1. Change from degree to radian:

a. 125°

Ans: $\dfrac{25\pi}{36}$

b. -32°

Ans: $-\dfrac{8\pi}{45}$

c. 450°

Ans: $\dfrac{5\pi}{2}$

d. -865°

Ans: $-\dfrac{173\pi}{36}$

2. Change from radian to degree:

a. $\dfrac{\pi}{6}$

Ans: 30°

b. $-\dfrac{3\pi}{5}$

Ans: -108°

c. $\dfrac{\pi}{2}$

Ans: 90°

d. $-\dfrac{4\pi}{7}$

Ans: $-\left(\dfrac{720}{7}\right)^\circ$

e. $-\dfrac{23\pi}{6}$

Ans: -690°

f. $\dfrac{20}{7}$

Ans: $\left(\dfrac{3600}{7\pi}\right)^\circ \approx 163.7^\circ$

g. -1

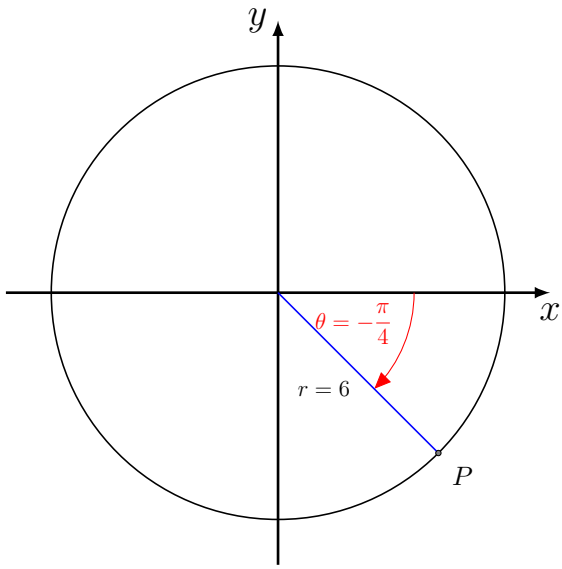
Ans: $\left(-\dfrac{180}{\pi}\right)^\circ \approx -57.3^\circ$

h. 3.14

Ans: $\left(\dfrac{565.2}{\pi}\right)^\circ \approx 180^\circ$

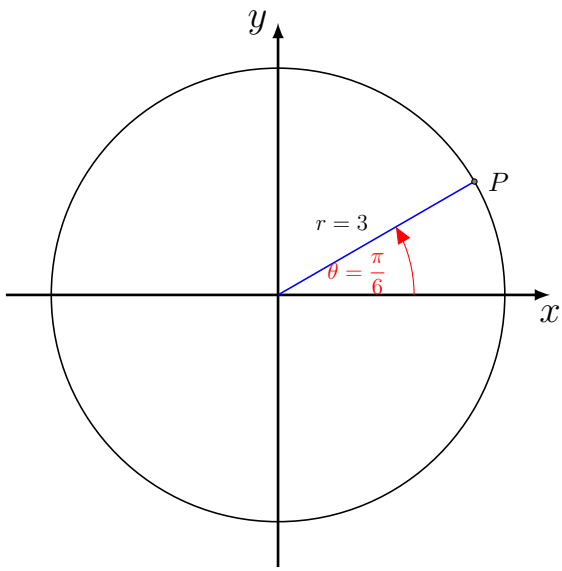
3. Find the coordinate of the terminal point P:

a.



