$\sin(u) \to$ MIN

$u = -\frac{\pi}{2} + 2\pi n$

$h(t) \to$ MAX

$\frac{2\pi(t+1)}{7} = -\frac{\pi}{2} + 2\pi n$

$t = \frac{11}{4} + 7n$

$n = 1$

$t = -\frac{11}{4} + 7 = 4.25$

158

(0, 1.1)

(0, 0)

(1.1, 55)

(4.1, 55)

(7.1, 55)

MID: 12cm

MAX: 55cm

H(t)

AH t

$P = 3t$

$AMP = \frac{55-12}{2} = \frac{43}{2} = 21.5$

$\cos(x)$

$\cos(3x) = \frac{\pi}{2} \times \frac{3}{2} = \frac{3\pi}{2}$

$\frac{2\pi}{3t} = \frac{2\pi}{3}$ $\frac{\pi}{2} \times \frac{3}{2} = \frac{3\pi}{2}$

$\cos\left(\frac{2\pi}{2}\right) = \cos\left(\frac{2\pi}{3}t\right) = \frac{3\pi}{2}$

(0, 1)(½, 0) MID: 33.5

sin cos

$S(\frac{3\pi}{2}) \sin(\frac{2\pi}{3}) \frac{3\pi}{2}$

$\sin\left(\frac{2\pi}{2}\right) = \frac{\pi}{2} \times \frac{21}{3\pi} = \frac{2\pi}{6\pi}$

$\sin\left(\frac{2\pi}{3}\right) = \frac{1}{3}$

$21.55\sin\left(\frac{2\pi}{3}(t-1.1)\right) + 33.55$

(1.1, 33.55)

cos

(1.1, 55)

$\cos(3x) = \frac{2\pi}{3}$

$\cos\left(\frac{2\pi}{3}t\right) = \frac{\pi}{2} \times \frac{3}{2\pi} = \frac{3\pi}{4\pi}$

$\cos\left(\frac{2\pi}{3}t\right) = \frac{3}{4}t$ ✓

$21.55\cos\left(\frac{2\pi}{3}(t-1.1)\right) + 33.55$

$t = 0$ 16/09/18 159

AVG = −20cm

$t = 0.2$ AVG

AMP = 5

MAX = AVG + 5 = −15

MIN = AVG − 5 = −25

P = 2 seconds

$\sin(x) \to \sin(2x)$

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

$\sin(\pi t) = \frac{\pi}{2} \times \frac{1}{\pi} = \frac{\pi}{2\pi}$

$\sin(\pi x) = \frac{1}{2}$

$3\sin(\pi(t+0$

$5\sin(\pi(t-0.2)) - 20$

$5\sin(\pi(t-0.2)) - 20$

$5\sin(\pi(t-0.2\pi)) - 20$

0.6

(0, 13.33)

$P = 2 \times 2$ $\frac{2\pi}{4} = \frac{\pi}{2}$

$H(0) = 5\sin\left(\frac{2\pi}{4}u\right) - 20$

$H(t) = 5\sin\left(\frac{2\pi}{4}(t-0.2)\right) - 20$

$H(t) = 5\sin\left(\frac{2\pi}{4}(t-0.2)\right) - 20$

$H(0.6) = 5\sin\left(\frac{2\pi}{4}(0.6-0.2)\right) - 20$

≈ 17.06

$\sin\left(\frac{2\pi}{4}\right) = \frac{\pi}{2} \times \frac{4}{2\pi} = \frac{4\pi}{4\pi}$

$\sin\left(\frac{2\pi}{4}t\right) = 1t$ (0, 0) (1, 1)

$5\sin\left(\frac{2\pi}{4}t\right)$ (0, 0)(1, 5)

$5\sin\left(\frac{2\pi}{4}(t-0.2)\right) - 20$

(−0.2, −20)(0.8, −15)

$5\sin\left(\frac{2\pi}{4}(0.6-0.2)\right) - 20$

(0, 4,

$5\sin\left(\frac{2\pi}{4}(0.4)\right) - 20$

$\sin\left(\frac{2\pi \times 0.4}{4}\right) = \left(\frac{0.8\pi}{4}\right)$

$\sin\left(\frac{0.8\pi}{4}\right) = \frac{\pi}{2} \times \frac{4}{0.8\pi}$

$\sin\left(\frac{0.8\pi}{4}\right) = \frac{4\pi}{1.6\pi} = \frac{4}{\frac{16}{10}}$

$\sin\left(\frac{0.8\pi}{4}\right) = \frac{40}{16} = 2.5t$

(0, 0)(2.5, 1)

5 = 5 = 12.5 − 20

−2.5 MID = −20

P = 4 AMP = 5

$u = 0$ ++, $\sin(x)$

$f(u)$, $\sin(u) = 2\pi$

$\frac{4}{2\pi}$ $\frac{2\pi}{4}u$

(t − 0.2)

(0.6 − 0.2)

0.2 $\frac{4\pi}{2\pi}$

$\sin\left(\frac{2\pi}{4}\right) = \frac{\pi}{2} \times \frac{4}{2\pi} = \frac{4\pi}{4\pi} = 1$

