1. $\dfrac{13+i}{x+iy} = 3+i$

$13 + i = (3 + i)(x + iy)$

$13 + i = 3x + 3iy + ix + i^2y$

$13 + i = 3x + 3iy + ix - y$

$13 + i = 3x - y + i(3y + x)$

$\left.\begin{array}{l} 3x - y = 13 \\ 3y + x = 1 \end{array}\right\}$ $\begin{array}{r} 9x - 3y = 39 \\ + \quad 3y + x = 1 \\ \hline 10x = 40 \\ \boxed{x = 4} \end{array}$

$3x - y = 13$

$3 \cdot 4 - y = 13$

$\boxed{y = -1}$

$x \cdot y = -1 \cdot 4 = -4$

Cevap: B

2. $\left| \dfrac{(3+4i)^2 \cdot (1+i)^4}{(i-1)^2} \right|$

$= \dfrac{|3+4i|^2 \cdot |1+i|^4}{|i-1|^2}$

$= \dfrac{\left(\sqrt{3^2+4^2}\right)^2 \cdot \left(\sqrt{1^2+1^2}\right)^4}{\left(\sqrt{1^2+(-1)^2}\right)^2}$

$= \dfrac{(9+16)(1+1)^2}{1+1}$

$= \dfrac{25 \cdot 4}{2} = 50$

Cevap: C

3. $3z + \bar{z} = 8$

$4z - 2\bar{z} = 2z + 20i \quad \Rightarrow \quad 4z - 2\bar{z} - 2z = 20i$

$\qquad\qquad\qquad\qquad\qquad 2z - 2\bar{z} = 20i$

$\qquad\qquad\qquad\qquad\qquad 2(z - \bar{z}) = 20i$

$\qquad\qquad\qquad\qquad\qquad \boxed{z - \bar{z} = 10i}$

$\begin{array}{r} 3z + \bar{z} = 8 \\ + \quad z - \bar{z} = 10i \\ \hline 4z = 8 + 10i \end{array}$

$z = \dfrac{8 + 10i}{4}$

$z = 2 + \dfrac{5i}{2}$

$\bar{z} = 2 - \dfrac{5i}{2}$

Cevap: A

4. $(1 + 3i)^{15} = a - bi$

$(1 - 3i)^{15} =$

$|1 + 3i|^{15} = |1 - 3i|^{15}$ olur.

$|a - bi| = |a + bi|$

O halde $(1 - 3i)^{15} = a + bi$ olur.

Cevap: A

5. $\dfrac{256}{(1+i)^{14}} = \dfrac{256}{((1+i)^2)^7} = \dfrac{256}{(1 + 2i + i^2)^7}$

$\qquad = \dfrac{256}{(1 + 2i - 1)^7} = \dfrac{256}{(2i)^7} = \dfrac{2^8}{2^7 \cdot i^7} = \dfrac{2}{i^3}$

$\qquad = -\dfrac{2}{\underset{(i)}{i}} = -\dfrac{2i}{i^2} = 2i$

Cevap: B

6. $(1+i)^2 - (1+i)^{-2} = 1 + 2i + i^2 - (1 + 2i + i^2)^{-1}$

$$= 1 + 2i - 1 - (1 + 2i - 1)^{-1}$$

$$= 2i - (2i)^{-1}$$

$$= 2i - \frac{1}{2i} = \frac{4i^2 - 1}{2i}$$

$$= \frac{-5}{2i} = \frac{-5i}{2i^2} = \frac{-5i}{-2} = \frac{5i}{2}$$

Cevap: B

7. $\left(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i \right)^{38} = \left(\left(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i \right)^2 \right)^{19}$

$$= \left(\frac{2}{4} + 2 \cdot \frac{\sqrt{2}}{2} \cdot \frac{\sqrt{2}}{2}i + \frac{2}{4}i^2 \right)^{19}$$

$$= \left(\frac{2}{4} + 2 \cdot \frac{2}{4}i - \frac{2}{4} \right)^{19}$$

$$= \left(\frac{4}{4}i \right)^{19} = i^{19} = i^3 = -i$$

Cevap: D

8. $\left(\frac{1-i}{1+i} \right)^2 + 1 - \frac{1}{\underset{(i)}{i}}$
$\quad\,\,_{(1-i)}$

