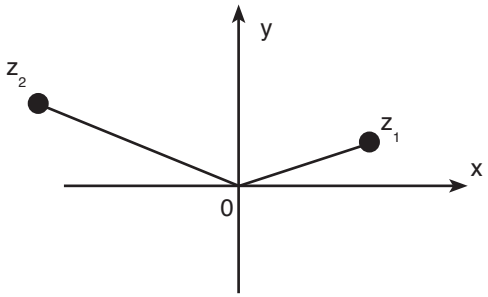
1.



$z_1 = |z_1|.(\cos\alpha + i\sin\alpha)$

$= 3.(\cos 30° + i\sin 30°)$

$= 3\left(\frac{\sqrt{3}}{2} + i\cdot\frac{1}{2}\right)$

$z_1 = \frac{3\sqrt{3}}{2} + \frac{3i}{2}$

$z_2 = |z_2|.(\cos\alpha + i\sin\alpha)$

$= 5.(\cos 150 + i\sin 150)$

$z_2 = 5.(-\cos 30 + i\sin 30)$

$= 5.\left(-\frac{\sqrt{3}}{2} + \frac{i}{2}\right)$

$z_2 = -\frac{5\sqrt{3}}{2} + \frac{5i}{2}$

$z_1 + z_2 = \frac{3\sqrt{3}}{2} + \frac{3i}{2} - \frac{5\sqrt{3}}{2} + \frac{5i}{2}$

$= \frac{-2\sqrt{3}}{2} + \frac{8i}{i} = -\sqrt{3} + 4i$

$|z_1 + z_2| = \sqrt{(-\sqrt{3})^2 + 4^2} = \sqrt{3+16} = \sqrt{19}$

Cevap: C

2. $\frac{z_1.z_2}{z_3} = \frac{2.\overset{2}{\cancel{6}}(\cos(150+240) + i\sin(150+240))}{\cancel{3}(\cos(345) + i\sin(345))}$

$= \frac{4.(\cos(390) + i\sin(390))}{\cos(345) + i\sin(345)}$

$= 4.(\cos(390 - 345) + i\sin(390 - 345))$

$= 4.(\cos 45 + i\sin 45)$

$= 4.\left(\frac{\sqrt{2}}{2} + i\frac{\sqrt{2}}{2}\right)$

$= 2\sqrt{2} + 2i\sqrt{2} = 2\sqrt{2}.(1 + i)$

Cevap: D

3. $z = i\sqrt{3} = |z|.(\cos\theta + i\sin\theta)$

$\tan\theta = \frac{\sqrt{3}}{0} \Rightarrow$ tanımsız

$\theta = \frac{\pi}{2} + 2k\pi$ k = 1 için

$\theta = \frac{\pi}{2} + 2\pi = \frac{5\pi}{2}$

Cevap: C

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

$\left(\sqrt{x_1} - \sqrt{x_2}\right)^2 = (a)^2$

$x_1 - 2\sqrt{x_1.x_2} + x_2 = a^2$

$x_1 + x_2 - 2\sqrt{x_1.x_2} = a^2$

$2 - 2\sqrt{4} = a^2$

$2 - 2.2 = a^2$

$-2 = a^2$

$\sqrt{-2} = a$

$\sqrt{i^2.2} = a \Rightarrow a = i\sqrt{2}$

Cevap: C

5. $u = 7 - 3i$

$v = 2i - 5$

$|u - v| = |7 - 3i - 2i + 5|$

$= |12 - 5i| = \sqrt{12^2 + (-5)^2}$

$= 13$

Cevap: D

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6. $z = \cos\frac{5\pi}{6} + i\sin\frac{5\pi}{6}$

$z = \cos150 + i\sin150$

$= \cos(180 - 30) + i\sin(180 - 30)$

$= -\cos30 + i\sin30$

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

$z + \frac{1}{z} = -\frac{\sqrt{3}}{2} + \frac{i}{2} + \frac{1}{\frac{-\sqrt{3}}{2} + \frac{i}{2}}$

