

Answer Sheet

1	$12 - 4\sqrt{3}$	✓	12	$19 - 9i$	✓
2	$12 + 10\sqrt{6}$	✓	13	$21 + 20i$	✓
3	$2\sqrt{5} + 5$	✓	14	41	✓
4	$3 - 3\sqrt{2} + \sqrt{6} - 2\sqrt{3}$	✓✓✓✓	15	$\frac{9}{25} + \frac{12}{25}i$	✓✓
5	$10 + 2\sqrt{2}i$	✓	16	$\frac{18}{29} + \frac{13}{29}i$	✓✓
6	$\frac{2\sqrt{5}}{5}$	✓	17	$\{6, -6\}$	✓✓
7	$3(\sqrt{3} - \sqrt{2})$	✓	18	$\{2\sqrt{3}, -2\sqrt{3}\}$	✓✓
8	$\frac{2 - 3\sqrt{x} + x}{4 - x}$	✓	19	$\{-1, -13\}$	✓✓
9	$5 + 45i$	✓	20	$\{8 + 2i, 8 - 2i\}$	✓✓
10	$-6 - 3i$	✓	21	$\{4, -1\}$	✓✓
11	$4 - 6i$	✓	22	$\{1 + \frac{\sqrt{2}}{2}i, 1 - \frac{\sqrt{2}}{2}i\}$	✓✓

East Los Angeles College
Department of Mathematics
Math 125
Test 2

Add or Subtract the following irrationals.

1. $3\sqrt{16} - 2\sqrt{12}$

2. $6\sqrt{4} + 5\sqrt{24}$

Multiply or Divide the following:

3. $\sqrt{5}(2 + \sqrt{5})$

4. $(3 + \sqrt{6})(1 - \sqrt{2})$

5. $(\sqrt{7} + \sqrt{3})^2$

6. $\frac{2}{\sqrt{5}}$

7. $\frac{3}{\sqrt{3} + \sqrt{2}}$

8. $\frac{1 - \sqrt{x}}{2 + \sqrt{x}}$

Add or Sub the following complex numbers:

9. $(3 + 51i) + (2 - 6i)$

10. $(-4 + i) - (2 + 4i)$

Multiply or Divide the following:

11. $-2i(3 + 2i)$

12. $(3 - 5i)(3 + 2i)$

13. $(5 + 2i)^2$

14. $(5 + 4i)(5 - 4i)$

15. $\frac{3i}{4 + 3i}$

16. $\frac{4 + i}{5 - 2i}$

Solve for x by using the **Square Root Formula**.

17. $x^2 + 4 = 40$

18. $2x^2 - 5 = 19$

19. $(x + 7)^2 = 36$

20. $(x - 8)^2 = -4$

Solve the following equations for x by using the **Quadratic Formula**

21. $x^2 - 3x - 4 = 0$

22. $2x^2 - 4x + 3 = 0$

Math 12S Test 2

① $3\sqrt{6} - 2\sqrt{12}$

$$\begin{aligned} &\sqrt[4]{4 \cdot 3} \\ &\sqrt{4} \sqrt{3} \\ &2\sqrt{3} \end{aligned}$$

$$3 \cdot 4 - 2 \cdot 2\sqrt{3} = \boxed{12 - 4\sqrt{3}}$$

② $6\sqrt{4} + 5\sqrt{24}$ $= 6 \cdot 2 + 5 \cdot 2\sqrt{6}$

$$\begin{aligned} &\sqrt[4]{4 \cdot 6} = \boxed{12 + 10\sqrt{6}} \\ &\sqrt{4} \sqrt{6} \\ &2\sqrt{6} \end{aligned}$$

③ $\sqrt{5}(\sqrt{2} + \sqrt{5}) = 2\sqrt{5} + \sqrt{25} + 5$

$$= \boxed{2\sqrt{5} + 5}$$

④ $(3 + \sqrt{6})(1 - \sqrt{2})$
foil

	1	$-\sqrt{2}$
3	3	$-3\sqrt{2}$
$\sqrt{6}$	$\sqrt{6}$	$-\sqrt{12}$

$$\begin{aligned} &3 - 3\sqrt{2} + \sqrt{6} - \sqrt{12} \\ &\sqrt[4]{4 \cdot 3} \\ &\sqrt{4} \sqrt{3} \\ &2\sqrt{3} \end{aligned}$$

$$\boxed{3 - 3\sqrt{2} + \sqrt{6} - 2\sqrt{3}}$$

$$(5) (\sqrt{7} + \sqrt{3})^2 = (\sqrt{7} + \sqrt{3})(\sqrt{7} + \sqrt{3})$$

foil

	$\sqrt{7}$	$\sqrt{3}$
$\sqrt{7}$	$\sqrt{49}$ 7	$\sqrt{21}$
$\sqrt{3}$	$\sqrt{21}$	$\sqrt{9}$ 3

$$7 + \sqrt{21} + \sqrt{21} + 3$$

$$\boxed{10 + 2\sqrt{21}}$$

$$(6) \frac{2}{\sqrt{5}} = \frac{2}{\sqrt{5}} \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{\sqrt{5}\sqrt{5}} = \boxed{\frac{2\sqrt{5}}{5}}$$

$$(7) \frac{3}{(\sqrt{3} + \sqrt{2})} \cdot \frac{(\sqrt{3} - \sqrt{2})}{(\sqrt{3} - \sqrt{2})} = \frac{3(\sqrt{3} - \sqrt{2})}{3 - 2}$$

$$= \boxed{3(\sqrt{3} - \sqrt{2})}$$

$$(8) \frac{(1 - \sqrt{x})}{(2 + \sqrt{x})} \cdot \frac{(2 - \sqrt{x})}{2 - \sqrt{x}} = \frac{(1 - \sqrt{x})(2 - \sqrt{x})}{4 - x}$$

