

Trigonometry (KEY)

Alg 2

Convert the angle measures in degree to radians.

1) 105°

$$\frac{105^\circ}{180^\circ} = \frac{x}{\pi \text{ rad}}$$

$$\boxed{\frac{7\pi}{12} \text{ rad} = x}$$

2) 245°

$$\boxed{x = \frac{49\pi}{36} \text{ rad}}$$

3) 20°

$$\boxed{x = \frac{\pi}{9} \text{ rad}}$$

4) 315°

$$\frac{315^\circ}{180^\circ} = \frac{x}{\pi \text{ rad}}$$

$$\boxed{\frac{7\pi}{4} \text{ rad} = x}$$

5) 330°

$$\boxed{x = \frac{11\pi}{6} \text{ rad}}$$

Convert the angle measures in radians to degrees.

6) $\frac{5\pi}{3} \text{ rad}$

$$= \frac{5(180^\circ)}{3}$$

$$= 300^\circ$$

7) $\frac{11\pi}{8} \text{ rad}$

$$= \frac{11(180^\circ)}{8}$$

$$= 247.5^\circ$$

8) $\frac{\pi}{6} \text{ rad}$

$$= \frac{(180^\circ)}{6}$$

$$= 30^\circ$$

9) $\frac{7\pi}{4} \text{ rad}$

$$= \frac{7(180^\circ)}{4}$$

$$= 315^\circ$$

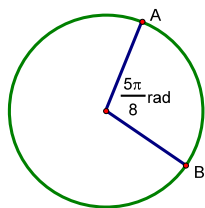
10) $\frac{13\pi}{12} \text{ rad}$

$$= \frac{13(180^\circ)}{12}$$

$$= 195^\circ$$

Find the length of minor arc AB using a proportion.

11) $C = 54 \text{ m}$



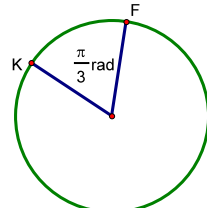
$$\frac{5\pi}{8} = \frac{x}{2\pi \cdot 54 \text{ m}}$$

$$\frac{5\pi \left(\frac{1}{2\pi} \right)}{8} = \frac{x}{54 \text{ m}}$$

$$\frac{5(54 \text{ m})}{16} = x$$

$$\boxed{x = 16.9 \text{ m}}$$

12) $C = 112 \text{ cm}$



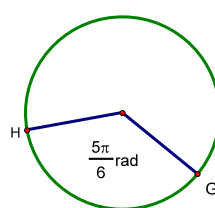
$$\frac{\pi}{3} = \frac{x}{2\pi \cdot 112 \text{ cm}}$$

$$\frac{\pi \left(\frac{1}{2\pi} \right)}{3} = \frac{x}{112 \text{ cm}}$$

$$\frac{(112 \text{ cm})}{6} = x$$

$$\boxed{x = 18.7 \text{ m}}$$

13) $A = 65 \text{ ft}^2$



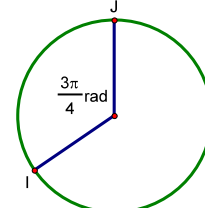
$$\frac{5\pi}{6} = \frac{x}{2\pi \cdot 65 \text{ ft}^2}$$

$$\frac{5\pi \left(\frac{1}{2\pi} \right)}{6} = \frac{x}{65 \text{ ft}^2}$$

$$\frac{5(65 \text{ ft}^2)}{12} = x$$

$$\boxed{x = 27.1 \text{ ft}^2}$$

14) $A = 235 \text{ m}^2$



$$\frac{3\pi}{4} = \frac{x}{2\pi \cdot 235 \text{ m}^2}$$

$$\frac{3\pi \left(\frac{1}{2\pi} \right)}{4} = \frac{x}{235 \text{ m}^2}$$

$$\frac{3(235 \text{ m}^2)}{8} = x$$

$$\boxed{x = 88.1 \text{ m}^2}$$

Given the length of one side of the 45-45-90 triangle at the right find the other two sides to the nearest tenth.

15) $J = 7$

$$\boxed{K = 7}$$

$$\boxed{L = 7\sqrt{2} = 9.9}$$

16) $K = 11\sqrt{2}$

$$\boxed{J = 11\sqrt{2} = 15.6}$$

$$\boxed{L = 11\sqrt{2}(\sqrt{2}) = 22}$$

17) $L = 8\sqrt{2}$

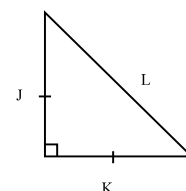
$$\boxed{J = \frac{8\sqrt{2}}{\sqrt{2}} = 8}$$

$$\boxed{K = 8}$$

18) $L = 26$

$$\boxed{J = \frac{26}{\sqrt{2}} = 18.4}$$

$$\boxed{K = 18.4}$$



Given the length of one side of the 30-60-90 triangle at the right find the other sides to the nearest tenth.

