

Assignment-6

Student Name: _____

Course Title: General Mathematics.

Due Date: Next Week in Class.

Course Code: Math-101.

Answer the following questions.

(Q1.) Identify the real part, the imaginary part, and the conjugate of the following.

(١) حدد الجزء الحقيقي و الجزء التخيلي و المرافق للاعداد التالية.

List of Complex Numbers			
Complex Numbers	Real part	Imaginary part	conjugate
$-\frac{3}{2} + \frac{5}{6}i$	$-\frac{3}{2}$	$\frac{5}{6}i$	$-\frac{3}{2} - \frac{5}{6}i$
$2 - 7i$	2	$-7i$	$2 + 7i$
$-9i + 4$	4	$-9i$	$4 + 9i$
$-5 + i\sqrt{2}$	-5	$\sqrt{2}i$	$-5 - \sqrt{2}i$
πi	$-$	πi	$-\pi i$
8	8	$-$	$-$

(Q2.) Perform the following operations of complex numbers.

(٢) نفذ العمليات التالية للاعداد المركبة.

1. $(4 + i) + (5 + 3i) =$

2. $(4 + i) - (5 + 3i) =$

3. $2 + (6 + 2i) =$

4. $(7 - i) - 4i =$

5. $-2i(-9 + 2i) =$

6. $(3i)(-5i) =$

7. $(1 + 2i)(3 - 4i) =$

8. $(4i)(2i) =$

9. $\frac{i}{3 + i} =$

$$10. \frac{-5 + 10i}{3 + 4i} =$$

$$11. \frac{7 + i}{2 + i} =$$

$$12. \frac{2 - \sqrt{-4}}{5 - \sqrt{-9}} =$$

$$13. \frac{1}{i} =$$

$$14. -7i^4 =$$

$$15. \sqrt{-3}\sqrt{-12} =$$

$$16. \sqrt{2}\sqrt{-8} =$$

السؤال الثاني :-

$$\boxed{1} (4 + i) + (5 + 3i)$$

$$9 + 4i$$

$$\boxed{2} (4 + i) - (5 + 3i)$$

$$(4 + i) + (-5 - 3i) = -1 - 2i$$

$$\boxed{3} 2 + (6 + 2i)$$

$$= 8 + 2i$$

$$\boxed{4} (7 - i) - 4i$$

$$7 - 5i$$

$$\boxed{5} -2i(-9 + 2i) = -2i(-9) - 2i(2i)$$

$$+ 18i + 4$$

$$\boxed{6} (3i)(-5i) = 3(-5)i \cdot i$$

$$= -15(i)^2 = +15$$

$$\boxed{7} (1 + 2i)(3 - 4i) = 1(3 - 4i) + 2i(3 - 4i)$$

$$3 - 4i + 6i - 8(i)^2 = 11 + 2i$$

$$\boxed{8} (4i)(2i)$$

$$= 8(i)^2 = 8(-1) = -8$$

$$\boxed{9} \frac{i}{3+i} = \frac{i}{3+i} \cdot \frac{3-i}{3-i}$$

البسط

المقام

$$i(3-i)$$

$$3i - (i)^2$$

$$3i + 1$$

$$(3+i)(3-i)$$

$$(3)^2 - (i)^2$$

$$9 + 1 = 10$$

$$\frac{3i}{10} + \frac{1}{10}$$

$$\boxed{10} \frac{-5+10i}{3+4i}$$

$$\frac{-5+10i}{3+4i} \cdot \frac{3-4i}{3-4i}$$

البسط

المقام

$$(-5+10i)(3-4i)$$

$$-5(3-4i) + 10i(3-4i)$$

$$-15 + 20i + 30i + 40$$

$$25 + 50i$$

$$(3+4i)(3-4i)$$

$$(3)^2 - (4i)^2$$

$$9 - 16(-1)$$

$$9 + 16 = 25$$

$$* \frac{25+50i}{25} = \frac{25}{25} + \frac{50i}{25} = 1 + 2i$$

$$\boxed{11} \quad \frac{7+i}{2+i}$$

$$\frac{7+i}{2+i} \cdot \frac{2-i}{2-i}$$

المقام

$$(7+i)(2-i)$$

$$7(2-i) + i(2-i)$$

$$14 - 7i + 2i - (i)^2$$

$$15 - 5i$$

المقام

$$(2+i)(2-i)$$

$$(2)^2 - (i)^2$$

$$4 + 1 = 5$$

$$\frac{15 - 5i}{5} = \frac{15}{5} - \frac{5i}{5} = 3 - i$$

$$\boxed{12} \quad \frac{2 - \sqrt{-4}}{5 - \sqrt{-9}} = \frac{2 - \sqrt{4} \sqrt{-1}}{5 - \sqrt{9} \sqrt{-1}} = \frac{2 - 2i}{5 - 3i}$$

