

Use the  $\pi$  button on your calculator instead of typing in 3.14. Present exact values (preferred) or round approximations to three decimal places.

1. Use your calculator to find the three-digit decimal approximation for

(a)  $\sin 17^\circ = 0.292$

(b)  $\sin 57^\circ = 0.839$

(c)  $\tan 45^\circ = 1$

(d)  $\sin^2 37^\circ + \cos^2 37^\circ = 1$

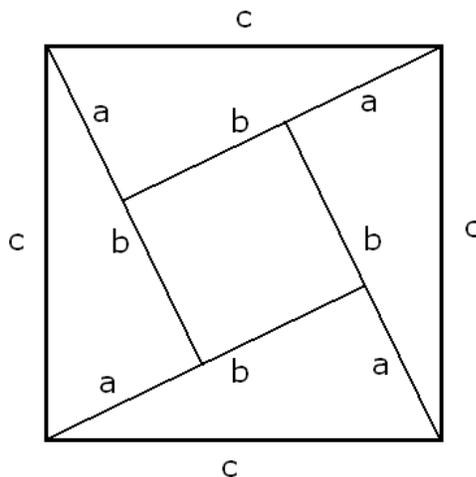
2. Find the three-digit decimal approximation for the smallest angle  $\alpha$ , in degrees, so that  $\sin \alpha = \frac{3}{4}$ .  $\sin^{-1} 0.75 = 48.59037789073$

3. The radius of a circle is 7 cm.

(a) Find the length of an arc subtended by a central angle of  $120^\circ$ .  $\frac{14\pi}{3} \text{ cm} \cong 14.661 \text{ cm}$

(b) Find the area of a sector subtended by a central angle of  $120^\circ$ .  $\frac{49}{3}\pi \text{ cm}^2 \cong 51.313 \text{ cm}^2$

4. This is a proof of the Pythagorean Theorem. Let  $ABC$  be a right triangle, with  $\gamma = 90^\circ$ . We use four identical triangles to construct the following picture.



(a) Find the area of the big square in terms of its sides.  $c^2$

(b) Find the area of the small rectangle in the middle.  $(b - a)^2$

(c) Find the area of the big rectangle as the following sum: the areas of the four right triangles and the area of the small rectangle in the middle.  $a^2 + b^2$

5. Use the regular triangle with sides 2, to find the exact values for each of the following.

(a)  $\sin 30^\circ = \frac{1}{2}$

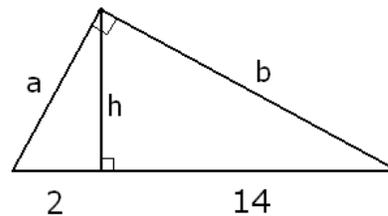
(b)  $\cos 60^\circ = \frac{1}{2}$

(c)  $\tan 30^\circ = \frac{1}{\sqrt{3}} = \frac{\sqrt{3}}{3}$

6. The pendulum of a clock moves through an angle of  $20^\circ$ . During one swing, the end of the pendulum travels 0.6 m. How long is the pendulum?  $\frac{5.4}{\pi}$  m  $\cong 1.719$  m

7. Find the exact value of  $a$ ,  $b$ , and  $h$ .

$$a = 4\sqrt{2} \cong 5.657 \quad b = 4\sqrt{14} \cong 14.967 \quad h = 2\sqrt{7} \cong 5.292$$



8. Find the measure of an inner angle in a regular polygon with 10 sides.  $144^\circ$

9. An object is traveling on a circular orbit of radius 200 miles. It completes a cycle in 24 minutes. Find the speed of the object. Express your answer in miles per hour.  $1000\pi \frac{\text{mi}}{\text{hr}} \cong 3141.593 \frac{\text{mi}}{\text{hr}}$

10. Find the distance between  $(4, -11)$  and  $(-16, 10)$ .  $29$  units

11. Find the area of the triangle  $ABC$ , where  $A(-4, -3)$ ,  $B(8, 1)$ , and  $C(-5, 1)$ .  $26$  unit<sup>2</sup>

12. The sides of a rectangle are 20 ft and 21 ft long. Find the length of the diagonal.  $29$  ft