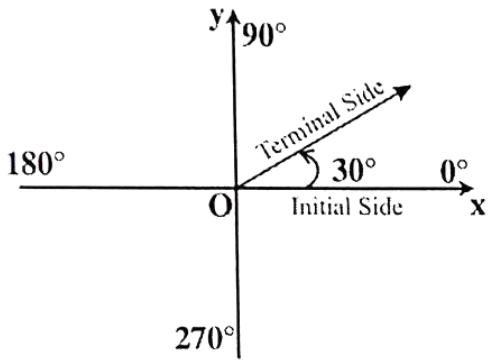
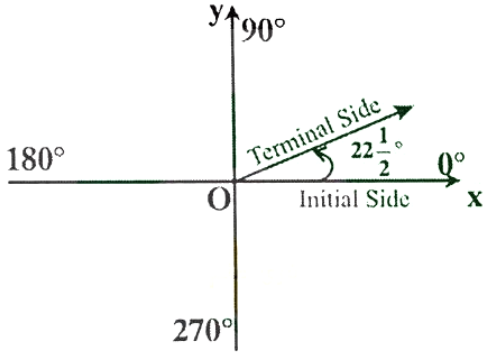
EXERCISE 7.1

Q.1. Locate the following angles:

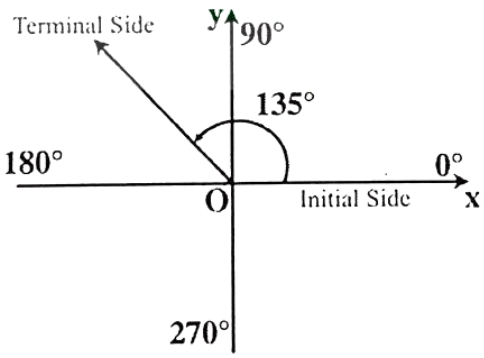
(i) 30°



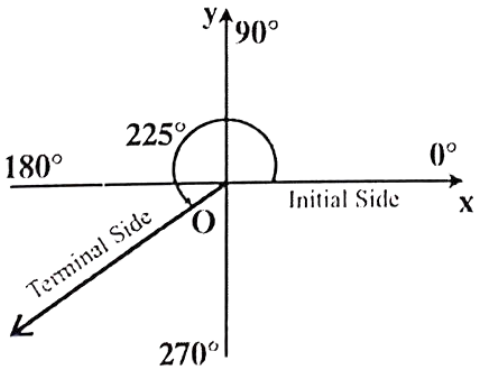
(ii) $22\frac{1}{2}°$



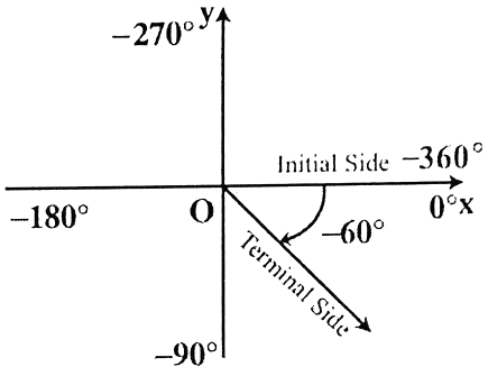
(iii) 135°



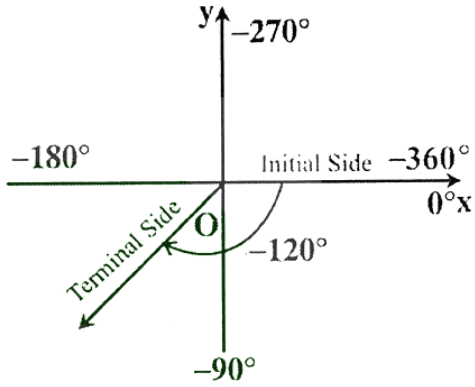
(iv) 225°



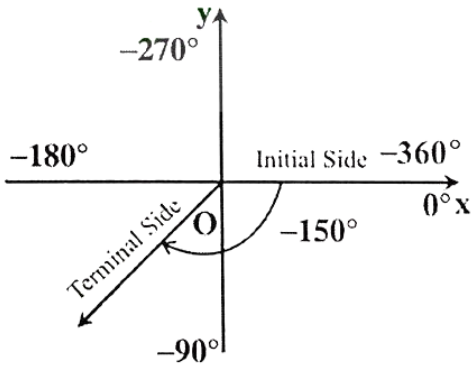
(v) –60°



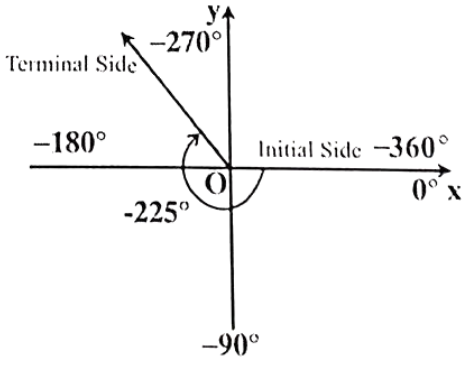
(vi) –120°



(vii) –150°



(viii) – 225°



Q.2. Express the following sexagesiml measures of angles in decimal form.

(i) 45°30′

Solution: 45°30′

$$= 45° + \frac{30}{60}°$$
$$= 45° + 0.5°$$
$$= 45.5°$$

(ii) 60°30′30″

Solution: 60°30′30″

$$= 60° + \frac{30}{60}° + \frac{30}{60\times 60}°$$
$$= 60° + 0.5° + 0.008°$$
$$= 60.508°$$

(iii) 125°22′50″

Solution: 125°22′50″

$$= 125° + \frac{22}{60}° + \frac{50}{60\times 60}°$$
$$= 125° + 0.367° + 0.0139°$$
$$= 125.3808°$$

Q.3. Express the following in D°M′S″:

(i) 47.36°