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

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

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

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

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

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

Cevap: A

7. $z_1 = 2x + 4 + yi$

$z_2 = 5x - 2 + (x + 1)i$

$z_1 = z_2 \Rightarrow 2x + 4 = 5x - 2$

$6 = 3x$

$\boxed{2 = x}$

$y = x + 1$

$y = 2 + 1$

$\boxed{y = 3}$

Cevap: C

8. $(2 - i)(y - xi) + (1 + i)(x - yi) = 3 - 9i$

$2y - 2xi - iy + xi^2 + x - yi + ix - yi^2 = 3 - 9i$

$2y - 2xi - iy - x + x - yi + ix + y = 3 - 9i$

$3y - xi - 2iy = 3 - 9i$

$3y + (-x - 2y)i = 3 - 9i$

$3y = 3 \quad \boxed{y = 1}$

$-x - 2y = -9 \Rightarrow -x - 2.1 = -9$

$\boxed{x = 7}$

$\sqrt{x^2 + y^2} = \sqrt{7^2 + 1^2} = \sqrt{50}$

$= 5\sqrt{2}$

Cevap: A

9. $(3 - 2i)(x + iy) - i(y + ix) = 26 + 8i$

$3x + 3iy - 2xi - 2yi^2 - iy - i^2x = 26 + 8i$

$3x + 3iy - 2xi + 2y - iy + x = 26 + 8i$

$4x + 2iy - 2xi + 2y = 26 + 8i$

$4x + 2y + i(2y - 2x) = 26 + 8i$

$4x + 2y = 26 \Rightarrow 2x + y = 13$

$2y - 2x = 8 \Rightarrow -\ y - x = 4$

$3x = 9$

$\boxed{x = 3}$

$y - x = 4$

$y - 3 = 4$

$\boxed{y = 7}$

$x.y = 3.7 = 21$

Cevap: E

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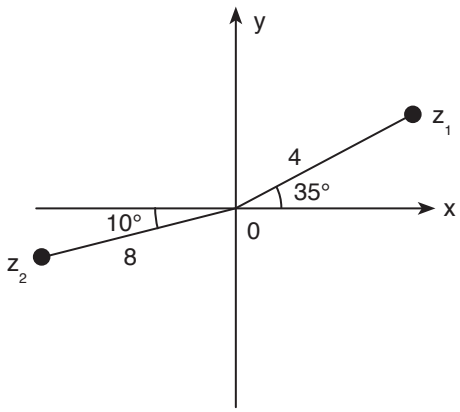
10.



$Arg(z_1) = 35$

$Arg(z_2) = 190$

$z_1 = 4.(\cos 35 + i\sin 35)$

$z_2 = 8.(\cos 190 + i\sin 190)$

$z_1^2 = 4^2(\cos 2.35 + i\sin 2.35)$

$z_1^2 = 16(\cos 70 + i\sin 70)$

$$\frac{z_1^2}{z_2} = \frac{16}{8}.(\cos(70 - 190) + i\sin(70 - 190))$$

$$= \frac{16}{8}.(\cos(-120) + i\sin(-120))$$

$$= \frac{16}{8}.(+\cos 120 - i\sin(120))$$

$$= \frac{16}{8}.(\cos(180 - 60) - i\sin(180 - 60))$$

$$= \frac{16}{8}.(-\cos 60 - i\sin 60)$$

$$= \frac{16}{8}\cdot\left(-\frac{1}{2} - i\frac{\sqrt{3}}{2}\right)$$

$$= -1 - i\sqrt{3}$$

Cevap: A

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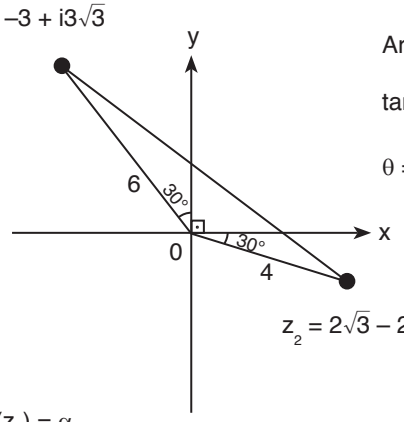
11.