foil

$$= \frac{2 - \sqrt{x} - 2\sqrt{x} + x}{4 - x} = \boxed{\frac{2 - 3\sqrt{x} + x}{4 - x}}$$

$$(9) (3 + 51i) + (2 - 6i)$$

$$3 + 51i + 2 - 6i \quad \boxed{5 + 45i}$$

$$(10) (-4+i) - (2+4i)$$

$$-4+i-2-4i$$

$$\underline{\underline{-6-3i}}$$

$$(11) -2i(3+2i) = -6i - 4(\overset{\curvearrowright}{i^2}) \rightarrow -1$$

$$= \underline{\underline{4-6i}}$$

$$(12) (3-5i)(3+2i)$$

FOIL

	3	2i
3	9	6i
-5i	-15i	-10($\overset{\curvearrowright}{i^2}) \rightarrow 1$

$$9+6i-15i+10$$

$$\underline{\underline{19-9i}}$$

$$(13) (5+2i)^2 = (5+2i)(5+2i)$$

FOIL

	5	2i
5	25	10i
2i	10i	4($\overset{\curvearrowright}{i^2}) \rightarrow -1$

$$25+10i+10i-4$$

$$\underline{\underline{21+20i}}$$

$$(14) (s+4i)(s-4i)$$

$$= s^2 + 4^2 = 2s + 16 = (41)$$

$$(15) \frac{3i}{(4+3i)} \cdot \frac{(4-3i)}{(4-3i)} = \frac{3i(4-3i)}{4^2+3^2}$$

$$\frac{12i - 9(\cancel{i^2})e^{-1}}{16+9} = \frac{12i + 9}{25}$$

$$= \left| \frac{9}{25} + \frac{12}{25}i \right|$$

$$(16) \frac{(4+i)(s+2i)}{(s-2i)(s+2i)} = \frac{(4+i)(s+2i)}{s^2+2^2}$$

$$\xrightarrow{\text{foil}} \frac{s^2+2^2}{2s+4+2i}$$

$$\begin{array}{c|cc} & s & 2i \\ \hline 4 & 20 & 8i \\ \hline i & 5i & 2(\cancel{i^2})+1 \end{array} \quad \begin{array}{l} \nearrow 20+13i-2 \\ 10+13i \end{array}$$

$$\frac{10+13i}{24} \quad \left| \frac{10}{24} + \frac{13}{24}i \right|$$

$$(17) \begin{array}{cc} x^2+4 & = & 40 \\ -4 & -4 & \end{array}$$

$$x^2=36$$

$$x = \pm \sqrt{36}$$

$$(x = \pm 6)$$

$$x=6$$

$$x=-6$$

$$(18) \quad \begin{array}{ccc} 2x^2 - 5 & = & 19 \\ +5 & & +5 \end{array}$$

$$2x^2 = 24 \quad ; \quad x^2 = 12$$

$$x = \pm \sqrt{12} = \sqrt{4 \cdot 3}$$

$$\sqrt{4} \sqrt{3}$$

$$2\sqrt{3}$$

$$x = \pm 2\sqrt{3}$$

$$\boxed{x = 2\sqrt{3} \quad ; \quad x = -2\sqrt{3}}$$

$$(19) \quad (x+7)^2 = 36$$

$$x+7 = \pm \sqrt{36}$$

$$x+7 = \pm 6$$

$$x+7 = 6 \quad \text{or} \quad x+7 = -6$$

$$\begin{array}{cc} -7 & -7 \end{array}$$

$$x = -1$$

$$\begin{array}{cc} -7 & -7 \end{array}$$

$$x = -13$$

$$(20) \quad (x-6)^2 = -4$$

$$x-6 = \pm \sqrt{-4} = \pm 2i$$

$$\sqrt{-1 \cdot 4}$$

$$\sqrt{-1} \sqrt{4} \quad i \cdot 2$$

$$x - 0 = \pm 2i$$

$$+0 \quad +0$$

$$x = 0 \pm 2i \quad ; \quad \left| \begin{array}{l} x = 0 + 2i \\ x = 0 - 2i \end{array} \right|$$

$$(21) \quad | x^2 - 3x - 4 = 0$$

$$a = 1$$

$$b = -3$$

$$c = -4$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4 \cdot 1 \cdot (-4)}}{2 \cdot 1}$$

$$x = \frac{3 \pm \sqrt{9 + 16}}{2}$$

$$x = \frac{3 \pm 5}{2}$$

$$x = \frac{3+5}{2}$$

$$x = \frac{3-5}{2}$$

$$| x = 4 |$$

$$| x = -1 |$$

$$(22) \quad 2x^2 - 4x + 3 = 0 \quad ; \quad a = 2$$

$$b = -4$$

$$c = 3$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4 \cdot 2 \cdot 3}}{2 \cdot 2}$$

$$x = \frac{4 \pm \sqrt{16 - 24}}{4}$$

$$x = \frac{4 \pm 2\sqrt{2}i}{4}$$

$$\sqrt{-8}$$

$$\sqrt{-1 \cdot 8}$$

$$\sqrt{-1} \sqrt{8}$$

$$\sqrt{-1} \sqrt{4 \cdot 2}$$

$$i \sqrt{4} \sqrt{2}$$

$$2i\sqrt{2}$$

$$x = \frac{4}{4} \pm \frac{2\sqrt{2}i}{4} \quad ; \quad x = 1 \pm \frac{\sqrt{2}}{2}i$$

$$\left| x = 1 + \frac{\sqrt{2}}{2}i \quad ; \quad x = 1 - \frac{\sqrt{2}}{2}i \right|$$