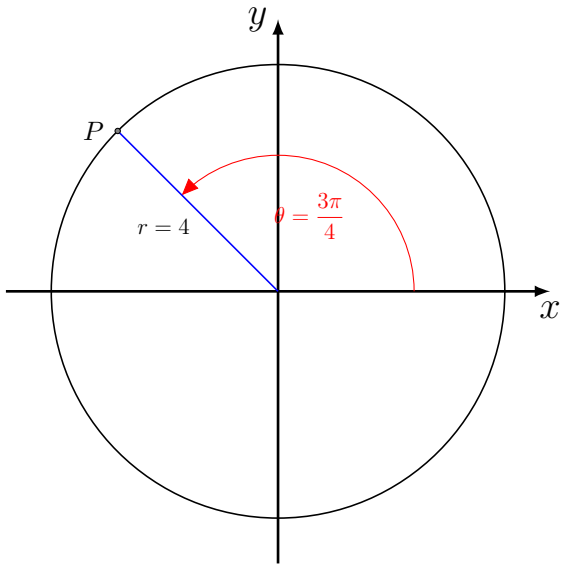
Ans: $P = \left(3\sqrt{2}, -3\sqrt{2}\right)$

b.



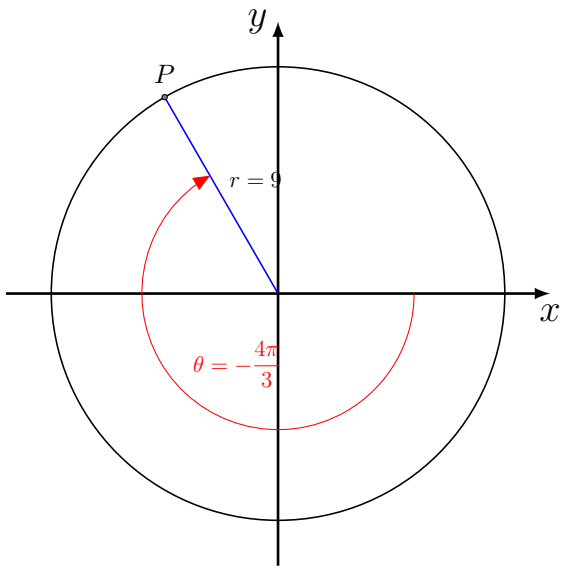
Ans: $P = \left(\frac{3\sqrt{3}}{2}, \frac{3}{2}\right)$

c.



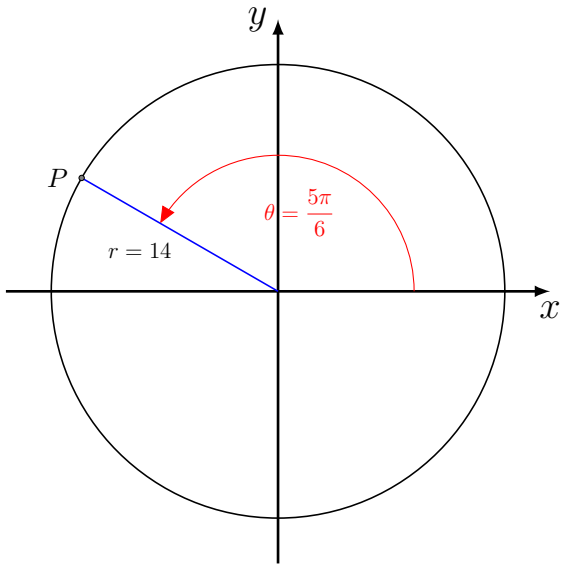
Ans: $P = \left(-2\sqrt{2}, 2\sqrt{2}\right)$

d.



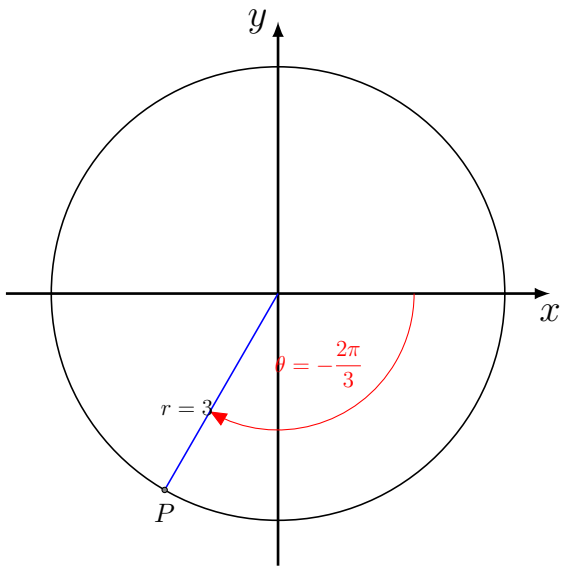
Ans: $P = \left(-\frac{9}{2}, \frac{9\sqrt{3}}{2}\right)$

e.



