
Perform your work on **separate paper** as necessary and **attach it**. Write your answers on this page. Answers must be clearly **legible**. Where possible write answers as an **exact** integer or fraction otherwise use **two** decimal accuracy. Leave π in answers where applicable. **Units** required. 50 pts

- 1) Let $y = \sin f(x)$ with $f(x)$ representing a linear function of the form $mx + b$. m & b are unitless. Can x be in either radians or degrees? Explain/justify your answer.

- 2) $y = \sin [\sin (x)]$. To graph with your TI, can x be in either radians or degrees? Explain/justify your answer.

- 3) What is the domain of $y = \sin^{-1} (2x + 1)$? 4) What is the range of $y = 2 \sin (x) + 1$

- 5) $t = \tan^{-1} \frac{x+1}{2}$

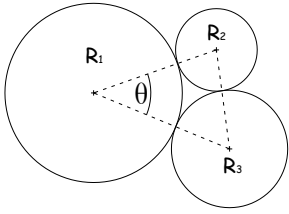
 $\sin t =$

- 6) $x = \sin f(y)$. Use inverse notation to write 'y' as a function of 'x'.

- 7) Solve for y as a function of x . $x = 2 \tan^{-1} \left[\frac{y-1}{3} \right] + \pi$

- 8) Solve for y as a function of x . $x = \ln [\sin (e^y - \pi) - b]$

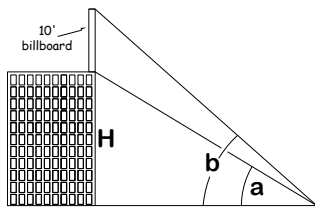
9) Find θ as a function of R_1, R_2 and R_3 .



$\theta(R_1, R_2, R_3) =$ _____

$\theta(10, 4, 2) =$ _____

11) Find H as a function of a and b .

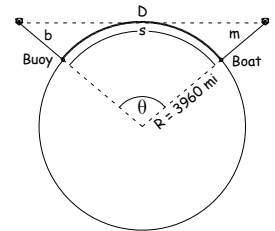


$H =$ _____

13) Two planes are traveling directly toward an airport. Plane A is 600 mi away, heading 294° azi, with velocity 450 mph. Plane B is 400 mi away, heading 68° azi, with velocity 380 mph. Find the distance between the planes as a function of time.

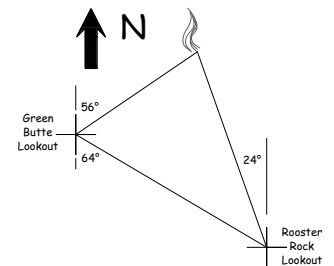
$D =$ _____

14) A Ship has a lookout in the crow's nest 10 m above the water looking for a lighthouse (y meters above sea level) that is situated on a rock outcropping. At what distance (s) will the lookout see the light as a function of the height of the lighthouse? $R_E \approx 6,370$ km



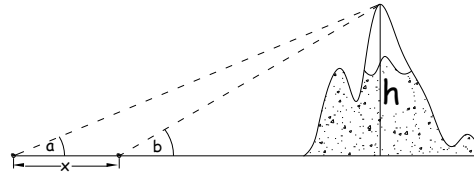
$s =$ _____

15) Smoke is spotted from Green Butte Lookout at 4:30 pm at $N56^\circ E$. At 4:36 pm, smoke is also spotted from Rooster Rock Lookout at $N 24^\circ W$. From Green Butte to Rooster Rock is 18.4 mi @ $S 64^\circ E$. With Green Butte is $(0, 0)$, what are the (x, y) coordinates of the smoke?



$(x, y) =$ _____

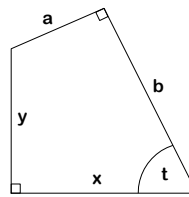
10) Find the mountain height as a function of a, b and x .



$h(a, b, x) =$ _____

$h(8.2^\circ, 12.5^\circ, 3 \text{ mi}) =$ _____

12) Find y as a function of a, b and t .



$y =$ _____

16) Give the function of the form $y = A \sin(bt - \phi) + C$ which matches each graph

