Precalculus Chapter 6 Review

Show ALL WORK on a SEPARATE SHEET OF PAPER.

Solve each triangle. If two solutions exist, find both solutions. If no solution exists, explain why. Round your answers to the nearest hundredth.

1. $A = 41°$, $a = 15$, $b = 13$
2. $a = 4$, $b = 9$, $c = 10$

3. $B = 150°$, $a = 10$, $b = 3$
4. $B = 32°$, $a = 10$, $b = 7$

5. Write the complex number in trigonometric form: $5 - 5i$

6. Given $z_1 = 2\sqrt{3} - 2i$, $z_2 = -10i$, complete the following:
   a. write the two complex numbers in trig form
   b. use the trig forms to find $z_1 z_2$ and $\dfrac{z_1}{z_2}$ where $z_2 \neq 0$.

7. Use DeMoivre's Theorem to find the indicated power of the complex number. Write result in standard form.
   a. $\left[5\left(\cos\dfrac{\pi}{12} + i\sin\dfrac{\pi}{12} \right) \right]^4$
   b. $(2 + 3i)^6$

Answer Key:
1. $B \approx 34.65°$, $C \approx 104.35°$, $c \approx 22.15$
2. $A \approx 23.56°$, $B \approx 64.06°$, $C \approx 92.39°$
3. No solution
4. Two solutions: $A \approx 49.20°$, $C \approx 98.80°$, $c \approx 13.05$
5. $5\sqrt{2}\left(\cos\frac{7\pi}{4} + i\sin\frac{7\pi}{4}\right)$

   $A \approx 130.80°$, $C \approx 17.20°$, $c \approx 3.91$
6. (a) $z_1 = 4\left(\cos\frac{11\pi}{6} + i\sin\frac{11\pi}{6}\right)$; $z_2 = 10\left(\cos\frac{3\pi}{2} + i\sin\frac{3\pi}{2}\right)$,

   (b) $z_1 z_2 = 40\left(\cos\frac{4\pi}{3} + i\sin\frac{4\pi}{3}\right)$; $\frac{z_1}{z_2} = \frac{2}{5}\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right)$
7. (a) $\frac{625}{2} + \frac{625\sqrt{3}}{2}i$
   (b) $2035 - 828i$