NAME GOES HERE!!!

Mat: 2410 Calc.

very cramped.
ound is mottled. Should be all white.
rying to fill every square inch, left to right
of letting the work breathe.

(3) ... solutions of the equation $\sin(3x) = \frac{1}{2}$ ... in the interval ...

Part A: $[0, 2\pi)$

* ... (Chart from ... I used ... calculate this.)

$n=0 \quad x = \frac{\pi}{18}\left(\frac{\pi}{18} + \frac{2n\pi}{3}\right) =$

$n=1 \quad x = \frac{\pi}{18} + \frac{2\pi}{3} = \frac{\pi}{18} + \frac{12}{18} = \frac{13\pi}{18}$

$n=2 \quad x = \frac{\pi}{18} + \frac{4\pi}{4} = \frac{\pi}{18} + \frac{24\pi}{18} = \frac{25\pi}{18}$

$n=0. \quad x = \frac{5\pi}{18} \quad x = \frac{5\pi}{18} + \frac{2n\pi}{3}$;

$n=1 \quad x = \frac{5\pi}{18} + \frac{2\pi}{3} = \frac{5\pi}{18} + \frac{12\pi}{18} = \frac{17\pi}{18}$

$n=2 \quad x = \frac{5\pi}{18} + \frac{4\pi}{3} = \frac{5\pi}{18} + \frac{24\pi}{18} = \frac{29\pi}{18}$

$x = \frac{\pi}{18} + \frac{2n\pi}{3} \quad x = \frac{\pi}{18} + \frac{2n\pi}{3}$

$x = \frac{5\pi}{18} + \frac{2n\pi}{3}$ These are our answers.

A) Solutions in $[0, 2\pi)$

$x = \frac{\pi}{18}, \frac{5\pi}{18}, \frac{13\pi}{18}, \frac{17\pi}{18}$

(4) Construct a cosine function that models the periodic data from the temperature table. Your model should have a period of 12 mo.

$T(x) = A\cos(B(x-C)) + D \quad T = A\cos \frac{\pi}{2} + B$ period = 12 months.

max t = July(7) min t = Jan(1) 30−10=20

$10\cos\frac{2\pi}{12}(x-7)+20$

(5) Given that $\tan(\beta) = \frac{13}{15}$ and $\sin(\beta) < 0$ find the exact values of the Other 5 trigonometric functions.

Sine & cosine = (−) tangent = (+)

$\tan(\beta)\ \frac{13}{15} \quad r = \sqrt{13^2 + 15^2} = \sqrt{169+225} = \sqrt{394}$

Sine $(\sin(\beta)) = \frac{-13}{\sqrt{394}}$ $(\csc\beta) = \frac{1}{\sin\beta} = \frac{\sqrt{394}}{-13}$

Cosine $(\cos\beta) = \frac{-15}{\sqrt{394}}$ $(\sec\beta) = \frac{1}{\cos\beta} = \frac{\sqrt{394}}{-15}$

$(\cot\beta) = \frac{15}{13}\ \frac{1}{\tan\beta}$

A) $(\sin\beta) = \frac{-13}{\sqrt{394}}$ | $(\cos\beta) = \frac{-15}{\sqrt{394}}$ | $(\tan\beta) = \frac{13}{15}$

$(\csc\beta) = \frac{\sqrt{394}}{-13}$ | $(\sec\beta) = \frac{\sqrt{394}}{-15}$ | $(\cot\beta) = \frac{15}{13}$

(6) Suppose $A = 33°$, $a = 10$ cm, and $B = 15$ cm. A) Show that there are two solutions to this triangle before solving. B) Law of Sines

$\frac{\sin(A)}{a} = \frac{\sin(B)}{b}$ $A = 33°$, $a = 10$ cm, $b = 15$ cm $(\sin(33°) = 0.5446)$

$\sin B = \frac{15 \cdot \sin(33°)}{10} = 0.816$ $\sin B = 0.8169$

Acute $= \sin^{-1}(0.816) \approx 54.32°$

Obtuse $= 180° - 54.32 \approx 125.68°$

$\sin(92.68) \approx 1$ $\frac{\sin C_1}{c} = \frac{\sin A}{a}$ $\frac{\sin C_2}{c} = \frac{\sin A}{a}$

