Math 130 - Review 2

October 7, 2019

Name _____

Score _____

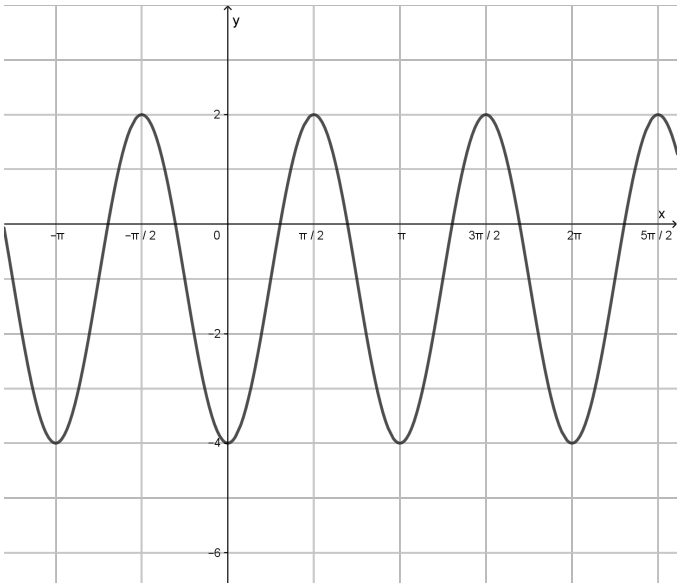
These problems may help you review for Test 2. Your actual test will not be as long as this review packet. When providing exact answers, simplify as much as possible.

---

1. At what x-values (give all of them) does the graph of $y = \sec x$ have vertical asymptotes?

2. Determine the locations of two consecutive asymptotes of the graph of $y = \cot(5x + \pi)$

3. Shown below is the graph of $y = -1 + 3\cos(2x - \pi)$. Use the given graph to sketch the graph of $y = -1 + 3\sec(2x - \pi)$.



4. Sketch a careful and detailed graph of $y = 3\cot \pi x$. Include two full periods. Label your axes.

5. Sketch a careful and detailed graph of $y = 5\csc(x - \frac{\pi}{6})$. Include two full periods. Label your axes.

6. Use your knowledge of the values of the trigonometric functions at special angles to determine the exact value of each of the following. Do not use a calculator.

   (a) $\arcsin 0$

   (b) $\tan^{-1} 1$

   (c) $\arccos\left(-\dfrac{1}{2}\right)$

   (d) $\sin^{-1}\left(\dfrac{\sqrt{2}}{2}\right)$

   (e) $\cos^{-1} 1$

   (f) $\arccos 2$

   (g) $\sin^{-1} \dfrac{\sqrt{3}}{2}$

7. Because the tangent and arctangent functions are inverses, Fernanda thought that it must be true that $\tan(\tan^{-1}(17)) = 17$. Is she correct? Explain why or why not.

8. Determine the exact value of $\tan^{-1}(\tan 2\pi)$.

9. Use a right triangle to find the exact value of $\sin(\cos^{-1}\sqrt{5}/7)$.

10. Use a right triangle to find the exact value of $\tan[\cos^{-1}(-2/3)]$.

11. Use a right triangle to determine an algebraic expression for $\sin[\tan^{-1}(2x)]$.

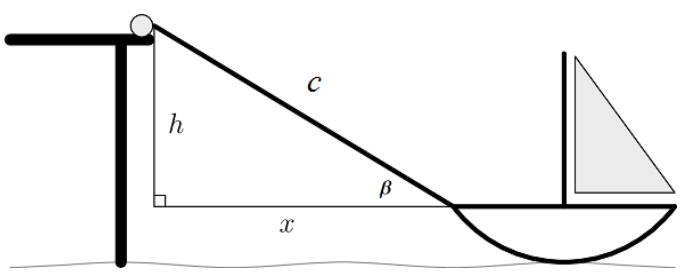
12. Use a calculator to determine the value of each of the following. Write you answers in radian measure rounded to the nearest tenth.

(a) $\sec^{-1} 4.5$

(b) $\arctan 17$

(c) $\cos^{-1} 0.25$

13. A boat is being pulled toward a dock as shown in the figure below. For each part of this problem, use the given information to determine the angle β. Give your answer in degree measure, rounded to the nearest tenth of a degree.



(a) $h = 2\,\text{m}$ and $x = 7\,\text{m}$

(b) $c = 13\,\text{ft}$ and $x = 12\,\text{ft}$

14. True or false?

(a) $\tan^2 x = \tan x^2$

(b) $\sin(-x) = \sin x$

(c) $\cos(-x) = \cos x$

(d) $\cos\left(\theta - \frac{\pi}{2}\right) = \sin\theta$

(e) $\sin^2 x + \cos^2 x = \sec^2 x - \tan^2 x$

15. Simplify each expression.

(a) $\sin x \; - \csc^2 x \; \sin x$

(b) $\sin x \; \cos^2 x - \sin x$

16. Factor each expression.

(a) $4\tan^2 u + \tan u - 3$

(b) $2\csc^2 w - 7\csc w + 6$

17. Rewrite and factor: $\csc^2 x - \cot x - 3$

18. Add and simplify: $\dfrac{\sin\theta}{1+\cos\theta} + \dfrac{\cos\theta}{\sin\theta}$

19. Show that $\cos(\sin^{-1} 2x) = \sqrt{1-4x^2}$.

20. Verify each identity.

(a) $\dfrac{\sec^2\beta - 1}{\sec^2\beta} = \sin^2\beta$

(b) $(\tan^2 x + 1)(\cos^2 x - 1) = -\tan^2 x$

(c) $\tan\alpha + \cot\alpha = \sec\alpha\ \csc\alpha$

(d) $\sec u + \tan u = \dfrac{\cos u}{1 - \sin u}$

21. Find the exact solutions: $3\tan^2 x - 1 = 0$
(Find all solutions.)

22. Find the exact solutions: $2\sin^2 x + 3\cos x - 3 = 0$
(Find all solutions.)

23. Find the exact solutions: $2\sin 4t - \sqrt{3} = 0$
(Find all solutions.)

24. Find the exact solutions in the interval $[0, 2\pi)$: $\sin^2 x + 2\sin x - 1 = 0$