

On “algebraic” problems, **CORRECT ANSWERS WITH LITTLE OR NO SUPPORTING WORK WILL RECEIVE LITTLE OR NO CREDIT.** Include three or more correct significant digits when giving numerical answers.

1. Short answer. [No work need be shown.]

a) Solve:  $10^x = 50$

b) A sound has sound energy 10,000,000 times that of the quietest sound a healthy young person can hear. What is its decibel value?

2. Use your graphing calculator to solve:  $\frac{(x-7)(x+1)}{x-2} > 0.$

[Do it on your calculator—you need not show work.]

3. Rewrite the interval “ $7.2 < x < 7.6$ ” in the form “ $|x - c| < d.$ ”

4. One earthquake is a 4.7 on the Richter scale and a second is a 6.2. The amplitude of the waves of the second are how many times the amplitude of the waves of the first?

5. Solve for  $x$ :  $\log(x) + \log(5x) = \log(x^4)$

[Hint: Use properties of logs.]

#	Points	Score
1	6	
2	6	
3	5	
4	6	
5	8	
6	10	
7	8	
8	8	
9	6	
10	5	
11	12	
12	8	
13	12	
total	100	

6. Solve algebraically for  $t$  and show work

$$1.08^t = 1.7(1.03)^{2t}$$

7. Suppose bacteria undergo exponential growth and their numbers increase 40% every 35 minutes. What is the doubling time?

---

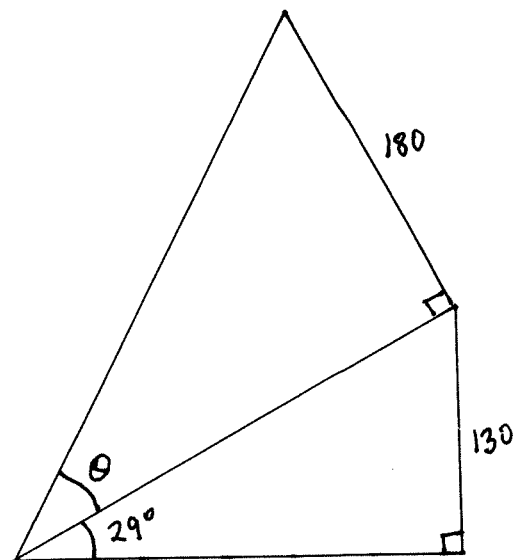
**Trigonometry: Set your calculator to DEGREE mode.**

Law of Cosines:  $c^2 = a^2 + b^2 - 2ab \cos C$ .    Law of Sines:  $(\sin A)/a = (\sin B)/b$ .

8. The figure has two right triangles, as marked. One angle is 29 degrees. The sides are 130 and 180.

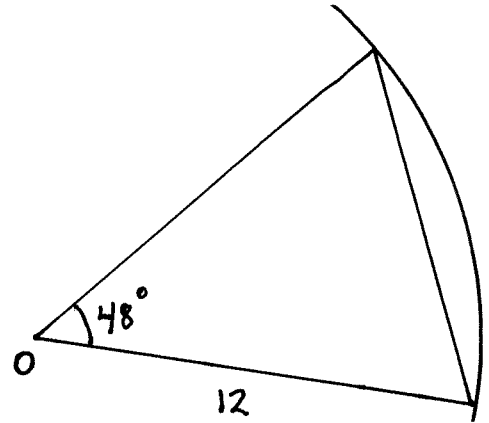
Find the unknown angle  $\theta$ .

[Label the picture with anything you discover as you go along and show the equations you are solving.]



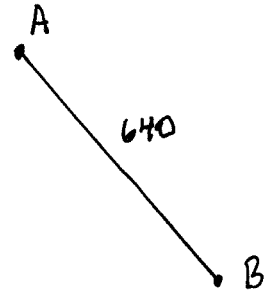
9. Sketch a good picture that clearly illustrates why the geometric case Angle-Side-Side might yield two different triangles.

10. In the figure the circle has radius 12 and the central angle is 48 degrees. How long is the side opposite the 48-degree angle? [Name the result you use at each step.]



11. [See the picture] From point A to point B is 640 feet S  $42^\circ$  E. From point B to point C is 800 feet S  $59^\circ$  W. How far, and what bearing, is it from point C to point A?

[As you go along, on the figure **fill in values for all the parts you discover**. Also, label your steps (1), (2) etc., so we can follow them in order. **Name** the trig result you use for each step. We do not need to see long equations written out; use your calculator.]

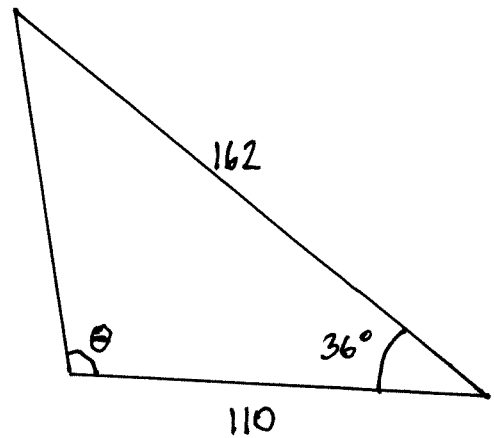


Answer these two: How far?

What is the bearing from C to A?

C

12. [See the figure.] The given angle is 36 degrees between sides of 110 and 162, as labeled. Find angle  $\theta$ . [Label the picture with anything you discover as you go along and name the law you use at each step.]



13. [See the picture] Sides are 40, 52 and 13, as labeled. Angles are  $32^\circ$  and  $106^\circ$ , as labeled. Find side RK, step by step.

- First, sketch on the picture a PLAN to find side RK, clearly labeling your picture with (1), (2), etc. marking the parts you would find in order. [First complete the plan without computing numbers.]
- After completing your plan on the figure, compute the numbers and find side RK.

