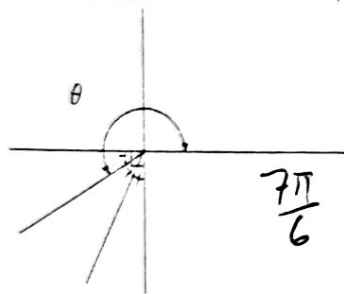


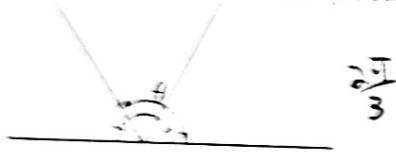
13. What is the measure of θ (in radians)?



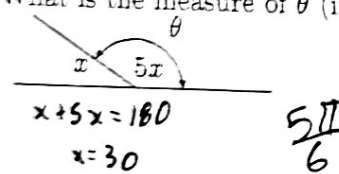
17. What is the measure of θ (in radians)?



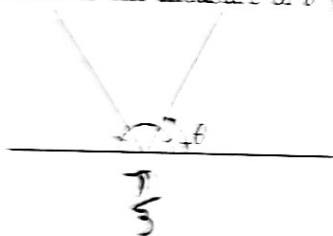
14. What is the measure of θ (in radians)?



18. What is the measure of θ (in radians)?



15. What is the measure of θ (in radians)?



19. $\frac{\pi}{3}$ radians is how many degrees?

60°

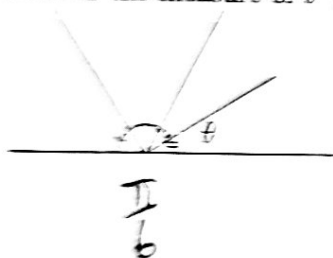
20. $\frac{\pi}{6}$ radians is how many degrees?

30°

21. $\frac{\pi}{2}$ radians is how many degrees?

90°

16. What is the measure of θ (in radians)?



22. $\frac{\pi}{4}$ radians is how many degrees?

45°

23. $\frac{3\pi}{4}$ radians is how many degrees?

135°

24. $\frac{2\pi}{3}$ radians is how many degrees?

120°

In problems 1-8, convert from radians to degrees.

1. $\frac{\pi}{6}$ 30° 2. $\frac{\pi}{4}$ 45° 3. $\frac{\pi}{10}$ 18° 4. $\frac{3\pi}{8}$ $\cdot \frac{180}{\pi}$ 108°
 5. $\frac{7\pi}{9}$ 140° 6. $\frac{13\pi}{20}$ 117° 7. $2 \cdot \frac{180}{\pi} = \frac{360}{\pi}$ 8. $1.3 \cdot \frac{180}{\pi} = \frac{234}{\pi}$

In problems 9-12, convert from degrees to radians.

9. $40^\circ \cdot \frac{\pi}{180} = \frac{2\pi}{9}$ 10. $175^\circ \cdot \frac{\pi}{180} = \frac{35\pi}{36}$ 11. $540^\circ \cdot \frac{\pi}{180} = 3\pi$ 12. $124^\circ \cdot \frac{\pi}{180} = \frac{31\pi}{45}$

In problems 13-14, find the arc length.

13. $r = 2$ in, $\theta = 25$ radians $s = r\theta$ $s = 50$
 $s = 2 \cdot 25$

14. $r = 1$ cm, $\theta = 70$ radians $s = r\theta$ $s = 70$ cm
 $s = 1 \cdot 70$


15. A central angle θ intercepts arcs s_1 and s_2 on two concentric circles with radii r_1 and r_2 respectively. Find θ and s_2 if $r_1 = 11$ cm, $s_1 = 9$ cm, and $r_2 = 44$ cm.

$s_1 = r_1 \theta$ $s_2 = r_2 \theta$
 $9 = 11 \theta$ $s_2 = 44 \cdot \frac{9}{11}$
 $\theta = \frac{9}{11}$ $s_2 = 36$ cm

16. A central angle θ intercepts arcs s_1 and s_2 on two concentric circles with radii r_1 and r_2 respectively. Find θ and r_2 if $r_1 = 8$ km, $s_1 = 36$ km, and $s_2 = 72$ km.

