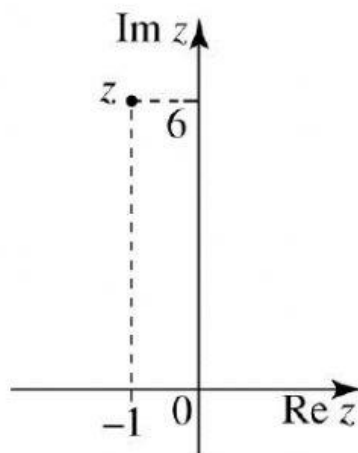


Chapter 1 Complex Numbers

1.



The point z on the Argand diagram above is:

A $1 - 6i$

B $-1 + 6i$

C $-1 - 6i$

D $1 + 6i$

E $6 - i$

2. If $z = i^5 + i^3 + i$ and $w = i^4 - i^2 - 2$, then $z + w$ is equal to:

A i

B $-2 + i$

C $3i$

D $-2 + 3i$

E $-4 + i$

3. If $z = 5 + 2i$, $w = -3 + i$ and $u = 4 - 3i$, then $2z + w - u$ is equal to:

A $9 + 6i$

B 6

C $-3 - 5i$

D $3 + 8i$

E $11 + 2i$

4. $(8 - 5i)(3 + 4i)$ is equal to:

- A $14 + 17i$
- B $54 + 32i$
- C $14 + 15i$
- D $14 - 15i$
- E $44 + 17i$

5. If $z = -5 + 6i$ and $w = 3 - 2i$, then $\overline{z}w$ is equal to:

- A $3 + 28i$
- B $-27 + 28i$
- C $-3 - 28i$
- D $-27 - 28i$
- E $3 + 8i$

6. $\frac{5i}{3+i}$ simplifies to:

- A $\frac{5}{8}(1 + 3i)$
- B $\frac{1}{10}(-5 + 15i)$
- C $\frac{1}{2}(1 + 3i)$
- D $\frac{1}{5}(2 + 5i)$
- E $\frac{1}{2}(-1 + 3i)$

7. If $z = x + yi$ and $z = \sqrt{-5 + 12i}$, then the values of x and y respectively are:

- A -3 and 2
- B -2 and 3
- C 3 and 2
- D -3 and -2
- E 2 and 3

8. If $z = 5 - 4i$ and $w = 2 + 3i$, then $\left| \frac{z}{w} \right|$ is equal to:

- A $\frac{13}{\sqrt{41}}$
- B $\frac{17}{6}$
- C $\frac{\sqrt{533}}{13}$
- D $5\sqrt{2}$
- E $\frac{\sqrt{435}}{13}$

9. If $z = -7 - 7i$, then $\text{Arg } z$ is equal to:

- A $-\frac{3\pi}{4}$
- B $\frac{\pi}{4}$
- C $\frac{3\pi}{4}$
- D $-\frac{\pi}{4}$
- E $\frac{5\pi}{4}$

10. The Cartesian form of $\sqrt{2} \text{ cis } \frac{\pi}{3}$ is:

- A $1 + i$
- B $\frac{1}{2}(\sqrt{2} + \sqrt{6}i)$
- C $2 + 2i$
- D $\sqrt{2} + \sqrt{2}i$
- E $\frac{1}{2}(\sqrt{6} + \sqrt{2}i)$

11. If $z_1 = \sqrt{2} \operatorname{cis}\left(-\frac{\pi}{6}\right)$ and $z_2 = \sqrt{6} \operatorname{cis}\frac{2\pi}{3}$, then $z_1 z_2$ is equal to:

- A $2\sqrt{3} \operatorname{cis}\frac{\pi}{9}$
- B $12 \operatorname{cis}\frac{\pi}{2}$
- C $12 \operatorname{cis}\left(-\frac{\pi^2}{9}\right)$
- D $-2\sqrt{3} \operatorname{cis}\left(-\frac{\pi}{2}\right)$
- E $2\sqrt{3} \operatorname{cis}\frac{\pi}{2}$