Solution: 47.36°

$$= 47° + 0.36°$$
$$= 47° + (0.36 \times 60)'$$
$$= 47° + 21.6'$$
$$= 47° + 21' + (0.6 \times 60)''$$
$$= 47° + 21' + 36''$$
$$= 47°\ 21'36''$$

(ii) 125.45°

Solution: 125.45°

$$= 125° + 0.45°$$
$$= 125° + (0.45 \times 60)'$$
$$= 125° + 27'$$
$$= 125°27'0''$$

(iii) 225.75°

Solution: 225.75°

$$= 225° + 0.75°$$
$$= 125° + (0.75 \times 60)'$$
$$= 225° + 45'$$
$$= 225°45'0''$$

(iv) – 22.5°

Solution: – 22.5°

$$= -[22° + 0.5°]$$
$$= -[22° + (0.5 \times 60)']$$
$$= -[22° + 30']$$
$$= -22°30'$$

(v) – 67.58°

Solution: $-(67° + 0.58°)$

$$= -[67° + (0.58 \times 60)']$$
$$= -[67° + 34.8']$$
$$= -[67° + 34' + 0.8']$$
$$= -[67° + 34' + (0.8 \times 60)'']$$
$$= -[67° + 34' + 48'']$$
$$= -67°34'48''$$

(vi) 315.18°

Solution: 315.18°

$$= 315° + 0.18°$$
$$= 315° + (0.18 \times 60)'$$
$$= 315° + 10.8'$$
$$= 315° + 10' + 0.8'$$
$$= 315° + 10' + (0.8 \times 60)''$$
$$= 315° + 10' + 48''$$
$$= 315°\ 10'\ 48''$$

Q.4. Express the following angles into radians.

