Spring Semester Trig Identity Test Name\_\_\_\_\_\_\_\_KEY\_\_\_\_\_\_\_\_\_\_\_

No Calculator Part Period\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_

I. Show work to evaluate each of the following and simplify each one as completely as possible without a calculator. Circle your final answer. (5 points each)

1. 2∙cos 75°sin 75° (2sin xcos x = sin 2x), so 2∙cos 75°sin 75° = sin (275°) = sin 150 = 1/2

2. Tan(Tan-1 3+ Tan-1 4) , so 

3. cos 65° - sin 25° = cos 65° - cos (90° – 25°) = cos 65° - cos 65° = 0

4. tan2 π/12 – sec2 π/12 (Since tan2 x + sec2x = 1, tan2x – sec2 x = -1 for all x.)

5. cot(½∙Cos-1(-12/13)) Since tan ½x =

6. cos(2∙Cos-1(-12/13)) Since cos 2x = 2cos2x – 1 , cos(2∙Cos-1(-12/13)) =2(-12/13)2 – 1 = 288/169 – 1

= 119/169

7. sin(x + 270°) = sin xcos 270° + cos xsin 270° = -cos x

8. sin 195° – sin 105° = sin(150° + 45°) – sin(150° - 45°) = 2cos 150°sin 45° = 

9. 2cos 18° ∙sin 72° = 2sin Acos B = sin(72° + 18°) + sin(72° - 18°) = sin 90° + sin 54° = 1 + sin 54°

10. Evaluate f(30°) if f(x) = 6 – 8sec(4(x – 45°))

F(30°) = 6 – 8sec(4(30° – 45°)) = 6 – 8sec(415°))= 6 – 8sec(-60°) = 6 – 8sec(60°) = 6 – 8(2) =

6 – 16 = -10

11. If f(x) = 6 – 8sec(4(x – 45°)), find all values of x: 0° < x < 180° so that f(x) = 22.

6 – 8sec(4(x – 45°)) = 22 ⇒ – 8sec(4(x – 45°)) = 16 ⇒ sec(4(x – 45°)) = -2 ⇒ cos(4(x – 45°) = -1/2

So 4(x – 45°) = ±120° + 360°k ⇒ x – 45° = ±30° + 90°k ⇒ x = 15° + 90°k or 75° + 90°k ⇒

{15°. 105°, 75°, 165°}

II. Verify the following identities.

12.  13. 

 

Solve for x if 0 < x < 2π

14. 4cos x + 4 sin x = 4⇒