12. If $z = 1 + i$ and $w = \sqrt{3} - i$, then $\frac{z^8}{w^4}$ is equal to:

- A $\frac{1}{\sqrt{2}}(-1 + \sqrt{3}i)$
- B $2(1 - \sqrt{3}i)$
- C $\frac{1}{2}(-1 + \sqrt{3}i)$
- D $\frac{1}{2}(-1 - \sqrt{3}i)$
- E $\frac{1}{2}(-3 + i)$

13. When factorised over $\mathbb{C}$, $z^2 + 4z + 7$ is equal to:

- A $(z + 3)(z + 1)$
- B $(z + 2 + \sqrt{3}i)(z + 2 - \sqrt{3}i)$
- C $(z + 2 - \sqrt{3}i)(z - 2 + \sqrt{3}i)$
- D $(z + 2 + \sqrt{3}i)(z + 2 + i)$
- E $(z + 2 + \sqrt{7}i)(z + 2 - \sqrt{7}i)$

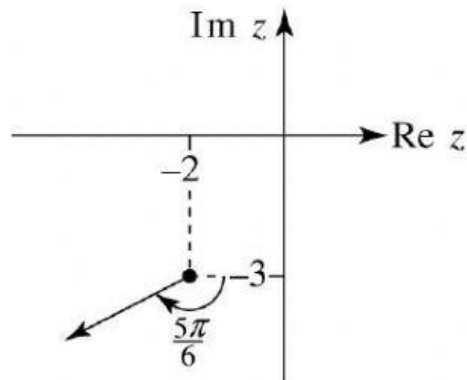
14. The solutions to $z = \sqrt{5+12i}$ are:

- A $-3 + 2i, -3 - 2i$
- B $2 - 3i, 2 + 3i$
- C $-2 - 3i, -2 + 3i$
- D $-3 - 2i, 3 + 2i$
- E $\sqrt{13} + \sqrt{13}i$

15. The solutions to $z^4 = 81$ are:

- A $-3, +3, -3i, 3i$
- B $-3, 3$
- C $-3 + 3i, 3 - 3i$
- D $-\sqrt{3}, \sqrt{3}, -\sqrt{3}i, \sqrt{3}i$
- E $-3, 3, 3i$

16.



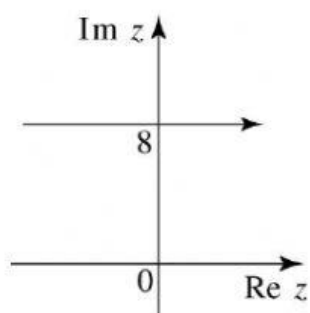
The graph above can be described by:

- A $\left\{ z : \text{Arg}(z - 2 - 3i) = \frac{5\pi}{6} \right\}$
- B $\left\{ z : \text{Arg}(z + 2 + 3i) = -\frac{5\pi}{6} \right\}$
- C $\left\{ z : \text{Arg}(z - 2 - 3i) = -\frac{5\pi}{6} \right\}$
- D $\left\{ z : \text{Arg}(z + 3 + 2i) = \frac{7\pi}{6} \right\}$
- E $\left\{ z : \text{Arg}(z + 2 + 3i) = \frac{5\pi}{6} \right\}$

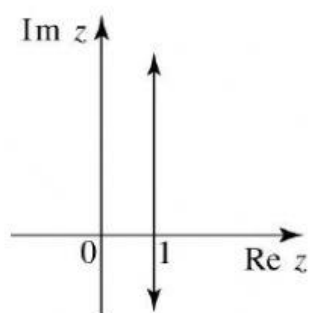
17. Which one of the following graphs correctly represents

