Name: _____

F.TF.A.2: Reciprocal Trigonometric Relationships 2

1 If $\sin x = \dfrac{1}{a}$, $a \neq 0$, which statement must be true?
1) $\csc x = a$
2) $\csc x = -\dfrac{1}{a}$
3) $\sec x = a$
4) $\sec x = -\dfrac{1}{a}$

2 The expression $1 - \sec x$ is equivalent to
1) $-\tan x$
2) $\dfrac{\cos x - 1}{\cos x}$
3) $\dfrac{\sin x - 1}{\sin x}$
4) $\dfrac{\tan x}{\sec x - 1}$

3 For all values of x for which the expressions are defined, $\sec x - \tan x$ is equivalent to
1) 1
2) $\cos x - \cot x$
3) $\dfrac{1 - \sin x}{\cos x}$
4) $\dfrac{\cos x - \sin^2 x}{\sin x \cos x}$

4 The expression $\sec^2 x + \csc^2 x$ is equivalent to
1) 1
2) $\dfrac{1}{\cos x \sin x}$
3) $\cos^2 x \sin^2 x$
4) $\dfrac{1}{\cos^2 x \sin^2 x}$

5 The expression $\sec^2 \theta - \tan^2 \theta$ is equal to
1) 1
2) 0
3) $\sin^2 \theta$
4) $\dfrac{1}{\cos^2 \theta}$

6 The expression $\cot \theta \cdot \sec \theta$ is equivalent to
1) $\dfrac{\cos \theta}{\sin^2 \theta}$
2) $\dfrac{\sin \theta}{\cos^2 \theta}$
3) $\csc \theta$
4) $\sin \theta$

7 The expression $(\tan \theta)(\csc \theta)$ is equivalent to
1) $\cos \theta$
2) $\sec \theta$
3) $\csc \theta$
4) $\csc \theta \cot \theta$

8 Expressed in simplest form, $\csc \theta \cdot \tan \theta \cdot \cos \theta$ is equivalent to
1) 1
2) $\sin \theta$
3) $\cos \theta$
4) $\tan \theta$

9 The expression $(\sec^2 \theta)(\cot^2 \theta)(\sin \theta)$ is equivalent to
1) $\sin \theta$
2) $\cos \theta$
3) $\csc \theta$
4) $\sec \theta$

10 The expression $\cos y(\csc y - \sec y)$ is equivalent to
1) $\cot y - 1$
2) $\tan y - 1$
3) $1 - \tan y$
4) $-\cos y$

11 The expression $\sin \theta(\cot \theta - \csc \theta)$ is equivalent to
1) $\cos \theta - \sin^2 \theta$
2) $2 \cos \theta$
3) $-\sin \theta$
4) $\cos \theta - 1$

12 The expression $(1 + \cos x)(1 - \cos x)$ is equivalent to
1) 1
2) $\sec^2 x$
3) $\sin^2 x$
4) $\csc^2 x$

13 The expression $\dfrac{\sec \theta}{\csc \theta}$ is equivalent to
1) $\sin \theta$
2) $\cos \theta$
3) $\dfrac{\sin \theta}{\cos \theta}$
4) $\dfrac{\cos \theta}{\sin \theta}$

14 The expression $\dfrac{\tan \theta}{\sec \theta}$ is equivalent to
1) $\dfrac{\cos^2 \theta}{\sin \theta}$
2) $\dfrac{\sin \theta}{\cos^2 \theta}$
3) $\cos \theta$
4) $\sin \theta$

15 For all values of θ for which the expression is defined, $\dfrac{\csc \theta}{\sec \theta}$ is equivalent to
1) $\cos \theta$
2) $\sin \theta$
3) $\cot \theta$
4) $\tan \theta$

16 The expression $\dfrac{\sin^2 x + \cos^2 x}{\cos x}$ is equal to
1) $\csc x$
2) $\sec x$
3) $\cos x \cdot \tan x$
4) $\sin x \cdot \cos x \cdot \tan x$

17 The expression $\sin A + \dfrac{\cos^2 A}{\sin A}$ is equivalent to
1) 1
2) $\sin A$
3) $\sec A$
4) $\csc A$

18 The expression $\dfrac{\sin^2 B}{\cos B} + \cos B$ is equivalent to
1) 1
2) $\dfrac{1}{\cos B}$
3) $\dfrac{1}{\sec B}$
4) $\sin^2 B$

19 If $\csc \theta = -2$, what is the value of $\sin \theta$?
1) -2
2) 2
3) $-\dfrac{1}{2}$
4) $\dfrac{1}{2}$

20 If $\tan(x + 20) = \cot x$, a value of x is
1) 35
2) 45
3) 55
4) 70

21 If $\tan x = \cot(2x - 6)$, then $m\angle x$ is
1) 28
2) 32
3) 45
4) 84

22 If $\cot(x - 10)° = \tan(4x)°$, a value of x is
1) 10
2) 20
3) 30
4) 40

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Answer Section

1 ANS: 1
$$\sin x = \frac{1}{\csc x}.$$

   REF: 060904b
2 ANS: 2
$$1 - \sec x = 1 - \frac{1}{\cos x} = \frac{\cos x - 1}{\cos x}$$

   REF: 080813b
3 ANS: 3   REF: 068623siii
4 ANS: 4   REF: 089428siii
5 ANS: 1   REF: 060220siii
6 ANS: 3
$$\cot \theta \cdot \sec \theta = \frac{\cos \theta}{\sin \theta} \cdot \frac{1}{\cos \theta} = \frac{1}{\sin \theta} = \csc \theta$$

   REF: 010915b
7 ANS: 2   REF: 010122siii
8 ANS: 1   REF: 069921siii
9 ANS: 3   REF: 010427siii
10 ANS: 1   REF: 068731siii
11 ANS: 4   REF: 060018siii
12 ANS: 3
$$(1 + \cos x)(1 - \cos x) = 1 - \cos x + \cos x - \cos^2 x = 1 - \cos^2 x = \sin^2 x$$

   REF: 010608b
13 ANS: 3
$$\frac{\sec \theta}{\csc \theta} = \frac{\dfrac{1}{\cos \theta}}{\dfrac{1}{\sin \theta}} = \frac{\sin \theta}{\cos \theta}$$

   REF: 010402b
14 ANS: 4
$$\frac{\tan \theta}{\sec \theta} = \frac{\dfrac{\sin \theta}{\cos \theta}}{\dfrac{1}{\cos \theta}} = \sin \theta$$

   REF: 010508b
15 ANS: 3   REF: 080318siii
16 ANS: 2   REF: 089316siii

17 ANS: 4

$$\sin A + \frac{\cos^2 A}{\sin A} = \frac{\sin^2 A}{\sin A} + \frac{\cos^2 A}{\sin A} = \frac{\sin^2 A + \cos^2 A}{\sin A} = \frac{1}{\sin A} = \csc A$$

REF: 060720b

18 ANS: 2   REF: 019530siii

19 ANS: 3

$$\sin \theta = \frac{1}{\csc \theta} = \frac{1}{-2}$$

REF: 080703b

20 ANS: 1   REF: 080118siii
21 ANS: 2   REF: 088932siii
22 ANS: 2   REF: 089328siii