

True or False ?

1. If $\cos \theta > 0$ and $\sin \theta < 0$ then $\tan \theta$ must be negative.
2. $\cos(t)$ is always less than or equal to 1.
3. If $\sin \theta = \sin \phi$ then θ and ϕ must be coterminal angles.
4. The point $(\pi, 3)$ is on the graph of the function f where

$$f(t) = \sin(t) \cos(t) + 3 - \tan(t).$$

5. If $g(t) = \sin(t) + \cos(t) \sin^2(t)$, then $g(-t) = -g(t)$ for all real numbers t .
6. If $|\sin(t)| = 1$, then $\tan(t)$ is undefined.
7. If $\csc t = 31$ then we know $\sin t = \frac{1}{31}$.
8. If $f(t) = 201 \sin(7t - 3)$ then we know the graph of f has period 7.
9. $\sin(a) + \sin(b) = \sin(a + b)$ for all real numbers a and b .
10. $\cos(a - b) = \cos(a) - \cos(b)$ for all real numbers a and b .
11. If $\tan(a) = \tan(b)$, then we know $a = b$.
12. There are angles θ and ϕ such that $\sin(\theta) = \sin(\phi)$ but θ and ϕ are not coterminal.
13. It is possible for $\sin \theta = 5/13$ and $\tan \theta = -5/12$.
14. The domain of the function f whose rule is $f(t) = \tan(t)$ is all real numbers.
15. The point $(\pi/3, 2)$ is on the graph of the function h whose rule is $h(t) = (\sin(t) + \tan(t) \cos^2(t))^2$.
16. There is a number M such that $\tan \theta$ is always less than M .
17. The graph of $f(t) = 12 \cos(2t - 4)$ passes through the t -axis when $t = \pi/4 + 2$. [Just to clarify, the t -axis is what you might normally think of as the x -axis]
18. For any real number t , $\sin(\csc(t)) = t$.

19. If $\sin \theta = \frac{\sqrt{2}}{2}$ and $\cos \theta = \frac{\sqrt{2}}{2}$, then we know θ must be $\frac{\pi}{4}$.
20. If $\tan(x) = 4$, then $\tan(2x) = 8$.
21. If $f(x) = \sin^2(x) \sec x - \cos x$, then $f(-x) = f(x)$.
22. For any real number t in the domain of the tangent function, the following is an identity.

$$\tan t = \frac{\sin(t + \pi)}{\cos(t + 2\pi)}$$

23. We know $\arccos(\cos(x)) = x$ for any real number x which lies between 0 and π .
24. We know $\arccos(\cos(x)) = x$ for ANY real number x .
25. We know $\cos(\arccos(x)) = x$ for any real number x with $-1 \leq x \leq 1$.
26. We know $\cos(\arccos(x)) = x$ for ANY real number x .
27. We know $\arctan(\tan(x)) = x$ for any real number x which lies between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$.
28. We know $\arctan(\tan(x)) = x$ for ANY real number x .
29. We know $\tan(\arctan(x)) = x$ for ANY real number x .
30. We know $\arcsin(\sin(x)) = x$ for any real number x which lies between $-\frac{\pi}{2}$ and $\frac{\pi}{2}$.
31. We know $\arcsin(\sin(x)) = x$ for ANY real number x .
32. We know $\sin(\arcsin(x)) = x$ for any real number x with $-1 \leq x \leq 1$.
33. We know $\sin(\arcsin(x)) = x$ for ANY real number x .
34. If c is some real number, then we know the equation $\tan x = c$ has infinitely many solutions.
35. If c is some real number, then we know the equation $\sin x = c$ has infinitely many solutions.
36. If c is some real number, then we know the equation $\sin x = c$ has either zero or infinitely many solutions.

37. If $\sec x = c$ where $c > 1$, then we know

$$x = \frac{1}{\arccos(c)} + 2\pi k \quad \text{or} \quad x = -\frac{1}{\arccos(c)} + 2\pi k$$

38. If $\sec x = c$ where $c > 1$, then we know

$$x = \arccos\left(\frac{1}{c}\right) + 2\pi k \quad \text{or} \quad x = -\arccos\left(\frac{1}{c}\right) + 2\pi k$$

39. $\tan(\arctan(31)) = 31$.

40. It is possible for the sides of a triangle to have lengths 3, 5, & 10.

41. It is possible for the sides of a triangle to have lengths 2, 5, & 6.

42. It is possible for the interior angles of a triangle to have measures 63° , 74° , and 42° .

43. It is possible for the equation $\cos x = c$ to have zero solutions, where c is some constant.

44. It is possible for the equation $\tan x = c$ to have zero solutions, where c is some constant.

45. If $f(x)$ is a polynomial with real coefficients and $f(2i + 3) = 0$, then we know $f(3 - 2i) = 0$.

46. If $f(x)$ is a polynomial with real coefficients and $f(3 - 2i) = 0$, then we know $f(2i - 3) = 0$.

47. Every non-constant polynomial with real coefficients has at least one real root.

48. Every non-constant polynomial with real coefficients has at least one complex root.

49. Every non-constant polynomial with real coefficients of odd degree has at least one real root.

50. $x + 1$ is a factor of the polynomial $f(x) = x^{94} + 3x^{21} + 2$.

51. In the following triangle $\sin A$ equals $\cos B$.