$$\{z : \operatorname{Im}(z + 2 - 5i) = 3\}?$$

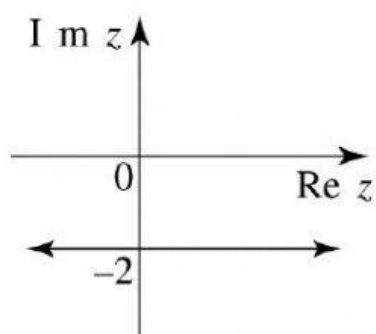
A



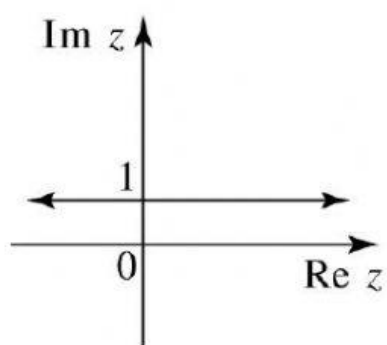
B



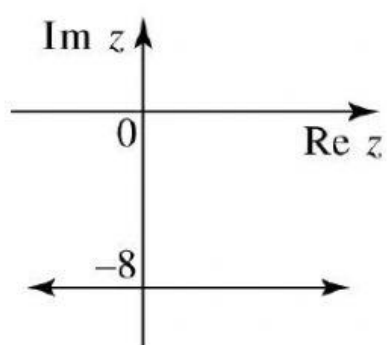
C



D



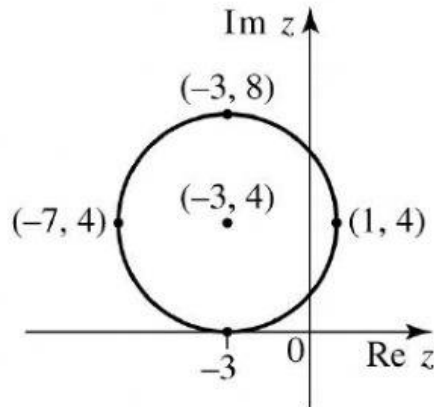
E



18. The equation for a circle of centre $4-i$ and radius 3 is:

- A $|z+4-i|=3$
- B $|z+4-i|=9$
- C $|z-4+i|=3$
- D $|z-4-i|=3$
- E $|z-4+i|=9$

20.



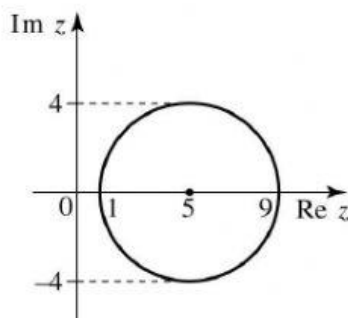
19. The equation of the circle above is:

- A $\{z: |z-3+4i|=4\}$
- B $\{z: |z-3+4i|=16\}$
- C $\{z: |z+3-4i|=2\}$
- D $\{z: |z+3-4i|=16\}$
- E $\{z: |z+3-4i|=4\}$

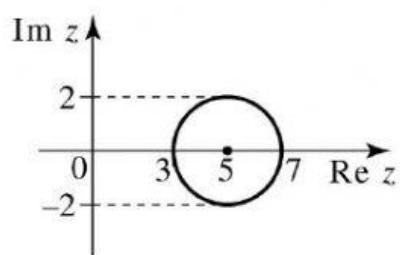
20. The graph which correctly represents the circle described by

$$\{z: |z-5|=2\} \text{ is:}$$

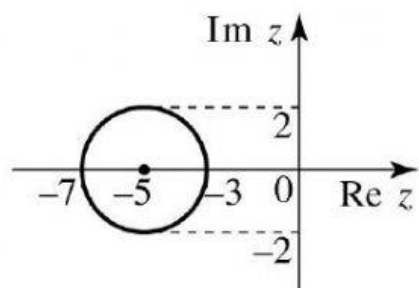
A



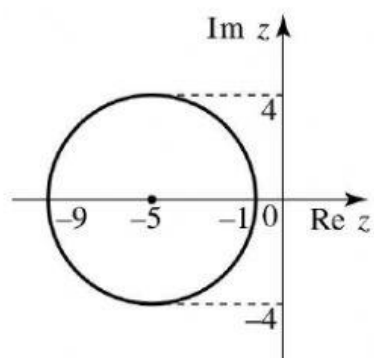
B



C



D



E