$\frac{1}{10} = 0.1$ $\frac{5}{0.1} = 50$

$\frac{3}{0.4}$ $\frac{1}{4} = 0.25$

$\frac{5}{0.25} = 20 = \frac{5}{20}$

0.4 $\frac{5}{20}$ t

$0.06 + 15 = 17.06$

$\frac{20}{2} = 10$ $\frac{1}{10} = 0.1$

$0.1 \times 0.6 = 0.06$

(0, 2)(0.2, 20)

(0, 4)

(0, 4)

$1/5 = 0.2$

$20 + 15 = 1$

$1/10 = 0.1$

$15/100 = 1.5$ 0.15

$5/10 = 0.5$

$0.5 + 1.5 = 2$

(0.4, 17)

$\frac{9.6}{1.1}$ 0.2×2^{t}

$5\sin\left(\frac{2\pi}{4}(t-0.2)\right) - 20$

$5\sin\left(\frac{2\pi}{4}(0.4)\right) - 20$

[(0, 2)(20)]

$\sin\left(\frac{2\pi}{4}(0.4)\right) = \sin(2\pi)$

$\sin(2\pi) = \frac{\pi}{2} \times \frac{1}{2\pi} = \frac{\pi}{4\pi}$

$\sin(2\pi) = \frac{1}{4} = 0.25$

$5 \times 0.25 = 1.25 - 20$

$= 18.75$

5

(0, 0) (0.4, −20) (0.4, −20)

(1, 4) (0.2, −20) 0.2 1.2 (0, 0)

$P = 4$ $4/4 = 1$

$1/10 = 0.1$ $\times 4 = 0.4$

$5/10 = 0.5$ $\times 4 = 2$

$\frac{+0.6}{10} = 2.06 = 17.06$ ✓

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$L(t) = 727 + 22\sin\left(\frac{2\pi(t-80.75)}{365}\right)$

$22\sin\left(\frac{2\pi(t-80.75)}{365}\right) + 727$

22 = AMP 727 = MID

$P = \frac{2\pi}{\frac{2\pi}{365}} = \frac{2\pi \cdot 365}{2\pi} = 365$

$L(t)$ = minutes of day

MAX = 749 MIN = 705

274.5 to MAX

$t = 364/4 = 91.25$

$91.25 \times 2 = 182.5$

$80.75 + 11.50 = $ MIN

$182.5 + 10.5 = 193.0$

$\frac{2\pi(t-80.75)}{365} = \frac{\pi}{2} + 2\pi n$

$t - 80.75 = 91.25 + 365n$

$t = 172 + 365n$ ✓

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$\frac{7\pi}{2}$ to $\frac{13\pi}{2}$

$\frac{13\pi - 3\pi}{2} = \frac{8\pi}{2}$

$\sin^{-1}(0.95) = 1.25$

$-\pi \leq x \leq \pi$

$\sin(\theta) = \sin(\pi - \theta)$

$\sin(\theta) = \sin(\theta - 2\pi)$

$x = 1.25 + n \cdot 2\pi$

$x = 1.89 + n \cdot 2\pi$

$x = 1.25 + n \cdot 2\pi$

n1 7.53 N

2 13.82 Y

3 20.10 Y

4 26.38 N

$x = 1.89 + n \cdot 2\pi$

N1 8.17 N

2 14.46 Y

3 20.74 N ✓

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0w

0 → 15 11:55

MAX $3N_m$

0 − 1.45 MIN $-3N_m$

TORQUE T

$AMP = \frac{3-(-3)}{2}$

$AMP = \frac{16}{2} = \frac{6}{2}$

AMP = 3

$P = 60$ $\frac{2\pi}{60}$

MID = 3 − 3 = 0

60 ÷ 4 = 15

$\sin\left(\frac{2\pi}{60}\right) = \frac{\pi}{2} \times \frac{60}{2\pi} = \frac{60\pi}{4\pi} = 15$

(0, 0)(15, 1)

$3\sin\left(\frac{2\pi}{60}\right) = (0, 0)(15, 3)$

$3\sin\left(\frac{2\pi}{60}(t + 0.5)\right)$

$3\sin\left(\frac{2\pi}{60}(t+5)\right) = (0, 0)$ (15, 3)

$3\sin\left(\frac{2\pi}{60}t + \frac{10\pi}{60}\right)$

$P = 60 \times 2$ $\frac{2\pi}{120}$

$3\cos\left(\frac{2\pi}{60}(t+5)\right) = (0, 3)$

$3\sin\left(\frac{2\pi}{60}(t-5)\right)$ ✓✓

11:55 12

−5 0

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MARCH South Pole

DAY TEMPERATURE

MAX −30°C 2 p.m.

MIN −54°C 2 a.m.

2AM 2PM t+2

$P = 24h$ $\frac{2\pi}{24}$

$AMP = \frac{30-(-54)}{2} = \frac{24}{2} = 2$

MID = −54 + 2 = −52°C

$P = 12 \times 2 = 24h$

$\frac{2\pi}{24}h = P$

MIN

$\cos(x)$ (0, 1) $\cos\left(\frac{2\pi}{24}\right)$

$\cos\left(\frac{2\pi}{24}\right) = \frac{\pi}{2} \times \frac{24}{2\pi} = \frac{24\pi}{4\pi}$

= 6 (0, 1)(6, 0)