1
$$2\pi - a$$
, $2\pi - b$, $2\pi - c$, $2\pi - d$

2 a
$$\sin x=rac{-\sqrt{3}}{2}$$
 $\therefore x=rac{4\pi}{3}, \, rac{5\pi}{3} ext{ as } x\in[0,\,2\pi]$

$$\sin(2x) = -\frac{\sqrt{3}}{2}, \; x \in [0, \; 2\pi]$$

$$\therefore 2x \in [0, 4\pi]$$

$$\therefore 2x = \frac{4\pi}{3}, \; \frac{5\pi}{3}, \; 2\pi + \frac{4\pi}{3}, \; 2\pi + \frac{5\pi}{3}$$

as
$$2x \in [0,\ 4\pi]$$

$$\therefore x = rac{2\pi}{3}, \; rac{5\pi}{6}, \; rac{5\pi}{3}, \; rac{11\pi}{6} \; ext{as} \; x \in [0, \; 2\pi]$$

c

$$2\cos 2x = -1$$

$$\therefore \cos 2x = -\frac{1}{2}, \ x \in [0,\ 2\pi]$$

$$\therefore 2x \in [0, 4\pi]$$

$$\therefore 2x = rac{2\pi}{3}, \; rac{4\pi}{3}, \; 2\pi + rac{2\pi}{3}, \; 2\pi + rac{4\pi}{3}$$

as
$$2x \in [0,\ 4\pi]$$

$$\therefore x = rac{\pi}{3}, \; rac{2\pi}{3}, \; rac{4\pi}{3}, \; rac{5\pi}{3}$$

as
$$x \in [0,\ 2\pi]$$

d

$$\sin\!\left(x+rac{\pi}{3}
ight)=-rac{1}{2},\ x\in[0,\ 2\pi]$$

$$\therefore x + rac{\pi}{3} \in \left[rac{\pi}{3}, \; rac{7\pi}{3}
ight]$$

$$\therefore x + \frac{\pi}{3} = \frac{7\pi}{6}, \ \frac{11\pi}{6}$$

as
$$x+rac{\pi}{3}\in\left[rac{\pi}{3},\ rac{7\pi}{3}
ight]$$

$$\therefore x=rac{5\pi}{6}, \; rac{3\pi}{2} \; ext{as} \; x \in [0, \; 2\pi]$$

$$2\cos\left(2\left(x+rac{\pi}{3}
ight)
ight)=-1$$

$$\therefore \cos \left(2 \left(x + rac{\pi}{3}
ight)
ight) = -rac{1}{2}, \; x \in [0, \; 2\pi]$$

$$\therefore x + rac{\pi}{3} \in \left[rac{\pi}{3}, \; rac{7\pi}{3}
ight]$$

$$\therefore 2igg(x+rac{\pi}{3}igg)\in \left\lceilrac{2\pi}{3}, \; rac{14\pi}{3}
ight
ceil$$

$$\therefore 2\left(x+rac{\pi}{3}
ight) = rac{2\pi}{3}, \; rac{4\pi}{3}, \; 2\pi + rac{2\pi}{3},$$

$$2\pi + \frac{4\pi}{3}, \ 4\pi + \frac{2\pi}{3}$$

as
$$2igg(x+rac{\pi}{3}igg)\in\left[rac{2\pi}{3},\ rac{14\pi}{3}
ight]$$

$$\therefore x + \frac{\pi}{3} = \frac{\pi}{3}, \ \frac{2\pi}{3}, \ \frac{4\pi}{3}, \ \frac{5\pi}{3}, \ \frac{7\pi}{3}$$

$$\therefore x=0,\;rac{\pi}{3},\;\pi,\;rac{4\pi}{3},\;2\pi\; ext{as}\;x\in[0,2\pi]$$

$$\mathsf{f} \quad 2\sin\!\left(2x+\frac{\pi}{3}\right) = -\sqrt{3}$$

$$\sin\left(2x+rac{\pi}{3}
ight)=rac{-\sqrt{3}}{2},\ x\in[0,\ 2\pi]$$

$$\therefore 2x \in [0, 4\pi]$$

$$\therefore \ 2x + \frac{\pi}{3} \in \left[\frac{\pi}{3}, \ \frac{13\pi}{3}\right]$$

$$\therefore 2x + \frac{\pi}{3} = \frac{4\pi}{3}, \ \frac{5\pi}{3}, \ 2\pi + \frac{4\pi}{3}, \ 2\pi + \frac{5\pi}{3}$$

as
$$2x+rac{\pi}{3}\in\left[rac{\pi}{3},\ rac{13\pi}{3}
ight]$$

$$\therefore 2x = \pi, \; \frac{4\pi}{3}, \; 3\pi, \; \frac{10\pi}{3}$$

$$\therefore x = \frac{\pi}{2}, \ \frac{2\pi}{3}, \ \frac{3\pi}{2}, \ \frac{5\pi}{3} \ ext{as} \ x \in [0, \ 2\pi]$$

3 a
$$-\frac{5\pi}{6}$$
, $-\frac{\pi}{6}$

b 0,
$$-\frac{2\pi}{3}$$
, $-\frac{\pi}{3}$, $\frac{\pi}{3}$, $\frac{2\pi}{3}$, π , $-\pi$

d 0,
$$-\frac{2\pi}{3}$$

$$e = -\frac{5\pi}{6}, -\frac{\pi}{2}, \frac{\pi}{6}, \frac{\pi}{2}$$