$$\frac{2-2i}{5-3i} \cdot \frac{5+3i}{5+3i}$$

المقام

$$(2-2i)(5+3i)$$

$$2(5+3i) - 2i(5+3i)$$

$$10 + 6i - 10i - 6(i)^2$$

$$16 - 4i$$

المقام

$$(5-3i)(5+3i)$$

$$(5)^2 - (3i)^2$$

$$25 + 9 = 34$$

$$\frac{16 - 4i}{34} = \frac{16}{34} - \frac{4i}{34} = \frac{8}{17} - \frac{2}{17}i$$

$$\boxed{13} \quad \frac{1}{i} \cdot \frac{-i}{-i}$$

$$1(-i) = -i$$

$-i$

$$(i)^2 - (i)^2$$

$$-1 - -1 = -1 + 1$$

القام

$$\boxed{14} \quad -7(i)^4 = -7(1) = -7$$

$$\boxed{15} \quad \sqrt{-3} \sqrt{-12} = \sqrt{3}i \sqrt{12}i$$

$$= \sqrt{36} (i)^2 = 6(-1) = -6$$

$$\boxed{16} \quad \sqrt{2} \sqrt{-8} = \sqrt{2} \sqrt{8}i$$

$$\sqrt{2} \cdot \sqrt{4} \sqrt{2}i = 2(\sqrt{2})^2 i = 2 \cdot 2 \cdot i = 4i$$

(Q3.) Solve for complex numbers x and y .

(٣) حل للعدد المركب x, y .

$$1. (2x - 1) + (3y + 2)i = 5 - 4i$$

$$2. \frac{(1+x) + (y-2)i}{1+i} = 2 - i$$

السؤال الثالث

$$\boxed{1} \quad (2x - 1) + (3y + 2)i = 5 - 4i$$

$$2x - 1 = 5$$

$$3y + 2 = -4$$

$$2x = 5 + 1$$

$$3y = -4 - 2$$

$$2x = 6$$

$$3y = -6$$

$$x = 3$$

$$y = -2$$

$$(3, -2)$$

$$\boxed{2} \frac{(1+x) + (y-2)i}{1+i} = 2-i$$

$$(1+x) + (y-2)i = (2-i)(1+i)$$

$$(1+x) + (y-2)i = 3+i$$

$$1+x = 3$$

$$y-2 = 1$$

$$x = 3 - 1$$

$$y = 1 + 2$$

$$x = 2$$

$$y = 3$$

$$(2, 3)$$

(Q4.) Solve for complex numbers z .

(٤) حل للعدد المركب z .

$$1. (10 - 2i)z + (5 + i) = 2i$$

$$2. (3 - 2i)z + (4i + 6) = 8i$$

السؤال الرابع :-

$$\boxed{1} (10 - 2i)z + (5 + i) = 2i$$

$$(10 - 2i)z = 2i - 5 - i$$

$$(10 - 2i)z = i - 5$$

$$\frac{(10 - 2i)z}{10 - 2i} = \frac{i - 5}{10 - 2i}$$

$$\frac{i - 5}{10 - 2i} \cdot \frac{10 + 2i}{10 + 2i}$$

البسط

$$(i - 5)(10 + 2i)$$

$$10i - 2 - 50 - 10i$$

$$\text{المقام} \quad (10)^2 - (2i)^2$$

$$100 + 4$$

-52

104

$$Z = -\frac{52}{104} = -\frac{1}{2}$$

$$\boxed{2} \quad (3 - 2i)Z + (4i + 6) = 8i$$

$$(3 - 2i)Z = 8i - 4i - 6$$

$$(3 - 2i)Z = 4i - 6$$

$$Z = \frac{4i - 6}{3 - 2i}$$

$$\frac{4i - 6}{3 - 2i} \cdot \frac{3 + 2i}{3 + 2i}$$

البرس

$$\begin{aligned} &(-6 + 4i)(3 + 2i) \\ &-18 - \cancel{12i} + \cancel{12i} - 8 \\ &-26 \end{aligned}$$

المقام

$$\begin{aligned} &(3)^2 - (2i)^2 \\ &9 + 4 = 13 \end{aligned}$$

$$Z = \frac{-26}{13} = -2$$