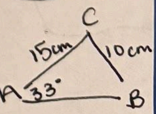
b. $B_1 = 54.32°$ $C = 180° - A - B_1 = 180° - 33° - 54.32° = 92.68$

$c = \frac{10 \cdot 1}{0.5446} \approx 18.36$ cm $B_2 = 125.68°$ $C_2 = 180° - A - B_2 = 180° - 33° - 125.68° = 21.32°$

$\sin 21.32 \approx 0.3633$ $\frac{10 \cdot 0.3633}{0.5446} = 6.67$ cm

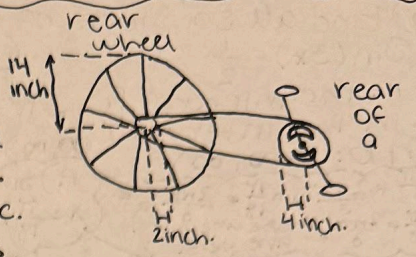
Triangle 1 = $B_1 \approx 54.32°$, $C_1 \approx 92.68°$, $c \approx 18.36$

Triangle 2 = $B_2 \approx 125.68°$, $C_2 \approx 21.32°$ $c \approx 6.67$



MAT 2410: Calc.

① The radii of the pedal sprocket, the wheel sprocket, & the wheel of the bicycle are 4 inches, 2 inches, and 14 inches, respectively. cyclist is pedaling at a rate of 1 revolution per sec. Find the speed the bicycle in ft. per sec. and miles per hour. See figure on right →



Shown Work:
Known Values:
14 inch. - bike wheel
2 inch - wheel sprocket
4 inch - pedal sprocket
1 inch - per sec.
? ft/sec and ? mph

@ 1 sec/revolution
$2\pi \times$ radius pedal spr.
$2\pi \times 4 = 8\pi$ inches

Per 1 sec = 8π inch/sec

wheel sprocket:
$\frac{4}{2} = 2$ revolutions

Circumference of rear wheel:
$2\pi \times 14$ inches $= 28\pi$ inches.

* we understand that each revolution = 2 revolutions, now we look @ distance.

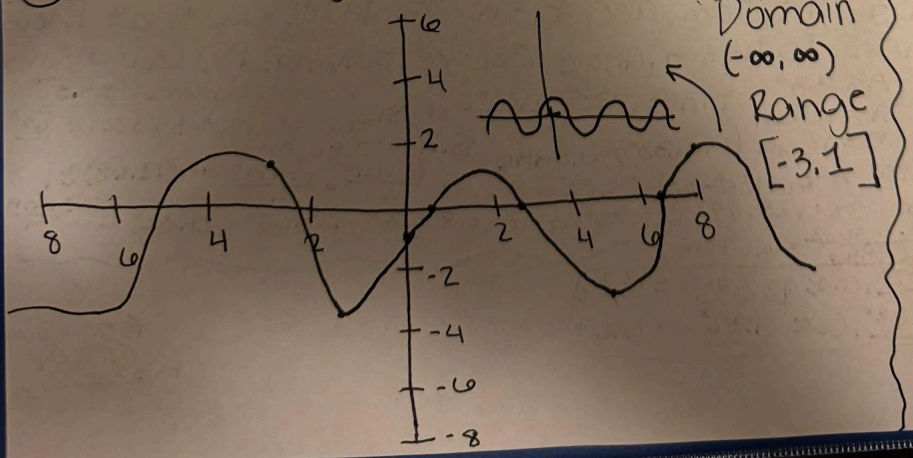
d/sec $= 2 \times 28\pi$ inch $= 56\pi$ inch./sec

Conversion ft/sec: $\frac{56\pi}{12} = 14.66$ ft/sec → $14.66 \times 0.681818 = \approx 10$ mph

Conversion mph: had to google the number for conversion! :) "

A) The speed of bike in ft/sec = 14.666 & mph = 10 mph!

② sketch the graph of $f(x) = 2\sin(\pi x) - 1$



Domain
$(-\infty, \infty)$
Range
$[-3, 1]$