Topic 2: Trigonometric Functions

Part 1

Q1 Find the radian measure of the angle with the given degree measure

(a) 72^o (b) 54^o (c) -60^o (d) -300^o

Q2 Find the degree measure of the angle with the given radian measure

(a) $\frac{7\pi}{6}$ (b) -2 (c) $\frac{5\pi}{18}$ (d) $\frac{-2\pi}{15}$

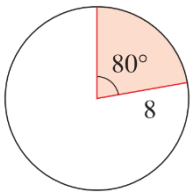
Q3 The measure of an angle in standard position is given below. Find two positive and two negative angles that are coterminal with the given angle

(a) 50^o (b) $\frac{3\pi}{4}$ (c) $\frac{11\pi}{6}$ (d) $\frac{-\pi}{4}$

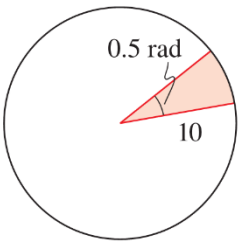
Q4 Find the length of an arc that subtends a central angle of 45^o in a circle of radius 10m.

Q5 Find the area of the sector shown in each figure

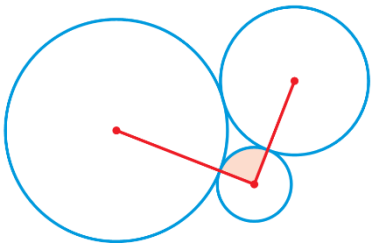
(a)



(b)

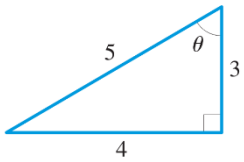


Q6 Three circle with radii 1, 2, and 3 m are externally tangent to one another, as shown in the figure below. Find the area of the sector of the circle of radius 1 that is cut off by the line segments joining the center of that circle to the centers of the other two circles

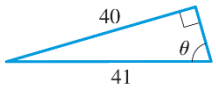


Q7 Find the exact values of the six trigonometric ratios of the angle θ in the triangle

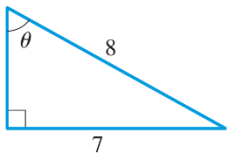
(a)



(b)

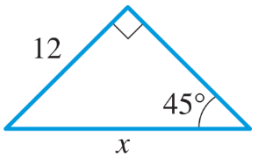


(c)

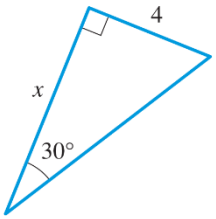


Q8 Find the side labelled x.

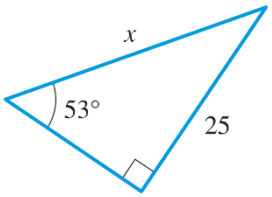
(a)



(b)

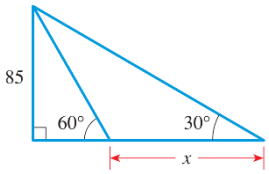


(c)

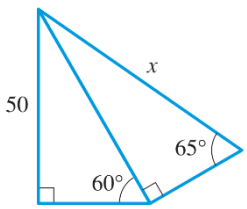


Q9 Find x rounded to one decimal place

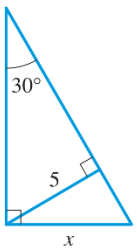
(a)



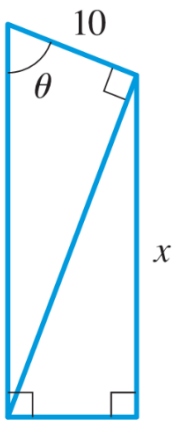
(b)



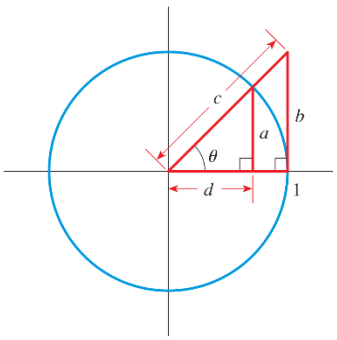
(c)



Q11 Express the length x in terms of the trigonometric ratios of θ



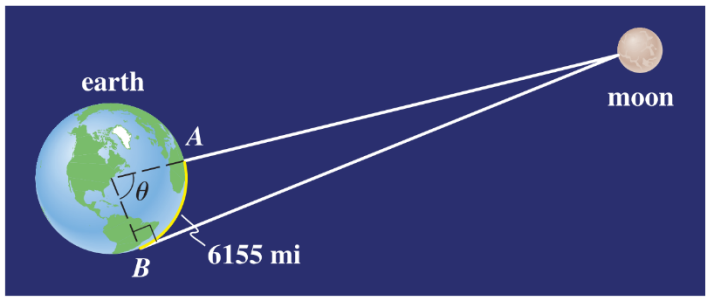
Q12 Express the length *a*, *b*, *c*, and *d* in the figure below in terms of the trigonometric ratios of θ



Q13 When the moon is seen at its zenith at a point A on the earth, it is observed to be at the horizon from point B. Point A and B are 6155 mi apart, and the radius of the earth is 3960 mi.