$$= \left(\frac{(1-i)^2}{1^2 + 1^2} \right)^2 + 1 - \frac{i}{i^2}$$

$$= \left(\frac{1 - 2i + i^2}{2} \right)^2 + 1 - \frac{i}{-1}$$

$$= \left(\frac{1 - 2i - 1}{2} \right)^2 + 1 + i$$

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

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

Cevap: C

9. $\frac{2 + i\sqrt{3}}{\underset{(1+i)}{1 - i}} = m + ni$

$$\frac{(2 + i\sqrt{3})(1 + i)}{(1 - i)(1 + i)} = \frac{2 + 2i + i\sqrt{3} + i^2\sqrt{3}}{1^2 + (-1)^2}$$

$$= \frac{2 + 2i + i\sqrt{3} - \sqrt{3}}{2} = m + ni$$

$$= \frac{2 - \sqrt{3} + i(2 + \sqrt{3})}{2} = m + ni$$

$$= \frac{2 - \sqrt{3}}{2} + i\frac{2 + \sqrt{3}}{2} = m + ni$$

$$m = \frac{2 - \sqrt{3}}{2}$$

$$n = \frac{2 + \sqrt{3}}{2}$$

$$m.n = \frac{2 - \sqrt{3}}{2} \cdot \frac{2 + \sqrt{3}}{2} = \frac{4 - 3}{4} = \frac{1}{4}$$

Cevap: C

TASARI EĞİTİM YAYINLARI

10. $z = \dfrac{(1-i\sqrt{3})^3}{(-2+2i)^4} = \dfrac{(1-i\sqrt{3})^3}{(-2(1-i))^4}$

$= \dfrac{(1-i\sqrt{3})^3}{16(1-i)^4} = \dfrac{(1-i\sqrt{3})^3}{16((1-i)^2)^2}$

$= \dfrac{(1-i\sqrt{3})^3}{16.(1-2i+i^2)^2} = \dfrac{(1-\sqrt{3})^3}{16.(-2i)^2}$

$= \dfrac{(1-i\sqrt{3})^3}{16.4:2} = \dfrac{(1-i\sqrt{3})^3}{-64}$

$= \dfrac{(1-i\sqrt{3})^2(1-i\sqrt{3})}{-64}$

$= \dfrac{(1-2i\sqrt{3}+3i^2)(1-i\sqrt{3})}{-64}$

$= \dfrac{(-2-2i\sqrt{3})(1-i\sqrt{3})}{-64} = \dfrac{-2(1+i\sqrt{3})(1-i\sqrt{3})}{-64}$

$= \dfrac{-2(1-3i^2)}{-64} = \dfrac{-2(1+3)}{-64}$

$= \dfrac{-2.4}{-64} = \dfrac{1}{8}$

$z = \dfrac{1}{8} \Rightarrow |z| = \sqrt{\left(\dfrac{1}{8}\right)^2} = \dfrac{1}{8}$

$z + |z| = \dfrac{1}{8}+\dfrac{1}{8} = \dfrac{2}{8} = \dfrac{1}{4}$

Cevap: B

11. $1 + \left(\dfrac{1-i}{1+i}\right) + \left(\dfrac{1-i}{1+i}\right)^2 + ... + \left(\dfrac{1-i}{1+i}\right)^{20}$
$\quad\quad\quad\quad\quad {\scriptstyle (1-i)}$

$= 1 + \dfrac{(1-i)^2}{1^2+1^2} + \left(\dfrac{(1-i)^2}{1^2+1^2}\right)^2 + ... + \left(\dfrac{(1-i)^2}{1^2+1^2}\right)^{20}$

$= 1 + \dfrac{1-2i+i^2}{2} + \left(\dfrac{1-2i+i^2}{2}\right)^2 + ... + \left(\dfrac{1-2i+i^2}{2}\right)^{20}$

$= 1 - i + (-i)^2 + ... + (-i)^{20}$

$= \underbrace{1-i-1+i}_{0} + \underbrace{1-i+}_{0} ... + 1 = 1$

Cevap: A

12. $\dfrac{i}{1-i} + \dfrac{2i-1}{1+i} = \dfrac{i(1+i)}{1^2+1^2} + \dfrac{(2i-1)(1-i)}{1^2+1^2}$
$\quad {\scriptstyle (1+i)} \quad {\scriptstyle (1-i)}$