$s_1 = r_1 \theta$
 $\frac{36}{8} = \theta$
 $\theta = \frac{9}{2}$

17. To the nearest inch, find the perimeter of a 10-degree sector cut from a circular disc of radius 11 inches.

 $10 \cdot \frac{\pi}{180} = \frac{\pi}{18}$ $s = r\theta = 11 \cdot \frac{\pi}{18}$ $p = 22 + \frac{11\pi}{9}$
 $s = \frac{11\pi}{18}$


18. A 100-degree arc of a circle has a length of 7 cm. To the nearest centimeter, what is the radius of the circle?

$100 \cdot \frac{\pi}{180} = \frac{5\pi}{9}$ $s = r\theta$ $r = \frac{63\pi}{5}$ cm
 $7 = r \cdot \frac{5\pi}{9}$

19. It takes ten identical pieces to form a circular track for a pair of toy racing cars. If the inside arc of each piece is 3.4 inches shorter than the outside arc, what is the width of the track?

$\frac{2\pi r}{10} = \frac{\pi}{5}$ $s_2 - s_1 = 3.4$ $s = r\theta$ $4.4 = r \cdot \frac{\pi}{5}$
 $r = \frac{1}{2}$ $r = \frac{1}{2}$ $4.4 \cdot \frac{5}{\pi} = r$ $r = \frac{22}{\pi}$
 difference is $\frac{\pi}{2}$

20. The concentric circles on an archery target are 6 inches apart. The inner circle (red) has a perimeter of 37.7 inches. What is the perimeter of the next-largest (yellow) circle?

 $Red = \frac{37.7}{2\pi} = \frac{2\pi r}{2\pi}$ $yellow = 6 + 6 = 12$
 $r = 6$ $C = 2\pi(12)$
 $C = 24\pi \approx 75.36$ in

Right Triangle Trig Practice

THIS IS TO BE DONE ENTIRELY NON-CALCULATOR.

For each special right triangle in problems 1-6, find the EXACT value of x.

1) $\angle X = 30^\circ$, $XZ = 52$, $XY = x$



2) $\angle C = 45^\circ$, $TC = 46$, $TY = x$



3) $\angle E = 45^\circ$, $PU = 8$, $PE = x$

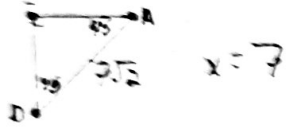


$x = 8\sqrt{2}$

4) $\angle Y = 60^\circ$, $YX = 62$, $ZY = x$



5) $\angle A = 45^\circ$, $AD = 7\sqrt{2}$, $AE = x$



$x = 7$

6) $\angle M = 60^\circ$, $PM = 4\sqrt{3}$, $PD = x$



$x = 12$

7) Which of the following are Pythagorean Triples? (Can be more than one answer)

- A. 7-24-25
- B. 7-5-10
- C. 7-12-13
- D. 8-15-17
- E. 9-40-41

8) Which of the following is equivalent to $\cos 42^\circ$?

- A. $\sin 48^\circ$
- B. $\sin 42^\circ$
- C. $\csc 42^\circ$
- D. $\cos 48^\circ$
- E. $\sec 48^\circ$

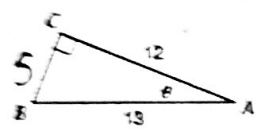
9) For $\triangle ABC$, with hypotenuse AC, if $\sin A = 0.6428$, then $\cos C$ is _____

- A. $1 - 0.6428$
- B. $1 - 0.6428$
- C. 0.6428
- D. $90^\circ - 0.6428$
- E. $180^\circ - 0.6428$

10) Find the values of all 6 trig functions for $\frac{\pi}{3}$ radians.

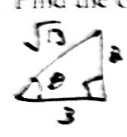
$\sin \frac{\pi}{3} = \frac{\sqrt{3}}{2}$ $\csc \frac{\pi}{3} = \frac{2}{\sqrt{3}}$
 $\cos \frac{\pi}{3} = \frac{1}{2}$ $\sec \frac{\pi}{3} = 2$
 $\tan \frac{\pi}{3} = \sqrt{3}$ $\cot \frac{\pi}{3} = \frac{1}{\sqrt{3}}$

11) Find the value of all 6 trig functions for θ .



