Precalculus. Test #3. Fall 2014 Name_____
Sections 1.1-4.5-6.4. Class time of day, section, or instructor_____

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.

#	Points	Score
1	8	
2	5	
3	4	
4	4	
5	6	
6	8	
7	4	
8	8	
9	6	
10	6	
11	5	
12	12	
13	10	
14	14	
total	100	

1. [Short answer. No work need be shown.]
a) Write as a power of 10: one million.

b) Write as a power of 10: 50

c) Which decays faster, $(\frac{1}{2})^{t/2}$ or $(\frac{1}{2})^{t/3}$?

d) Here is a log fact: $\log(cd) = \log(c) + \log(d)$.
State, in symbols, the corresponding exponential fact.

2. Consider the function : $f(x) = \dfrac{2x - 8}{(x - 3)(x + 5)}$. Give its

1) zeros:

2) vertical asymptotes:

3) horizontal asymptotes:

4) end-behavior model:

3. Write the interval "$2.3 < x < 5.5$" in the form "$|x - c| < d$."

4. Use properties of logs to rewrite the expression as an equivalent expression without logs of products, logs of quotients, or logs of powers. $\log(5x(1 - x)^6)$

5. Solve algebraically: The half-life model is $A(t) = A(0)(½)^{t/h}$. The half-life of Carbon 14 is 5600 years. If 72% of the original Carbon 14 remains, how old is the substance?

6. Solve algebraically. $1.03^t = 4(1.02)^t$

7. Normal conversation is 60 decibels. How many decibels is a sound with 500 times the sound energy of normal conversation?

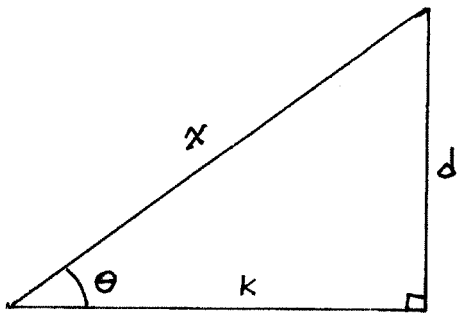
8. Group A is 1/3 of the current population of a certain country and is growing exponentially at 2.7% per year (compounded annually). Group B is the rest of the population of that country but is growing at only 1% per year (compounded annually). Assume these growth rates continue. SET UP (do not bother to solve) a single equation to answer: When will the population of Group A be equal that of Group B?

Trigonometry: Set your calculator to DEGREE mode.

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

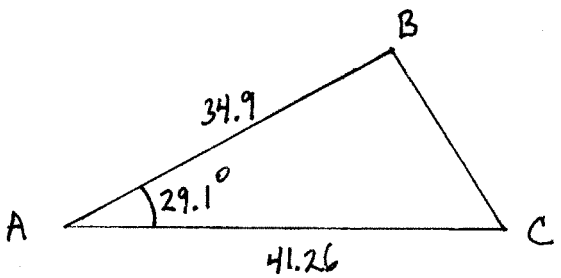
9. The figure is a right triangle.

a) If $d = 77$ and $\theta = 37°$, find side x.



b) If $k = 180$ and $d = 130$, find θ.

10. Angle A is 29.1°, and the sides are 41.26 and 34.9 as labeled. Find angle B.



11. a) Sketch and label a right triangle to illustrate "$\cos^{-1}(c) = x$."

12. Sketch and label a good BIG picture to illustrate all the angles and lengths in

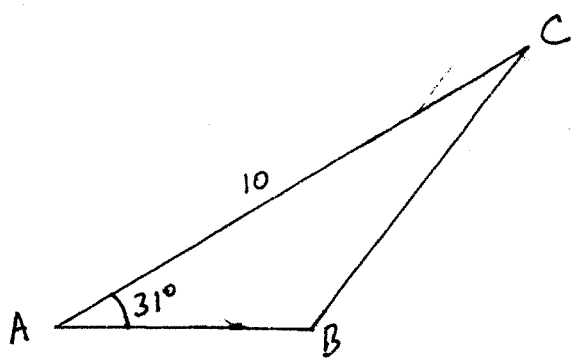
a) "B is 3 miles N 20° E of A." (Use the whole space below here for a **big** picture.)

b) Then add into the picture C where "C is 1 mile S 68° E of B."

c) Find the distance from A to C.

[This will be marked on how well your picture illustrates the information.]

13. Solve algebraically. See the picture. Angle A is 31°. BC is 40% longer than AB. $AC = 10$. How long is AB?



14. See the figure. Do not assume it is accurate or to scale. If there is more than one answer compatible with the given data, give all the answers.

a) Sketch on the figure a PLAN to find side AB, clearly labeling yours steps (1), (2), etc on the figure. Also, fill in the steps below, telling how you plan to find the part. [First complete the plan without computing numbers.]

b) After completing your plan, compute the numbers and side AB.

Angle CAD = 41°. CA = 120. DA = 108. BC = 52.

step (1)

step (2)

step (3)

etc.