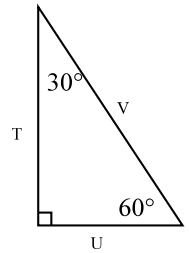
19) $U = 5$

20) $U = 9\sqrt{3}$

21) $V = 38$

$V = 5(2) = 10$ $V = (9\sqrt{3})(2) = 18\sqrt{3} = 31.2$ $U = 38/2 = 19$

$T = 5(\sqrt{3}) = 8.7$ $T = 9\sqrt{3}(\sqrt{3}) = 27$ $T = 19(\sqrt{3}) = 32.9$



22) $T = 14\sqrt{3}$

23) $T = 22$

24) $V = 12\sqrt{3}$

$U = \frac{14\sqrt{3}}{\sqrt{3}} = 14$

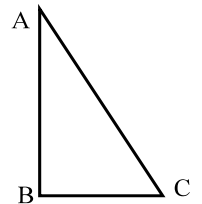
$U = \frac{22}{\sqrt{3}} = 12.7$

$U = \frac{12\sqrt{3}}{2} = 6\sqrt{3} = 10.4$

$V = 14(2) = 28$

$V = \frac{22}{\sqrt{3}}(2) = 25.4$

$T = 6\sqrt{3}(\sqrt{3}) = 6(3) = 18$



In the figure at the right the ratio $\frac{\text{Opposite } \angle A}{\text{Hypotenuse}} = \frac{5}{13}$.

25) $BC = 35$, find AB and AC .

26) $AB = 52$, find BC and AC .

$\frac{5}{13} = \frac{35}{AC}$

$35^2 + AB^2 = 91^2$

$5^2 + b^2 = 13^2$

$\frac{5}{12} = \frac{BC}{52}$

$\frac{13}{12} = \frac{AC}{52}$

$AC = \frac{35(13)}{5}$

$1,225 + AB^2 = 8,281$

$25 + b^2 = 169$

$BC = \frac{5(52)}{12}$

$AC = \frac{13(52)}{12}$

$AC = 91$

$AB = 84$

$b = 12$

$BC = 21.7$

$AC = 56.3$

Give the indicated trigonometric ratio as a fraction and to four decimal places.

27) $\sin \angle C$

28) $\tan \angle F$

29) $\cos \angle D$

30) $\tan \angle A$

$12/37 = .3243$ Can't Do! $20/29 = .6897$ $35/12 = 2.9167$

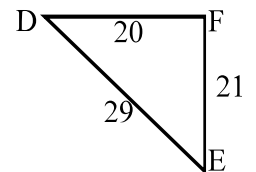
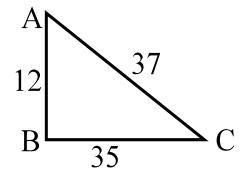
31) $\sin \angle E$

32) $\cos \angle D$

33) $\sin \angle A$

34) $\cos \angle C$

$20/29 = .6897$ $20/29 = .6897$ $35/37 = .9459$ $35/37 = .9459$



Give the indicated trigonometric ratio as a fraction and to four decimal places.

35) $\sin 30^\circ$

36) $\sin 45^\circ$

37) $\sin 60^\circ$

$1/2 = .5000$

$\frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} = .7071$

$\frac{\sqrt{3}}{2} = .8660$

38) $\cos 30^\circ$

39) $\cos 45^\circ$

40) $\cos 60^\circ$

$$\frac{\sqrt{3}}{2} = .8660$$

$$\frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} = .7071$$

$$1/2 = .5000$$

41) $\tan 30^\circ$

42) $\tan 45^\circ$

43) $\tan 60^\circ$

$$\frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3} = .5774$$

$$\frac{1}{1} = 1.0000$$

$$\frac{\sqrt{3}}{1} = \sqrt{3} = 1.7321$$

Find the trigonometric ratios using the information given. Use the figure at the right.

44) $\sin \angle P = 3/5$

$\cos \angle R =$

$\tan \angle P =$

$3^2 + b^2 = 5^2; b = 4$

$4/5 = .8000$

$3/4 = .7500$

45) $\tan \angle P = 2/6$

$\sin \angle P =$

$\tan \angle R =$

$2^2 + 6^2 = c^2; c = 2\sqrt{10}$

$2/2\sqrt{10} = \sqrt{10}/10 = .3162$

$6/2 = 3.0000$

46) $\tan \angle R = 15/8$

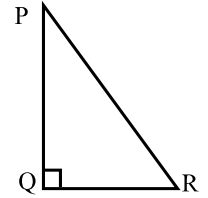
$\tan \angle P =$

$\sin \angle P =$

$8^2 + 15^2 = c^2; c = 17$

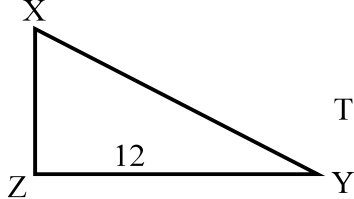
$8/15 = .5333$

$8/17 = .4706$



Use the information given to find the lengths of the missing sides in the triangles below.

