Sample Problems for Exam 3

Precalculus, Mth 130, Spring 2014

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- Exam 3: Monday May 12th, Review: Wednesday May 12th.
- This sample exam has many more questions than the actual exam will have.
- Syllabus for Exam 3: Sections 6.4, 6.5, 7.1 - 7.5.

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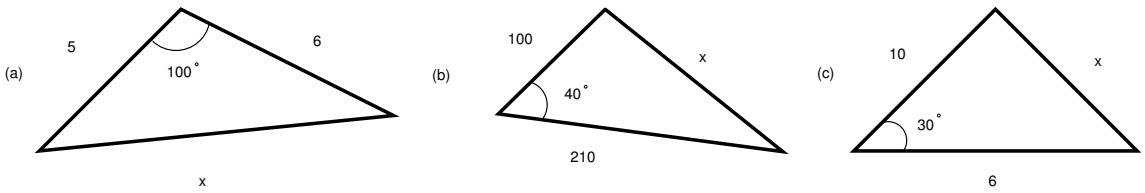
1. Sketch each triangle and then solve the triangle using the Law of Sines.
   (a) $\angle A = 50°,\ \angle B = 68°,\ c = 230.$
   (b) $\angle B = 10°,\ \angle C = 100°,\ c = 115.$
   (c) $a = 28,\ b = 15,\ \angle A = 110°.$

2. Find the side labelled x using the Law of Cosines.



3. Find the area of triangle ABC with sides $a = 9, b = 12, c = 15$. Use Heron's Formula.

4. Two boats leave the same port at the same time. One travels at a speed of 30 mi/h in the direction N 50° E and the other travels at a speed of 26 mi/h in a direction S 70° E. How far apart are the two boats after one hour ? (See Figure on page 514, bottom right).

5. Verify the following identitites.
   (a) $\dfrac{\cos x}{\sec x} + \dfrac{\sin x}{\csc x} = 1$
   (b) $(\cot x - \csc x)(\cos x + 1) = -\sin x$
   (c) $\tan^2 u - \sin^2 u = \tan^2 u \sin^2 u$
   (d) $\cos 2t = \cos^2 t - \sin^2 t$
   (e) $\sin(x - \pi) = -\sin x$
   (f) $\dfrac{1 + \sin x}{1 - \sin x} = (\tan x + \sec x)^2$

6. Find value of (a) $\tan 15°$ (b) $\cos 195°$ (c) $\sin 22.5°$

7. Write the expression $-\sqrt{3}\sin x + \cos x$ in terms of sine only.

8. Find $\sin(x/2), \cos(x/2),\ \tan(x/2)$ given that $\cos x = -4/5$ and $-180^\circ < x < 270^\circ$.

9. Use inverse functions to find the following values.
   (a) $\sin^{-1}(\sin(5\pi/6))$ (b) $\tan(\sin^{-1}(1/2))$ (c) $\cos(\tan^{-1}(2))$ (d) $\tan(\sin^{-1}(4/5))$

10. Find all solutions of the following trigonometric equations.

    (a) $\sin^2 x = 1$

    (b) $2\cos^2 x - 1 = 0$

    (c) $\cos x \sin x - 2\cos x = 0$

    (d) $\sin^2 x = 2\sin x + 3$

    (e) $\cos 3x = \sin 3x$