(a) Find the angle θ in degrees

(b) Estimate the distance from point A to the moon



Q14 Find the reference angle for the given angle

(a) 99^o (b) 225^o (c) -150^o

(d) $\frac{11\pi}{4}$ (e) 2.3 (f) -1.4π

Q15 Find the exact value of the trigonometric function

(a) $\sin 150^o$ (b) $\sec(300^o)$ (c) $\tan 750^o$

(d) $\csc\left(\frac{17\pi}{3}\right)$ (e) $\cos\left(-\frac{7\pi}{3}\right)$ (f) $\cot\left(-\frac{\pi}{4}\right)$

Q16 Write the first trigonometric function in terms of second for θ in the given quadrant

(a) $\tan\theta$, $\cos\theta$; θ in Quadrant III

(b) $\cos\theta$, $\sin\theta$; θ in Quadrant IV

(c) $\sec\theta$, $\tan\theta$; θ in Quadrant II

(d) $\sec\theta$, $\sin\theta$; θ in Quadrant I

Q17 Find the values of trigonometric functions of θ from the information given

(a) $\sin\theta = \frac{3}{5}$, θ in Quadrant II (b) $\tan\theta = -\frac{3}{4}$, $\cos\theta > 0$

(c) $\cos\theta = -\frac{2}{7}$, $\tan\theta < 0$ (d) $\csc\theta = 2$, θ in Quadrant I

Q18 If $\theta = \frac{\pi}{3}$, find the value of each expression.

(a) $\sin 2\theta$, $2\sin\theta$ (b) $\sin\left(\frac{1}{2}\theta\right)$, $\frac{1}{2}\sin\theta$ (c) $\sin^2\theta$, $\sin\theta^2$

Q19 Find the area of triangle with sides of length 7 and 9 and included angle 72°.

Q20 Graph the function

(a) $f(x) = 1 + \cos x$ (b) $g(x) = 3\cos x$

(c) $h(x) = -\frac{1}{2}\sin x$ (d) $i(x) = -\tan x$

Q21 Find the amplitude and period of the function and sketch its graph

(a) $y = -3\sin x$ (b) $y = \frac{1}{2}\cos\left(\frac{1}{4}x\right)$ (c) $y = 1 + \frac{1}{2}\cos\pi x$

Q22 Find the amplitude, period, and phase of the function, and graph one complete period

(a) $y = 3\cos\left(x + \frac{\pi}{4}\right)$ (b) $y = -4\sin 2\left(x + \frac{\pi}{2}\right)$ (c) $y = \frac{1}{2} - \frac{1}{2}\cos\left(2x - \frac{\pi}{3}\right)$

Q23 Find the exact value of each expression, if it is defined

(a) $\sin^{-1}(-1)$ (b) $\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)$ (c) $\cos^{-1}(-1)$ (d) $\cos^{-1}\left(\frac{1}{2}\right)$

(e) $\tan^{-1} 0$ (f) $\tan^{-1}\sqrt{3}$ (g) $\tan^{-1}\left(-\frac{\sqrt{3}}{3}\right)$ (h) $\sin^{-1}\left(-\frac{1}{2}\right)$

Q24 Find the exact value of each expression, if it is defined

(a) $\cos\left(\cos^{-1}\left(\frac{2}{3}\right)\right)$ (b) $\sin\left(\sin^{-1}\left(\frac{1}{4}\right)\right)$ (c) $\tan\left(\tan^{-1}(5)\right)$

(d) $\cos^{-1}\left(\cos\left(\frac{5\pi}{6}\right)\right)$ (e) $\tan\left(\tan^{-1}\left(-\frac{\pi}{4}\right)\right)$ (f) $\sin\left(\sin^{-1}\left(-\frac{\pi}{3}\right)\right)$

(g) $\tan\left(\sin^{-1}\left(\frac{\sqrt{2}}{2}\right)\right)$ (h) $\cos\left(\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)\right)$ (i) $\sin\left(\tan^{-1}(-1)\right)$