$z_1 = -3 + i3\sqrt{3}$



$Arg(z_1) = \theta$

$$\tan\theta = \frac{3\sqrt{3}}{-3} = -\sqrt{3}$$

$\theta = 120°$

$Arg(z_2) = \alpha$

$$\tan\alpha = \frac{-2}{2\sqrt{3}} = -\frac{1}{\sqrt{3}}$$

$\alpha = -30°$

$$|z_1| = \sqrt{3^2 + (3\sqrt{3})^2}$$

$$= \sqrt{9 + 27}$$

$$= \sqrt{36} = 6$$

$$|z_2| = \sqrt{(2\sqrt{3})^2 + (-2)^2}$$

$$= \sqrt{12 + 4} = \sqrt{16}$$

$$= 4$$

$$A(\widehat{z_1 0 z_2}) = \frac{1}{2}.4.6.\sin 150$$

$$= \frac{1}{2}.4.6.\frac{1}{2} = 6$$

Cevap: B

12. $(\bar{z}+1).(1+i) = 2-i$

$$\bar{z}+1 = \frac{2-i}{\underset{(1-i)}{1+i}}$$

$$\bar{z} = \frac{(2-i).(1-i)}{2} - 1$$

$$\bar{z} = \frac{2-2i-i+i^2}{2} - 1$$

$$\bar{z} = \frac{1-3i-2}{2} = \frac{-1-3i}{2} = -\frac{1}{2} - \frac{3}{2}i$$

$$\Rightarrow \quad z = -\frac{1}{2} + \frac{3}{2}i$$

$$\Rightarrow \quad im(z) = \frac{3}{2}$$

Cevap: A

13. $z = 3 + 4i$

$$\frac{z+|z|}{z-|z|} = \frac{3+4i+\sqrt{3^2+4^2}}{3+4i-\sqrt{3^2+4^2}}$$

$$= \frac{3+4i+5}{3+4i-5} = \frac{8+4i}{-2+4i}$$

$$= \frac{2(4+2i)}{2(-1+2i)} = \frac{4+2i}{\underset{(-1-2i)}{-1+2i}}$$

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

$$= \frac{-4-8i-2i-4i^2}{5}$$

$$= \frac{-10i}{5} = -2i$$

Cevap: C

14. $|z| = z + \bar{z}$

E) $z = \sqrt{3} + i$

$\bar{z} = \sqrt{3} - i$

$|z| = \sqrt{(\sqrt{3})^2 + 1^2} = 2$

$z + \bar{z} = \sqrt{3} + i + \sqrt{3} - i$

$= 2\sqrt{3}$

olur.

$|z| \neq z + \bar{z}$ oldu.

Cevap: E

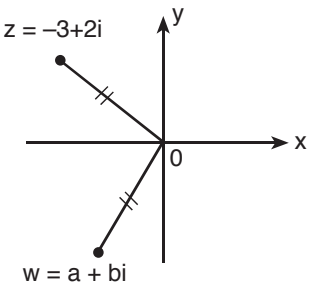
15. $z = 3.i^{18} + i^{17} + i^{16}$

$z = 3.i^2 + i^1 + i^0$

$= -3 + i + 1 = -2 + i$

Cevap: A

16.



$|z| = |w|$

$\sqrt{(-3)^2+2^2} = \sqrt{a^2+b^2}$

$\sqrt{13} = \sqrt{a^2+b^2}$

$13 = a^2 + b^2$

Cevap: D

17. $z(3 + i) = -5 + i - \bar{z}$

$z = x + iy$

$\bar{z} = x - iy$

$(x + iy)(3 + i) = -5 + i - (x - iy)$

$3x + ix + 3iy + i^2 y = -5 + i - x + iy$

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

$3x - y = -5 - x \quad \Rightarrow \quad 4x - y = -5$

$x + 3y = 1 + y \quad \Rightarrow \quad x + 2y = 1$

$\Rightarrow \quad 8x - 2y = -10$

$+ \quad x + 2y = 1$

$9x = -9$

$\boxed{x = -1}$

$x + 2y = 1$

$-1 + 2y = 1$

$2y = 2$

$\boxed{y = 1}$

$z = x + iy = -1 + i$

Cevap: E

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18. $\left(i+\frac{i}{2}\right)\left(i+\frac{i}{3}\right)\left(i+\frac{i}{4}\right)\ldots\left(i+\frac{i}{49}\right)$

$= \frac{3i}{2}\cdot\frac{4i}{3}\cdot\frac{5i}{4}\cdot/\ldots/\cdot\frac{50i}{49}$

$= \frac{i}{2}\cdot\frac{i}{1}\cdot\frac{i}{1}\cdot\ldots\cdot\frac{50i}{1} = \frac{50.i^{48}}{2}$

$= \frac{50}{2} = 25$

Cevap: A

19. $z_1 = 1 + i$

$z_2 = 2 - i$

$\left|\frac{z_1}{z_2}\right| = \frac{|z_1|}{|z_2|} = \frac{\sqrt{1^2+1^2}}{\sqrt{2^2+(-1)^2}}$

$= \frac{\sqrt{2}}{\sqrt{5}} = \frac{\sqrt{10}}{5}$
$(\sqrt{5})$

Cevap: B

20. $z = \frac{9}{2+i} - \frac{33}{4-3i}$
$(2-i)\quad(4+3i)$

$= \frac{9(2-i)}{2^2+(-1)^2} - \frac{33(4+3i)}{4^2+3^2}$

$= \frac{18-9i}{5} - \frac{33(4+3i)}{25}$
(5)

$= \frac{90-45i}{25} - \frac{132+99i}{25}$

$= \frac{-42-144i}{25}$

$im(z) = -\frac{144}{25}$

Cevap: D

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