$\sin \theta = \frac{5}{13}$ $\csc \theta = \frac{13}{5}$
 $\cos \theta = \frac{12}{13}$ $\sec \theta = \frac{13}{12}$
 $\tan \theta = \frac{5}{12}$ $\cot \theta = \frac{12}{5}$

12) Let θ be an acute angle such that $\tan \theta = \frac{2}{3}$. Find the other 5 trig ratios.

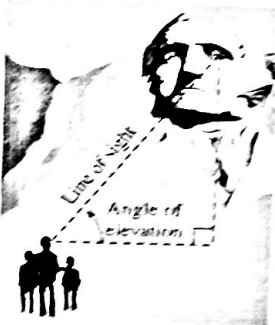


$\sin \theta = \frac{2}{\sqrt{13}}$ $\csc \theta = \frac{\sqrt{13}}{2}$
 $\cos \theta = \frac{3}{\sqrt{13}}$ $\sec \theta = \frac{\sqrt{13}}{3}$
 $\tan \theta = \frac{2}{3}$ $\cot \theta = \frac{3}{2}$

13) Solve the triangle.



$A = 90^\circ$
 $B = 28^\circ$
 $C = 62^\circ$
 $a = 20$
 $b = 20$
 $c = 20$

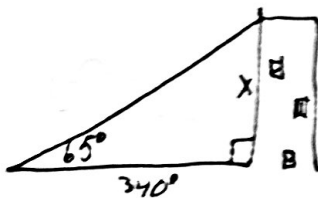


* Angle of Elevation—from the horizontal up

* Angle of Depression—from the horizontal down



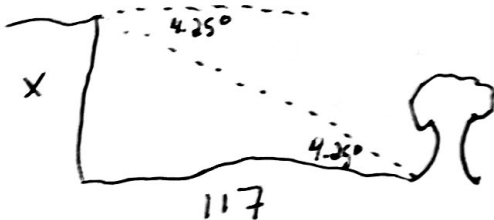
Example 1 From a point 340 ft away from the base of the Peach Tree Center Plaza in Atlanta, GA the angle of elevation to the top of the building is 65° . What is the height of the building? Give the EXACT answer & the answer rounded to the nearest ft



$$\tan 65 = \frac{x}{340}$$

$$x = 340 \tan 65 \approx 729.1 \text{ ft}$$

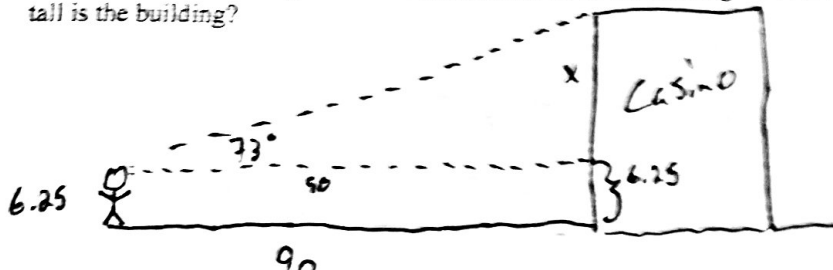
Example 2 The angle of depression from the edge of a cliff to the base of a tree on the ground below is 4.25° . If the base of the cliff is 117 ft from the base of the tree, how high is the cliff?



$$\tan 4.25 = \frac{x}{117}$$

$$x = 117 \tan 4.25 \approx 8.7 \text{ ft}$$

Example 3 On November 13, 2007 The New Frontier hotel and casino in Las Vegas, NV was to be demolished. To help calculate the safety zone for spectators to watch, the head demolition engineer needed to calculate the height of the New Frontier. His eyes are 6 ft 3 in from the ground and his line of sight to the top of the New Frontier forms a 73° angle with the horizontal. If he is standing 90 feet from the base of the building, how tall is the building?



$$\tan 73 = \frac{x}{90}$$

$$x = 90 \tan 73 \approx 294.4 + 6.25$$

$$x \approx 300.65 \text{ ft}$$