$\quad\quad = \dfrac{i+i^2}{2} + \dfrac{2i-2i^2-1+i}{2}$

$\quad\quad = \dfrac{i-1}{2} + \dfrac{3i+1}{2}$

$\quad\quad = \dfrac{4i}{2} = 2i$

Cevap: A

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

$= 10 - 25i + 4i - 10i^2 - (10 - 4i + 25i - 10i^2)$

$= 10 - 21i + 10 - (10 + 21i + 10)$

$= 20 - 21i - 20 - 21i = -42i$

Cevap: A

14. $\sqrt{-2}.\sqrt{-5}.\sqrt{-10}$

$= \sqrt{i^2.2}.\sqrt{i^2.5}.\sqrt{i^2.10}$

$= i\sqrt{2}.i\sqrt{5}.i\sqrt{10} = i^3.10 = -10i$

Cevap: C

15. $3z + 2i = \bar{z} - 3$

$z = x + iy$ olsun.

$3(x+iy) + 2i = x - iy - 3$

$3x + 3iy + 2i = x - 3 - iy$

$3x = x - 3 \Rightarrow 2x = -3 \quad\quad x = -\dfrac{3}{2}$

$3y + 2 = -y \Rightarrow 4y = -2 \quad\quad y = -\dfrac{1}{2}$

$z = -\dfrac{3}{2} - i.\dfrac{1}{2}$

$|z| = \sqrt{\left(-\dfrac{3}{2}\right)^2 + \left(-\dfrac{1}{2}\right)^2}$

$\quad = \sqrt{\dfrac{9}{4}+\dfrac{1}{4}} = \sqrt{\dfrac{10}{4}} = \dfrac{\sqrt{10}}{2}$

Cevap: D

16. $z = \sqrt{3} - 2i$
$\overline{z} = \sqrt{3} + 2i$ } $z + \overline{z} = \sqrt{3} - 2i + \sqrt{3} + 2i$
$= 2\sqrt{3}$

Cevap: D

17. $z = \dfrac{1 - \sqrt{7}\,i}{\sqrt{3} - i}$

$|z^4| = |z|^4 = \left| \dfrac{1 - \sqrt{7}\,i}{\sqrt{3} - i} \right|^4$

$= \dfrac{\left| 1 - \sqrt{7}\,i \right|^4}{\left| \sqrt{3} - i \right|^4} = \dfrac{\left(\sqrt{1^2 + (-\sqrt{7})^2} \right)^4}{\left(\sqrt{(\sqrt{3})^2 + (-1)^2} \right)^4}$

$= \dfrac{\sqrt{1 + 7}^4}{\left(\sqrt{3 + 1} \right)^4} = \dfrac{\sqrt{8}^4}{\sqrt{4}^4}$

$= \left(\sqrt{\dfrac{8}{4}} \right)^4 = \left(\sqrt{2} \right)^4 = 4$

Cevap: C

18. $\dfrac{i^{2017} - i^{2016}}{i^{2019} - i^{2016}} = \dfrac{i^1 - i^0}{i^3 - i^0}$

$= \dfrac{i - 1}{-i - 1} = \dfrac{1 - i}{1 + i} \cdot {\scriptstyle (1 - i)}$

$= \dfrac{(1 - i)^2}{1^2 + (-1)^2} = \dfrac{1 - 2i + i^2}{2}$

$= \dfrac{-2i}{2} = -i$

Cevap: E

19. $\overline{z} + i\overline{z} = z + 4$

$z = x + iy$

$\overline{z} = x - iy$

$x - iy + i(x - iy) = x + iy + 4$

$x - iy + ix - i^2 y = x + 4 + iy$

$x + y + i(x - y) = x + 4 + iy$

$x + y = x + 4 \Rightarrow \boxed{y = 4}$

$x - y = y \Rightarrow x = 2y \Rightarrow x = 2.4$

$\boxed{x = 8}$

$z = x + iy = 8 + 4i$

Cevap: E

20. $\left(\dfrac{1 - i}{1 + i} \right)^{13}_{\scriptstyle (1-i)} = \left(\dfrac{(1 - i)^2}{1^2 + 1^2} \right)^{13}$

$= \left(\dfrac{1 - 2i + i^2}{2} \right)^{13}$

$= \left(\dfrac{-2i}{2} \right)^{13} = (-i)^{13}$

$= -i^{13} = -i$

Cevap: E