Geometry Unit 8 worksheet: Solving right triangles

Name _____ Date _____ Period _____

1. Solve each equation for x. Give x to two decimal places.

(a) $\cos 23^\circ = \dfrac{x}{18}$

(b) $\tan 61^\circ = \dfrac{x}{4.5}$

(c) $\sin 17^\circ = \dfrac{6}{x}$

(d) $\tan 34^\circ = \dfrac{13}{x}$

(e) $\cos 76^\circ = \dfrac{2.4}{x}$

(f) $\sin 49^\circ = \dfrac{x}{0.85}$

2. The boom of a crane is a straight arm 16 m long, hinged at its lower end. It is raised to an angle of 42° above the horizontal. How far above the hinge is the tip of the boom, and how far from the hinge is it, measured horizontally? Give both to the nearest tenth of a meter.

3. In $\triangle JKL$ the right angle is at K, $m\angle L = 58^\circ$ and $JK = 9$. Find the perimeter of $\triangle JKL$ to the nearest tenth.

4. Isosceles trapezoid $ABCD$ has the longer base $AB = 20$, legs $AD = BC = 7$, and base angles $m\angle A = m\angle B = 64^\circ$. Find its height, the shorter base CD, and its area, each to two decimal places.

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5. In right $\triangle ABC$ the right angle is at C, $m\angle A = \theta$, and $AC = b$.

(a) Name the sides from $\angle A$, and write AB and BC in terms of b and θ.

(b) Now name the sides from $\angle B$, whose measure is $90^\circ - \theta$, and write AB again in terms of b and θ.

(c) Explain why your two expressions for AB are equal.

6. In right $\triangle ABC$ the right angle is at C, $m\angle A = 34^\circ$, and the altitude $\overline{CD}$ to the hypotenuse has length 6. Find AC, BC and AB to two decimal places.

7. In $\triangle PQR$ the right angle is at R, $m\angle P = 25^\circ$ and $PQ = 12$. Mia wants QR. She writes "QR is next to the angle, so it is adjacent" and gets $QR = 12\cos 25^\circ \approx 10.88$.

(a) What is wrong with Mia's naming?

(b) Find QR correctly, to two decimal places.

(c) Mia's number is the length of a side of the triangle. Which side?

8. The end of a house's attic is an isosceles triangle. Its base is the attic floor, 9.6 m wide, and each of the two roof slopes meets the floor at an angle of 32°. The rafters run straight from the ends of the floor up to the ridge.

(a) How long is each rafter?

(b) How high is the ridge above the attic floor?

Give both to two decimal places.

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