Precalculus Unit 7 worksheet: Law of cosines

Name _____ Date _____ Period _____

1. Find the side named in each triangle ABC. Use a calculator and round to two decimal places.

(a) $a = 9$, $b = 13$, $C = 41°$; find c.

(b) $b = 5.5$, $c = 8.2$, $A = 104°$; find a.

(c) $a = 17$, $c = 12$, $B = 73°$; find b.

(d) $a = 3.6$, $b = 2.9$, $C = 148°$; find c.

2. Triangle ABC is placed on the coordinate plane with C at the origin and $B = (4, 0)$ on the positive x-axis. Side $\overline{CA}$ has length 2, and angle $C = 120°$ is measured from the positive x-axis.

(a) Find the exact coordinates of A.

(b) Use the distance formula to find $c = AB$ exactly.

(c) Check your answer to (b) with the law of cosines.

3. A laptop is hinged at H. The hinge is 24 cm from the front edge F of the keyboard and 21 cm from the top edge T of the screen, and the distance from F to T is 36 cm. Use a calculator.

(a) Find the opening angle $\angle FHT$ between the keyboard and the screen, to the nearest hundredth of a degree.

(b) The screen is tilted back until $\angle FHT = 125°$. How far is the top edge of the screen from the front edge now? Round to two decimal places.

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4. A triangle has sides 5, 12 and x. Find, exactly, every value of x for which the triangle is (a) right, (b) obtuse, (c) acute.

5. Triangle ABC has $a = 9$, $b = 10$ and $c = 4$. Without a calculator, find the cosine of its largest angle as a fraction in lowest terms, name the angle, and say whether the triangle is acute, right or obtuse.

6. Priya solves the triangle with $a = 7$, $b = 13$ and $C = 40^\circ$. She finds $c \approx 8.86$ correctly. Then she writes $\sin B = \dfrac{13 \sin 40^\circ}{c}$, gets $B \approx 70.50^\circ$, and finishes with $A = 180^\circ - 40^\circ - 70.50^\circ = 69.50^\circ$.

(a) Without computing any new angle, explain why her angles cannot be right.

(b) Find the correct A and B to the nearest hundredth of a degree. Use a calculator.

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