(i) 30°

Solution: 30°

$$= 30\ \frac{\pi}{180}\ radians$$

$$= \cancel{30}\ \frac{\pi}{\cancel{30}\times 6}\ radians$$

$$= \frac{\pi}{6}\ \text{radians}$$

(ii) 60°

Solution: 60°

$$= 60\ \frac{\pi}{180}\ radians$$

$$= \cancel{60}\ \frac{\pi}{\cancel{60}\times 3}\ radians$$

$$= \frac{\pi}{3}\ \text{radians}$$

(iii) **135°**

Solution: $135°$

$$= 135 \ \frac{\pi}{180} radians$$

$$= \cancel{45} \times 3 \ \frac{\pi}{\cancel{45} \times 4} radians$$

$$= \frac{3\pi}{4} \text{ radians}$$

(iv) **225°**

Solution: $225°$

$$= 225 \ \frac{\pi}{180} radians$$

$$= \cancel{45} \times 5 \ \frac{\pi}{\cancel{45} \times 4} radians$$

$$= \frac{5\pi}{4} radains$$

(v) **– 150°**

Solution: $-150°$

$$= -150 \ \frac{\pi}{180} radians$$

$$= -5 \times \cancel{30} \ \frac{\pi}{\cancel{30} \times 6} radians$$

$$= \frac{-5\pi}{6} \text{ radians}$$

(vi) **– 225°**

Solution: $-225°$

$$= -225 \ \frac{\pi}{180} \text{radians}$$

$$= -5 \times \cancel{45} \ \frac{\pi}{\cancel{45} \times 4} \text{radians}$$

$$= \frac{-5\pi}{4} \text{ radians}$$

(vii) **300°**

Solution: $300°$

$$= 300 \ \frac{\pi}{180} radians$$

$$= \cancel{60} \times 5 \ \frac{\pi}{\cancel{60} \times 3} radians$$

$$= \frac{5\pi}{3} \text{ radians}$$

(viii) **315°**

Solution: $315°$

$$= 315 \ \frac{\pi}{180} radians$$

$$= \cancel{45} \times 7 \ \frac{\pi}{\cancel{45} \times 4} radians$$

$$= \frac{7\pi}{4} \text{ radians}$$

Q.5. Convert each of the following to degrees.

(i) $\frac{3\pi}{4}$

Solution: $\frac{3\pi}{4}$ radians

$$= \frac{3\pi}{4} \ \frac{180}{\pi} \text{ degrees}$$

$$= \frac{3\cancel{\pi}}{\cancel{4}} \ \frac{\overset{45}{\cancel{180}}}{\cancel{\pi}} \text{ degrees}$$

$$= 3 \times 45 \text{ degrees}$$

$$= 135°$$

(ii) $\frac{5\pi}{6}$

Solution: $\frac{5\pi}{6}$

$$= \frac{5\pi}{6} \ \frac{180}{\pi} \text{ degrees}$$

$$= \frac{5\cancel{\pi}}{\cancel{6}} \ \frac{\overset{30}{\cancel{180}}}{\cancel{\pi}} \text{ degrees}$$

$$= 5 \times 30 \text{ degrees}$$

$$= 150°$$

(iii) $\frac{7\pi}{8}$

Solution: $\frac{7\pi}{8}$ radians

$$= \frac{7\pi}{8} \ \frac{180}{\pi} \text{ degrees}$$

$$= \frac{7\cancel{\pi}}{8} \ \frac{180}{\cancel{\pi}} \text{ degrees}$$

$$= \frac{7 \times 180}{8} \text{ degrees}$$

$$= \frac{1260}{8} \text{ degrees}$$

$$= 157.5°$$

(iv) $\frac{13\pi}{16}$

Solution: $\frac{13\pi}{16}$ radians

$= \frac{13\pi}{16} \frac{180}{\pi}$ degrees

$= \frac{13\cancel{\pi}}{16} \frac{180}{\cancel{\pi}}$ degrees

$= \frac{13\times180}{16}$ degrees

$= \frac{2340}{16}$ degrees

$= 146.25°$

(v) 3 radians

Solution: 3 radians

$= 3 \frac{180}{\pi}$ degrees

$= \frac{540}{\pi}$ degrees

$= 171.887°$

(vi) **4.5**

Solution: 4.5 radians

$= 4.5 \frac{180}{\pi}$ degrees

$= \frac{810}{\pi}$ degrees

$= 257.831°$

(vii) $-\frac{7\pi}{8}$

Solution: $-\frac{7\pi}{8}$ radians

$= -\frac{7\cancel{\pi}}{8} \frac{180}{\cancel{\pi}}$ degrees

$= \frac{-1260}{8}$ degrees

$= -157.5°$

(viii) $-\frac{13}{16}\pi$

Solution: $-\frac{13}{16}\pi$ radians

$= -\frac{13\cancel{\pi}}{16} \frac{180}{\cancel{\pi}}$ degrees

$= \frac{-2340}{16}$

$= -146.25°$