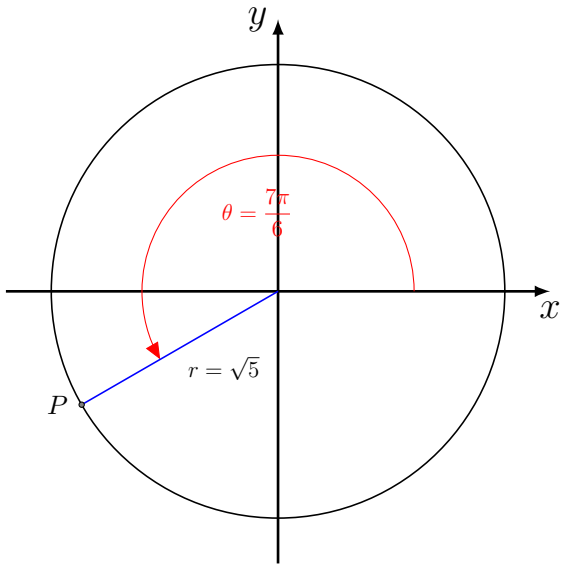
Ans: $P = \left(-7\sqrt{3}, 7\right)$

f.



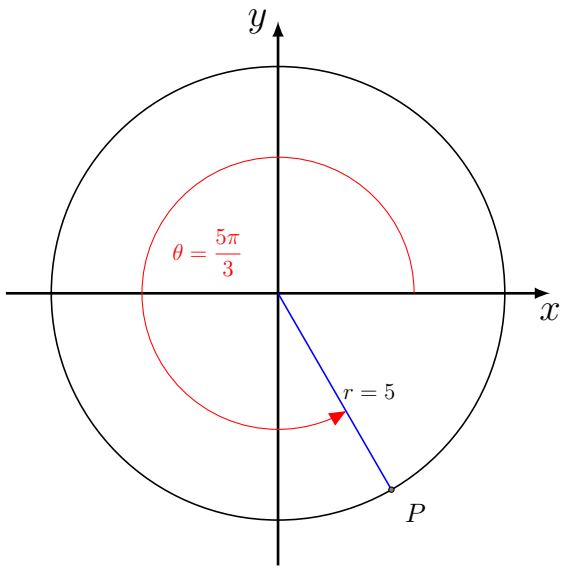
Ans: $P = \left(-\frac{3}{2}, -\frac{3\sqrt{3}}{2}\right)$

g.



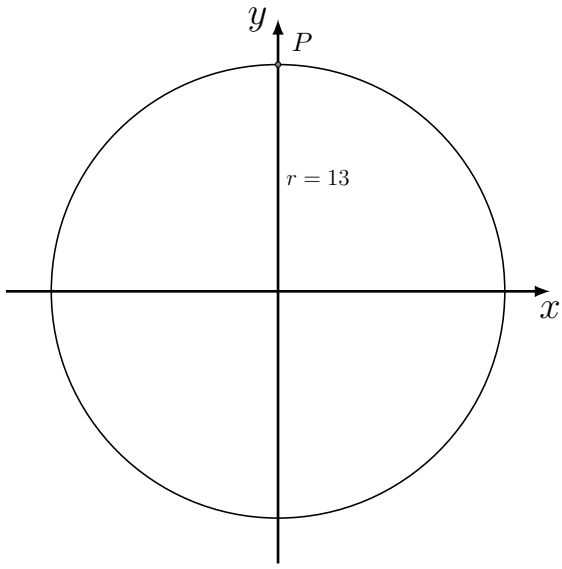
Ans: $P = \left(-\frac{\sqrt{15}}{2}, -\frac{\sqrt{5}}{2}\right)$

h.



