

Student ID: _____

Section Number: _____ Serial Number: _____

Instructor's Name: _____

Part I	Q1 (1.5 points)	
	Q2 (1.5 points)	
	Q3 (3 points)	
	Q4 (3 points)	
	Q5 (3 points)	
	Q6 (2 points)	
	Q7 (3 points)	
	Q8 (2 points)	
Part II	(6 points)	
Total	25	

Model answer version (A)

First Exam summer 2017-2018

Part I: Solve each of the following questions completely.

1.(1.5 points) Compute $(7 - i)(4 + 2i)$.

Solution:

$$\begin{aligned}[7(4) + 7(2i) - 4i - 2(-1)] &= [28 + 14i - 4i + 2] \\ &= 30 + 10i\end{aligned}$$

2.(1.5 points) Simplify $\frac{\frac{2}{5} - \frac{3}{10}}{\frac{1}{2} + \frac{2}{5}}$

Solution:
$$\frac{\frac{4-3}{10}}{\frac{5+4}{10}} = \frac{1}{10} \cdot \frac{10}{9} = \frac{1}{9}$$

3.(3 points) Factor each of the following completely.

a. $(x^3 - 27)$

$$= (x - 3)(x^2 + 3x + 9)$$

b. $(x^3 - 2x^2 + 4x - 8)$

$$= x^2(x - 2) + 4(x - 2) = (x - 2)(x^2 + 4)$$

4.(3 points) Simplify $\frac{5x+10}{x^2-2x-3} \div \frac{x^2-4}{x+1}$.

Solution:

$$= \frac{5x+10}{x^2-2x-3} \cdot \frac{x+1}{x^2-4} = \frac{5(x+2)(x+1)}{(x-3)(x+1)(x-2)(x+2)} = \frac{5}{(x-3)(x-2)}$$

5. (3 points) Solve the following equation.

$$x^4 - 5x^2 + 4 = 0$$

Solution: let $w = x^2$ then $w^2 - 5w + 4 = 0$,

$$(w - 4)(w - 1) = 0$$

$$w - 4 = 0 \text{ or } w - 1 = 0$$

$$w = 4 \text{ or } w = 1$$

$$x = \pm 2 \text{ or } x = \pm 1$$

The Solution set $\{\pm 2, \pm 1\}$

6. (2 points) Solve the following inequality.

$$x^3 - 3x^2 - 18x \leq 0$$

Solution: $x(x^2 - 3x - 18) \leq 0$

$$x(x - 6)(x + 3) \leq 0$$

zeros: 0, 6, -3

	$(-\infty, -3]$	$[-3, 0]$	$[0, 6]$	$[6, \infty)$
X	-	-	+	+
x-6	-	-	-	+
X+3	-	+	+	+
Result	-	+	-	+

Solution set $(-\infty, -3] \cup [0, 6]$

7. (3 points) Find an equation of the circle that has the points $P(-6, 2)$ and $Q(2, 2)$ as endpoints of a diameter.

Solution:

$$\begin{aligned}\text{Center } M &= \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2} \right) \\ &= \left(\frac{-6+2}{2}, \frac{2+2}{2} \right) = (-2, 2)\end{aligned}$$

$$\begin{aligned}\text{radius } CQ: d &= \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} \\ &= \sqrt{(-2 - 2)^2 + (2 - 2)^2} \\ &= \sqrt{16} = 4\end{aligned}$$

Equation of the circle: $(x - h)^2 + (y - k)^2 = r^2$

$$(x + 2)^2 + (y - 2)^2 = 16$$

8. (2 points) Find an equation of the line through the point $P(3, 5)$ that is parallel to the line $3x + 2y - 1 = 0$.

Solution:

The slope: $y = \frac{-3}{2}x + \frac{1}{2}$, $m = \frac{-3}{2}$

Equation of the line:

$$(y - y_1) = m(x - x_1)$$

$$(y - 5) = \frac{-3}{2}(x - 3)$$

$$2y + 3x - 19 = 0$$

Part II: (6 points) choose the correct answer, justify your answer.

Question number	9	10	11	12	13	14
answer	<u>c</u>	<u>d</u>	<u>c</u>	<u>b</u>	<u>a</u>	<u>a</u>

Part II: (6 points) choose the correct answer, justify your answer.

Question number	9	10	11	12	13	14
answer						

9. $\left(\frac{2x^2y^3}{x^{-1}y^{-2}}\right)^{-2} =$

- a) $-4x^4y^2$ b) $\frac{-4}{x^2y^2}$ c) $\frac{1}{4x^6y^{10}}$ d) $2x^4y$

10. $\sqrt{4x^4 + 16x^2} =$

- a) $4|x|\sqrt{x^2 + 4}$ b) $4x\sqrt{x^2 + 4}$
c) $2x^2 + 4x$ d) $2|x|\sqrt{x^2 + 4}$

11. The equation of a vertical line passes through $(2, -3)$ is

- a) $x = -3$ b) $y = 2$ c) $x = 2$ d) $y = -3$

12. The graph represented by $y = x^2 + 2$ is

- a) Symmetric about the x-axis.
b) Symmetric about the y-axis.
c) Symmetric about the origin.
d) None of the above is true.

13. The solution set of the equation $\sqrt{2x + 3} - 5 = 0$ is

a) $\{11\}$

b) $\{-4\}$

c) $\{4\}$

d) $\{-11\}$

14. Rationalize the numerator $\frac{\sqrt{3} + \sqrt{5}}{2}$

a) $\frac{-1}{\sqrt{3} - \sqrt{5}}$

b) $\frac{-1}{\sqrt{3} + \sqrt{5}}$

c) $\frac{1}{\sqrt{3} - \sqrt{5}}$

d) $\frac{1}{\sqrt{3} + \sqrt{5}}$