Right Triangle Trigonometry REVIEW Practice

Name _Master E_
Date _____ Block _____

Trigonometric Functions

$\sin A = \dfrac{OPP}{HYP} = \dfrac{a}{c}$

$\cos A = \dfrac{ADJ}{HYP} = \dfrac{b}{c}$
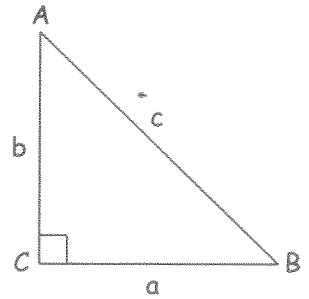
$\tan A = \dfrac{OPP}{ADJ} = \dfrac{a}{b}$

Reciprocal Trigonometric Functions

$\csc A = \dfrac{HYP}{OPP} = \dfrac{c}{a}$

$\sec A = \dfrac{HYP}{ADJ} = \dfrac{c}{b}$

$\cot A = \dfrac{ADJ}{OPP} = \dfrac{b}{a}$

Evaluate the six trigonometric functions for angle θ.

1.

$\sin \theta = \dfrac{6\sqrt{85}}{85}$ $\csc \theta = \dfrac{\sqrt{85}}{6}$

$\cos \theta = \dfrac{7\sqrt{85}}{85}$ $\sec \theta = \dfrac{\sqrt{85}}{7}$

$\tan \theta = \dfrac{6}{7}$ $\cot \theta = \dfrac{7}{6}$

(triangle: legs 6, 7, hypotenuse $\sqrt{85}$)

2.

$\sin \theta = \dfrac{3}{5}$ $\csc \theta = \dfrac{5}{3}$

$\cos \theta = \dfrac{4}{5}$ $\sec \theta = \dfrac{5}{4}$

$\tan \theta = \dfrac{3}{4}$ $\cot \theta = \dfrac{4}{3}$

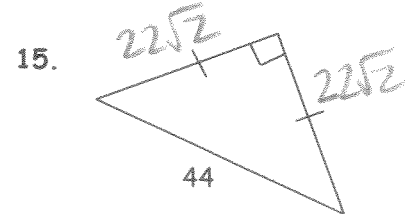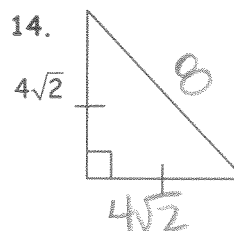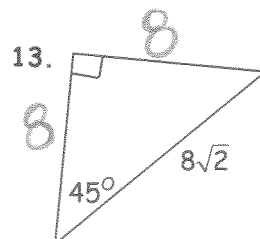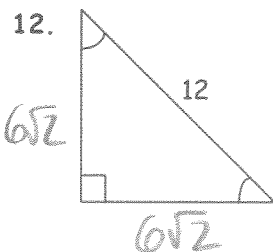(triangle: 5, 3, 4)

3. $\sqrt{315} = 3\sqrt{35}$ $\bigstar \dfrac{2}{3\sqrt{35}} = \dfrac{1}{\sqrt{35}}$

$\sin \theta = \dfrac{1}{6}$ $\csc \theta = \dfrac{6}{1}$

$\cos \theta = \dfrac{\sqrt{35}}{6}$ $\sec \theta = \dfrac{6\sqrt{35}}{35}$

$\bigstar \tan \theta = \dfrac{\sqrt{35}}{35}$ $\cot \theta = \dfrac{\sqrt{35}}{1}$