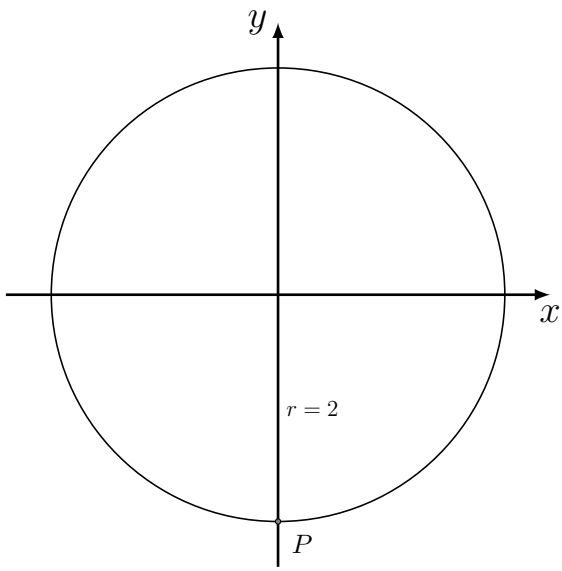
Ans: $P = \left(\frac{5}{2}, -\frac{5\sqrt{3}}{2}\right)$

i.



Ans: $P = (0, 13)$

j.



Ans: $P = (0, -2)$

4. Find the coordinate of the terminal point P of the given angle θ with the circle of radius r:

a. $\theta = \dfrac{2\pi}{3}, \quad r = \dfrac{1}{2}$

Ans: $P = \left(-\dfrac{1}{4}, \dfrac{\sqrt{3}}{4}\right)$

b. $\theta = \dfrac{5\pi}{6}, \quad r = 1$

Ans: $P = \left(-\dfrac{\sqrt{3}}{2}, \dfrac{1}{2}\right)$

c. $\theta = \dfrac{7\pi}{3}, \quad r = 20$

Ans: $P = \left(10, 10\sqrt{3}\right)$

d. $\theta = -\dfrac{21\pi}{4}, \quad r = 10$

Ans: $P = \left(-5\sqrt{2}, 5\sqrt{2}\right)$

e. $\theta = -\dfrac{\pi}{2}, \quad r = 8$

Ans: $P = (0, -8)$

f. $\theta = \dfrac{65\pi}{3}, \quad r = 12$

Ans: $P = \left(6, -6\sqrt{3}\right)$

g. $\theta = -\dfrac{37\pi}{6}, \quad r = \dfrac{3}{4}$

Ans: $P = \left(\dfrac{3\sqrt{3}}{8}, -\dfrac{3}{8}\right)$

h. $\theta = \dfrac{59\pi}{3}, \quad r = \sqrt{6}$

Ans: $P = \left(\dfrac{\sqrt{6}}{2}, -\dfrac{3\sqrt{2}}{2}\right)$

i. $\theta = -\dfrac{82\pi}{3}, \quad r = 5$

Ans: $P = \left(-\dfrac{5}{2}, \dfrac{5\sqrt{3}}{2}\right)$

j. $\theta = \dfrac{45\pi}{2}, \quad r = 9$

Ans: $P = (0, 9)$

k. $\theta = \dfrac{53\pi}{4}, \quad r = 1$

Ans: $P = \left(-\dfrac{\sqrt{2}}{2}, -\dfrac{\sqrt{2}}{2}\right)$

l. $\theta = -\dfrac{5\pi}{6}, \quad r = 3$

Ans: $P = \left(-\dfrac{3\sqrt{3}}{2}, -\dfrac{3}{2}\right)$

m. $\theta = -27\pi, \quad r = 6$

Ans: $P = (-6, 0)$

5. Find the **exact value** of the following:

a. $\sin(0)$

Ans: 0

b. $\cos(0)$

Ans: 1

c. $\tan(0)$

Ans: 0

d. $\cot(0)$

Ans: Undefined

e. $\sec(0)$

Ans: 1

f. $\csc(0)$

Ans: Undefined

g. $\cos\left(-\frac{2\pi}{3}\right)$

Ans: $-\frac{1}{2}$

h. $\cos\left(\frac{2\pi}{3}\right)$

Ans: $-\frac{1}{2}$

