Marks	10	10	20	25	15	80	20

1) Simplify $2x^2 - 3\left[2\left(x^2 + x\right) - 3x\left(x + 4\right)\right]$.

A) $68x^3 - 84x^2$

B) $-68x^3 + 84x^2$

C) $4x^3 + 5x^4 - x$

D) $5x^2 + 30x$

2) Given $A = \left\{2, -2, 4, \sqrt{2}, 5\right\}$ and $B = \left\{1, 2, 3, 4\right\}$ find $A \cap B$.

A) $\left\{2, 4\right\}$

B) $\left\{-2, 4\right\}$

C) $\left\{1, 2, -2, 3, 4, \sqrt{2}, 5\right\}$

D) $\varnothing$

3) Simplify $\left(\dfrac{25\ a^{-3}\ b^{14}\ c^{-\frac{2}{3}}}{-5\ a^3\ b^{-14}\ c^{\frac{1}{3}}}\right)^{-2}$.

A) $\dfrac{c^2}{25a^{12}b^{56}}$

B) $\dfrac{a^{12}c^2}{25b^{56}}$

C) $\dfrac{a^{12}c^2}{-25b^{56}}$

D) $\dfrac{25c^2}{a^{12}b}$

4) Rewrite the expression $\left|3 - \pi\right| + \left|1 - \sqrt{3}\right|$ without the absolute value bars

A) $\pi + 1 - 3\sqrt{3}$

B) $\pi - 1 + 3\sqrt{3}$

C) $\pi + \sqrt{3} - 4$

D) $2 - \pi + \sqrt{3}$

5) Simplify $\left(x^2 - 3y\right)\left(x^2 + 3y\right)$.

A) $x^4 - 9y^2$

B) $x^4 + 3y^2$

C) $x^2 - 3y^2$

D) $x^2 + 9y^2$

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

Question	1	2	3	4	5
Answer					

6) One factor of $24x^4 + 10x^3y - 4x^2y^2$ is

A) $3x + 2y$

B) $x + y$

C) $x - 2y$

D) $4x + y$

7) Factor **completely** $x^2 - 25a^2 + 100 - 20x$

A) $x^2 - 5a + 20(5 - x)$

B) $(x - 10 - 5a)(x - 10 + 5a)$

C) $(x - 5a)(x + 5a)$

D) $5(x^2 - a^2) + 80x$

8) Factor **completely** $y^5 - 81y$

A) $y^5(1 - 81y)$

B) $y^2(y^2 + 9)(y - 9)$

C) $(y^2 - 9)(y^2 + 9)$

D) $y(y + 3)(y - 3)(y^2 + 9)$

9) Simplify by performing the indicated operation $\dfrac{2x + 8}{x - 3} \div \dfrac{x^2 + 5x + 4}{x^2 - 9}$

A) $\dfrac{4(x - 3)}{x - 1}$

B) $\dfrac{2(x + 3)}{x + 1}$

C) $\dfrac{2(x + 3)}{x^2 - 9}$

D) $\dfrac{3(x + 1)}{x + 3}$

10) Solve $2(x + 2) - 3(x - 2) = 15$

A) $x = -5$

B) $x = -2$

C) $x = 5$

D) $x = 2$

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

Question	6	7	8	9	10
Answer					

11) [4 pts] Evaluate $\dfrac{3y - 4x^2}{2|xy| - y^2}$, given $x = 2$ and $y = -1$.

12) [4+4 pts] Simplify each of the following expressions **(show all your steps):**

a) $\sqrt[3]{24x^6 y^3} - y\sqrt[3]{81x^6}$

b) $\dfrac{\sqrt{500x^{-2}}}{\sqrt{10x^{-4}}}$

13) [4+4 pts] Perform the indicated operations and simplify:

a) $(2x + 3)^3$

b) $(x - 1)(x^2 - 2x + 4)$

14) [5 pts] Rationalize the denominator $\dfrac{12}{\sqrt{3}-\sqrt{7}}$

15) [5+5 pts] Factor **completely** the following

a) $3x^3 - 2x^2 - 6x + 4$

b) $\left(x^2 + 3\right)^{\frac{1}{2}} - \left(x^2 + 3\right)^{\frac{3}{2}}$
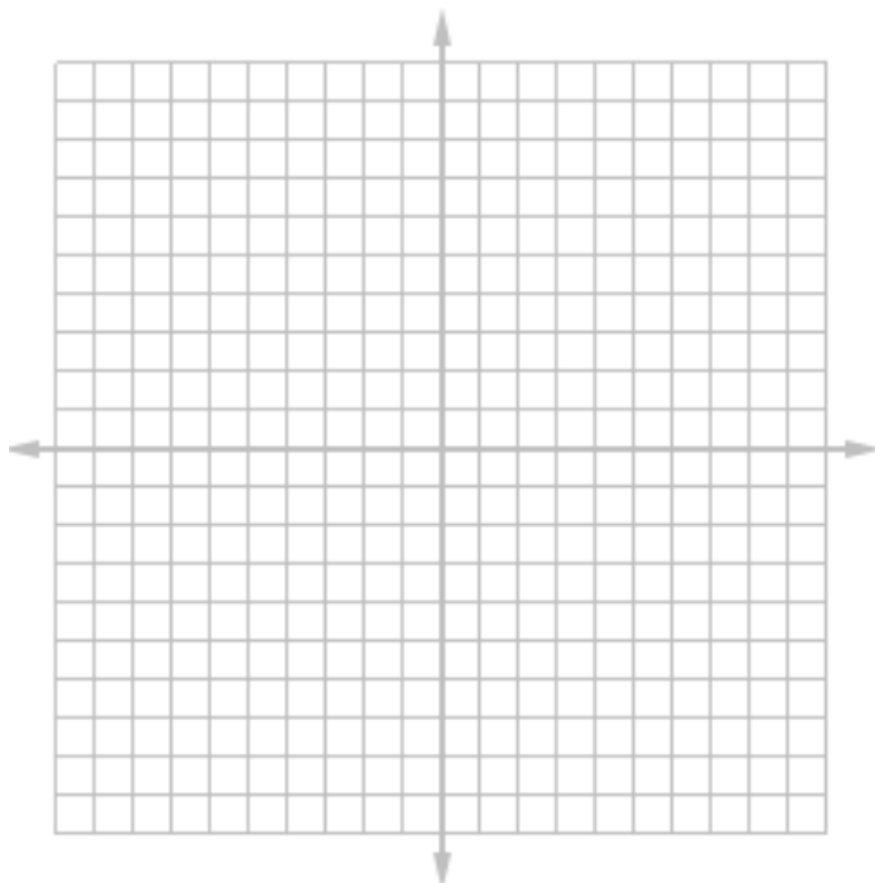
16) [5+5pts] Simplify the following expressions by performing the indicated operations

a) $\dfrac{x+3}{x^2-1} - \dfrac{x+2}{x-1}$

b) $\dfrac{\dfrac{x-3}{x+3}}{\dfrac{x}{x^2+x-6} - \dfrac{3}{x-2}}$

17) [5 pts] Factor **completely** $16x^3 - 2y^3$

18) [5 pts] Use a table of values to graph $y = 2x - 6$.

19) [5 pts] Solve the equation $\dfrac{2x+3}{2x} - \dfrac{1}{3x} = \dfrac{7+5x}{6x}$

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