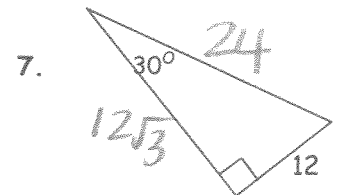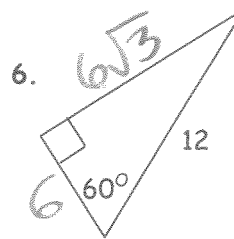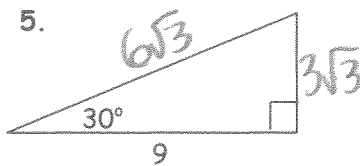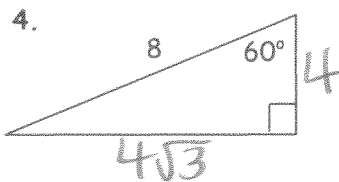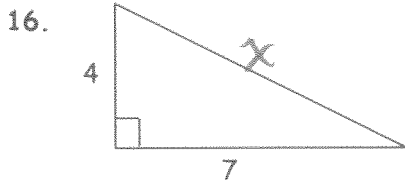(triangle: legs 3, 18)

Determine the lengths of all of the sides of each special right triangle. (Use what we know about special right triangles: 30°-60°-90° and 45°-45°-90°.)

4. 8, 60°, 4, $4\sqrt{3}$

5. $6\sqrt{3}$, $3\sqrt{3}$, 30°, 9

6. $6\sqrt{3}$, 12, 6, 60°

7. 30°, 24, $12\sqrt{3}$, 12

8. $6\sqrt{3}$, 60°, $12\sqrt{3}$, 18

9. 16, 8, 30°, $8\sqrt{3}$

10. 4, $4\sqrt{2}$, 45°, 4

11. $2\sqrt{3}$, $2\sqrt{6}$, $2\sqrt{3}$

12. 12, $6\sqrt{2}$, $6\sqrt{2}$

13. 8, 8, $8\sqrt{2}$, 45°

14. $4\sqrt{2}$, 8, $4\sqrt{2}$

15. $22\sqrt{2}$, $22\sqrt{2}$, 44
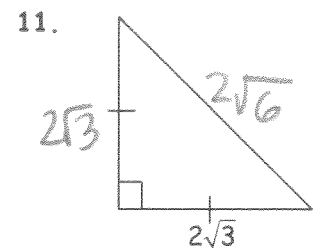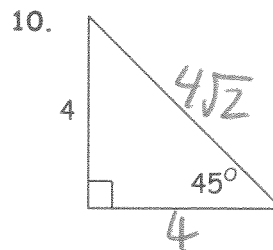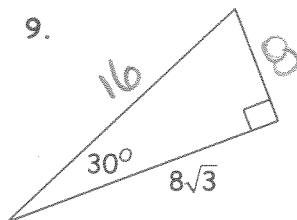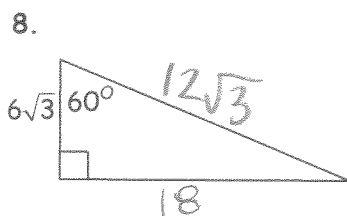
Use the Pythagorean Theorem to find the missing side length.

16.

4 | x | 7 (right triangle)

$$x = \sqrt{16+49} = \sqrt{65}$$
$$\boxed{8.06}$$

17.

8 | 3 | x (right triangle)

$$x = \sqrt{64-9}$$
$$x = \sqrt{55}$$
$$\boxed{x = 7.42}$$

18.
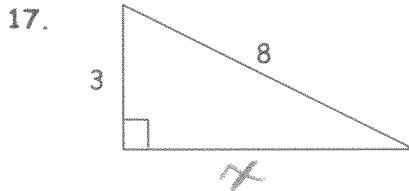
12 | x | $\sqrt{10}$ (right triangle)
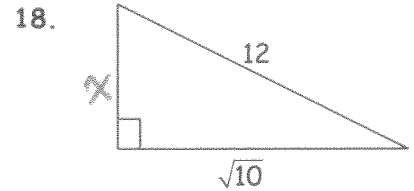
$$x = \sqrt{144-10}$$
$$x = \sqrt{134}$$
$$\boxed{x = 11.58}$$
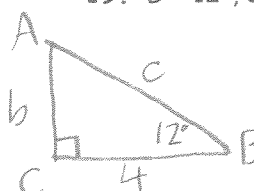
To solve a right triangle: Find all of the missing <u>sides and angles</u>.
Solve ΔABC using the diagram at the right and the given measurements.