i. $\sin\left(-\frac{2\pi}{3}\right)$

Ans: $-\frac{\sqrt{3}}{2}$

j. $\sin\left(\frac{2\pi}{3}\right)$

Ans: $\frac{\sqrt{3}}{2}$

k. $\sec\left(\frac{13\pi}{6}\right)$

Ans: $\frac{2}{\sqrt{3}}$

l. $\csc\left(-\frac{13\pi}{3}\right)$

Ans: $-\frac{2}{\sqrt{3}}$

m. $\tan\left(\frac{17\pi}{6}\right)$

Ans: $-\frac{1}{\sqrt{3}}$

n. $\cot\left(-\frac{29\pi}{2}\right)$

Ans: 0

o. $\tan\left(-\frac{29\pi}{2}\right)$

Ans: Undefined

p. $\cos\left(\frac{15\pi}{4}\right)$

Ans: $\frac{\sqrt{2}}{2}$

q. $\sin\left(-\frac{25\pi}{6}\right)$

Ans: $-\frac{1}{2}$

r. $\sin\left(\frac{\pi}{6}\right)$

Ans: $\frac{1}{2}$

s. $\cos\left(\frac{\pi}{6}\right)$

Ans: $\frac{\sqrt{3}}{2}$

t. $\sin\left(-\frac{\pi}{3}\right)$

Ans: $-\frac{\sqrt{3}}{2}$

u. $\cos\left(-\frac{\pi}{3}\right)$

Ans: $\frac{1}{2}$

v. $\sin\left(\frac{\pi}{2}\right)$

Ans: 1

w. $\cos\left(\frac{\pi}{2}\right)$

Ans: 0

x. $\tan\left(\frac{\pi}{2}\right)$

Ans: Undefined

y. $\csc\left(\frac{\pi}{2}\right)$

Ans: 1

z. $\sin\left(\frac{3\pi}{2}\right)$

Ans: -1

aa. $\cos\left(-\frac{3\pi}{4}\right)$

Ans: $-\frac{\sqrt{2}}{2}$

bb. $\tan\left(\frac{5\pi}{4}\right)$

Ans: 1

cc. $\cot\left(-\frac{7\pi}{4}\right)$

Ans: 1

dd. $\cos(\pi)$

Ans: -1

ee. $\sin(\pi)$

Ans: 0

ff. $\cos\left(-\frac{11\pi}{3}\right)$

Ans: $\frac{1}{2}$

gg. $\sin\left(-\frac{11\pi}{3}\right)$

Ans: $\frac{\sqrt{3}}{2}$

hh. $\tan\left(\frac{11\pi}{3}\right)$

Ans: $-\sqrt{3}$

ii. $\cos\left(\frac{37\pi}{6}\right)$

Ans: $\frac{\sqrt{3}}{2}$

jj. $\sin\left(\frac{37\pi}{6}\right)$

Ans: $\frac{1}{2}$

kk. $\tan\left(\frac{37\pi}{6}\right)$

Ans: $\frac{1}{\sqrt{3}}$

6. Suppose θ is an angle in standard position and P is the terminal point of θ, find the value of the six trigonometric functions of θ:

a. $P = (1, -3)$

Ans: $\sin\theta = \dfrac{-3}{\sqrt{10}}$, $\cos\theta = \dfrac{1}{\sqrt{10}}$,

$\tan\theta = -3$, $\cot\theta = -\dfrac{1}{3}$,

$\csc\theta = \dfrac{-\sqrt{10}}{3}$, $\sec\theta = \sqrt{10}$,

b. $P = \left(\dfrac{1}{3}, \dfrac{\sqrt{2}}{3}\right)$

Ans: $\sin\theta = \dfrac{\sqrt{6}}{3}$, $\cos\theta = \dfrac{\sqrt{3}}{3}$,

$\tan\theta = \sqrt{2}$, $\cot\theta = \dfrac{\sqrt{2}}{2}$,

$\csc\theta = \dfrac{\sqrt{6}}{2}$, $\sec\theta = \sqrt{3}$,

c. $P = \left(-\dfrac{\sqrt{3}}{4}, -\sqrt{3}\right)$

Ans: $\sin\theta = \dfrac{-4}{\sqrt{17}}$, $\cos\theta = -\dfrac{1}{\sqrt{17}}$,

$\tan\theta = 4$, $\cot\theta = \dfrac{1}{4}$,

$\csc\theta = -\dfrac{\sqrt{17}}{4}$, $\sec\theta = -\sqrt{17}$,

d. $P = \left(-2, \sqrt{2}\right)$

Ans: $\sin\theta = \dfrac{1}{\sqrt{3}}$, $\cos\theta = -\dfrac{2}{\sqrt{6}}$,

$\tan\theta = -\dfrac{\sqrt{2}}{2}$, $\cot\theta = -\dfrac{2}{\sqrt{2}}$,

$\csc\theta = \sqrt{3}$, $\sec\theta = -\dfrac{\sqrt{6}}{2}$,

7. Find the value of the other five trigonometric functions of θ from the information given:

a. $\cos\theta = \dfrac{2}{5}$, terminal point of θ is in first quadrant.

Ans: $\sin\theta = \dfrac{\sqrt{21}}{5}$

b. $\sin\theta = \dfrac{\sqrt{3}}{4}$, terminal point of θ is in second quadrant.

Ans: $\cos\theta = -\dfrac{\sqrt{13}}{4}$

c. $\tan\theta = -\dfrac{1}{5}$, terminal point of θ is in second quadrant.

Ans: $\cos\theta = -\dfrac{5}{\sqrt{26}}$, $\sin\theta = \dfrac{1}{\sqrt{26}}$

d. $\csc\theta = -\dfrac{7}{2}$, terminal point of θ is in fourth quadrant.

Ans: $\cos\theta = \dfrac{\sqrt{45}}{7}$, $\sin\theta = -\dfrac{2}{7}$

e. $\sec\theta = 2$, terminal point of θ is in fourth quadrant.

Ans: $\cos\theta = \dfrac{1}{2}$, $\sin\theta = -\dfrac{\sqrt{3}}{2}$

f. $\cot\theta = \dfrac{-\sqrt{3}}{5}$, terminal point of θ is in second quadrant.

Ans: $\cos\theta = \dfrac{-\sqrt{3}}{\sqrt{28}}$, $\sin\theta = \dfrac{5}{\sqrt{28}}$

g. $\cos\theta = -\dfrac{1}{\sqrt{3}}$, terminal point of θ is in second quadrant.

Ans: $\sin\theta = \dfrac{\sqrt{2}}{\sqrt{3}}$

h. $\cos\theta = \dfrac{\sqrt{5}}{6}$, terminal point of θ is in fourth quadrant.

Ans: $\sin\theta = -\dfrac{\sqrt{31}}{6}$

8. If $\sin(\theta) = \dfrac{2}{3}$, $\sin(-\theta) =?$

Ans: $-\dfrac{2}{3}$

9. If $\cos(\theta) = \dfrac{1}{4}$, $\cos(-\theta) =?$

Ans: $\dfrac{1}{4}$

10. If $\tan(\theta) = \sqrt{2}$, $\tan(-\theta) =?$

Ans: $-\sqrt{2}$

11. If $\sin(\theta) = \frac{1}{3}$, $\sin(4\pi - \theta) =?$

Ans: $-\frac{1}{3}$

12. If $\cos(\theta) = -\frac{4}{5}$, $\cos(-\theta - 6\pi) =?$

Ans: $-\frac{4}{5}$