47) $\sin X = 4/5$



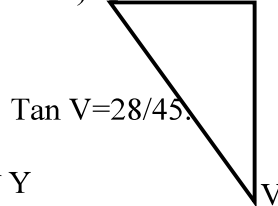
$$\frac{4}{5} = \frac{12}{z}$$

$$z = 15$$

$$y^2 + 12^2 = 15^2$$

$$y = 9$$

48) $\tan V = 28/45$



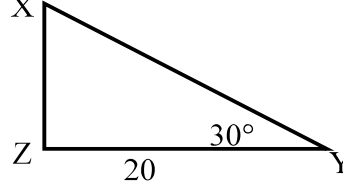
$$\frac{28}{45} = \frac{56}{t}$$

$$t = 90$$

$$56^2 + 90^2 = u^2$$

$$u = 106$$

49)



$$\tan 30^\circ = \frac{y}{20} \quad \cos 30^\circ = \frac{20}{z}$$

$$.5774 = \frac{y}{20}$$

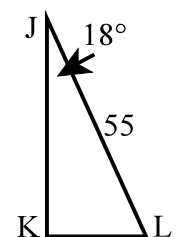
$$y = .5774(20)$$

$$y = 11.5$$

$$z = \frac{20}{\cos 30^\circ}$$

$$z = 23.1$$

50)

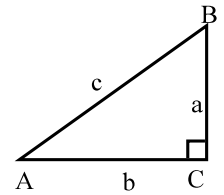


$$j = 17, l = 52.3$$

Use the given information to find the measures of angles A and B.

51) $a = 12, c = 20$

52) $b = 24, c = 26$



$$\sin \angle A = \frac{12}{20}$$

$$\cos \angle A = \frac{24}{26}$$

$$\sin^{-1}(\sin \angle A) = \sin^{-1}\left(\frac{12}{20}\right)$$

$$\cos^{-1}(\cos \angle A) = \cos^{-1}\left(\frac{24}{26}\right)$$

$$\begin{aligned} m\angle A &= 36.9^\circ \\ m\angle B &= 90^\circ - 36.9^\circ = 53.1^\circ \end{aligned}$$

$$\begin{aligned} m\angle A &= 22.6^\circ \\ m\angle B &= 90^\circ - 22.6^\circ = 67.4^\circ \end{aligned}$$

53) $a = 14, b = 19$

54) $b = 21, c = 28$

$$\tan \angle A = \frac{14}{19}$$

$$\sin \angle B = \frac{21}{28}$$

$$\tan^{-1}(\tan \angle A) = \tan^{-1}\left(\frac{14}{19}\right)$$

$$\sin^{-1}(\sin \angle B) = \sin^{-1}\left(\frac{21}{28}\right)$$

$$\begin{aligned} m\angle A &= 36.4^\circ \\ m\angle B &= 90^\circ - 36.4^\circ = 53.6^\circ \end{aligned}$$

$$\begin{aligned} m\angle B &= 48.6^\circ \\ m\angle A &= 90^\circ - 48.6^\circ = 41.4^\circ \end{aligned}$$

Solve $\triangle ABC$ using the information given in each problem.

55) $A = 20^\circ, a = 15$

56) $A = 38^\circ, b = 23$

57) $B = 50^\circ, a = 18$

$$m\angle B = 90^\circ - 20^\circ = 70^\circ$$

$$m\angle B = 90^\circ - 38^\circ = 52^\circ$$

$$m\angle A = 90^\circ - 50^\circ = 40^\circ$$

$$\sin 20^\circ = \frac{15}{c}$$

$$\tan 38^\circ = \frac{a}{23}$$

$$\tan 50^\circ = \frac{b}{18}$$

$$c = \frac{15}{\sin 20^\circ}$$

$$\tan 38^\circ(23) = a$$

$$\tan 50^\circ(18) = b$$

$$\begin{aligned} c &= 43.9 & a &= 18 & b &= 21.5 \end{aligned}$$

$$\tan 20^\circ = \frac{15}{b}$$

$$\cos 38^\circ = \frac{23}{c}$$

$$\sin 40^\circ = \frac{18}{c}$$

$$b = \frac{15}{\tan 20^\circ}$$

$$c = \frac{23}{\cos 38^\circ}$$

$$c = \frac{18}{\sin 40^\circ}$$

$$\begin{aligned} b &= 41.2 & c &= 29.2 & c &= 28.0 \end{aligned}$$