19. B = 12°, a = 4

$A = \underline{78°}$
$b = \underline{.85}$
$c = \underline{4.09}$
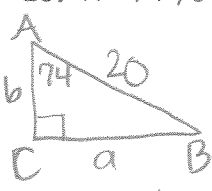
$\tan 12 = \dfrac{b}{4}$

$\cos 12 = \dfrac{4}{c}$

20. A = 74°, c = 20

$B = \underline{16°}$
$a = \underline{19.23}$
$b = \underline{5.51}$
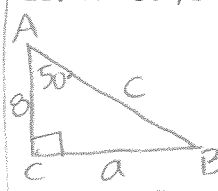
$\sin 74 = \dfrac{a}{20}$ $\cos 74 = \dfrac{b}{20}$

21. A = 50°, b = 8

$B = \underline{40°}$
$a = \underline{9.53}$
$c = \underline{12.45}$

$\cos 50 = \dfrac{8}{c}$ $\tan 50 = \dfrac{a}{8}$

22. B = 38°, c = 7

$A = \underline{52°}$
$a = \underline{5.52}$
$b = \underline{4.31}$
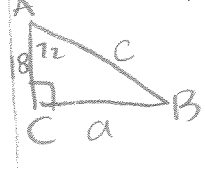
$\sin 38 = \dfrac{b}{7}$ $\cos 38 = \dfrac{a}{7}$

23. A = 72°, b = 18

$B = \underline{18°}$
$a = \underline{55.40}$
$c = \underline{58.25}$
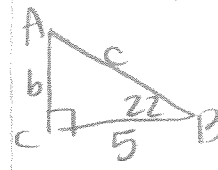
$\tan 72 = \dfrac{a}{18}$ $\cos 72 = \dfrac{18}{c}$

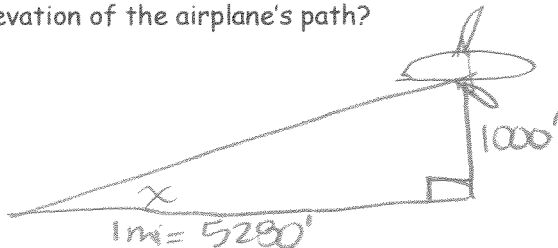**24.** B = 22°, a = 5

$A = \underline{68°}$
$b = \underline{2.02}$
$c = \underline{5.39}$

$\tan 22 = \dfrac{b}{5}$ $\cos 22 = \dfrac{5}{c}$

Solve each of the following using right triangle trigonometry. <u>Round lengths of sides to the nearest tenth and express angle measures using degrees, minutes, and seconds.</u>
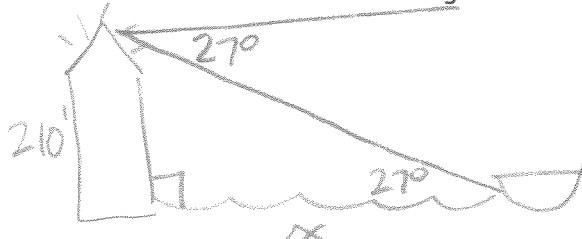
25. An airplane rises vertically 1000 feet over a horizontal distance of 1 mile. What is the angle of elevation of the airplane's path?

1000' x 1 mi = 5280'

$$\tan x = \frac{1000}{5280} = 10.724$$
$$\boxed{10°43'28''}$$

26. From the top of a lighthouse 210 feet high, the angle of depression of a boat is 27°. Find the distance from the boat to the foot of the lighthouse. The lighthouse was built at sea level.

27° 210' 27° x

$$\tan 27 = \frac{210}{x} \qquad \boxed{x = 412.15 \text{ feet}}$$