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

(0,0)(6,1)

~~$2\sin\left(\frac{2\pi}{24}\right) - 52$~~ cos = (0,1)(5,0)

~~(0,-52)(6,-50)~~

$2\cos\left(\frac{2\pi}{24}\right) - 52$

~~(2,-52)~~ (0,-50)(6,-52)

$2\cos\left(\frac{2\pi}{24}(t)\right) - 52$

0 → 2pm -50°C

2PM → 2am -54°C

P = 12h ×2

MAX → MIN

P = 12 × 2 = 24h

$\frac{2\pi}{24h}$ cos(x) MID=-52

$AMP = \frac{-50-(-54)}{2} = \frac{4}{2} = |2|$

$2\cos\left(\frac{2\pi}{24}t\right) - 52$

$2\cos\left(\frac{2\pi}{24}(t+10)\right) - 52$

t = 14 MAX

t = 2 MIN

$+2\cos\left(\frac{2\pi}{24}(t-4)\right) - 52$

~~(0,-54)~~

$2\cos\left(\frac{2\pi}{24}(t-6)\right) - 52$

(0,50)(0,-52)

~~$2\cos\left(\frac{2\pi}{24}(2-6)\right) - 52$~~

~~(0,-50)(2,-52)~~

$2\sin\left(\frac{2\pi}{24}(2-6)\right) - 52$

(0,-52)(2,-50)

$-2\sin\left(\frac{2\pi}{24}(2-6)\right) - 52$

(0,-52)(2,-54)

~~$-2\sin\left(\frac{2\pi}{24}(5-6)\right) - 52$~~

~~(5,~~ 5PM

2pm

$\frac{12h}{2} = 6$

12h 2am

2pm+6=18

~~18 = 24~~ ~~18 = min~~ 18 = MID = -52

$\frac{2\pi}{24} / 2 = \frac{\pi}{12} = \frac{\pi}{2} \times \frac{12}{\pi} =$

~~$P = \frac{12\pi}{2\pi} = 6$~~

$-2\sin\left(\frac{2\pi}{24}(17-6)\right) - 52$

~~(17,~~

~~2sin~~

$T(6) = 2\cos\left(\frac{2\pi}{24}(17-14)\right) - 52$

0 → 2pm = max -50

~~0~~ → 2am = min -54

sin cos

u=0 MAX u=2pm

$T(t) = 2\cos\left(\frac{2\pi}{24}(17-14)\right) - 52$

T(t) = -50,59°C

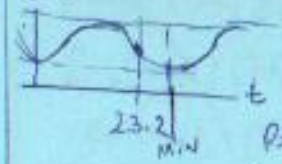
INTERNATIONAL SPACE STATION 164

t AFTER PERIGEE (MIN) IN KM

$A(t) = 415 - \sin\left(\frac{2\pi(t+23.2)}{92.8}\right)$

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

u=0 u=t u=MIN-t



P = 92.8 min

$-\sin\left(\frac{2\pi}{92.8}(t+23.2)\right) + 415$

~~(0,~~ (23.2, 415)(0,414)

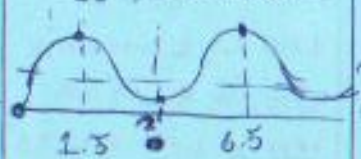
AMP = |-1| = 1

t = 0 TRONQUE PARTOUT 165

t = 1.5 L = 12cm

t = 6.5 L = 12cm

t = ? L = 4cm



$P = |1.5 - 6.5| =$ ~~|-4.5|~~

~~$P = |-4.5| = 4.5$~~

t = 1.5 12cm

cos(x) $\frac{2\pi}{4.5}$

$AMP = \frac{12-4}{2} = \frac{8}{2} = 4$

MID = 12 - 4 = 8

$\cos\left(\frac{2\pi}{4.5}(t)\right) = \frac{\pi}{2} \times \frac{4.5}{2\pi}$

$\cos\left(\frac{2\pi}{4.5}t\right) = \frac{4.5\pi}{4\pi} = \frac{9}{8}$

$\cos\left(\frac{2\pi}{4.5}t\right) = (0,1)(\frac{1}{8},0)$

$4\cos\left(\frac{2\pi}{4.5}t\right) = (0,4)(\frac{1}{8},0)$

$4\cos\left(\frac{2\pi}{4.5}t\right) + 8 = (0,12)(\frac{1}{8},$

~~$4\cos\left(\frac{2\pi}{4.5}(t-1.5)\right) + 8$~~

(-1.5,12)(-1.325,8)

(0,0)(1.5,12)

sin(x) (0,0)(5,1)

$\sin\left(\frac{2\pi}{4.5}t\right) = (0,0)(\frac{1}{8},1)$

$4\sin\left(\frac{2\pi}{4.5}t\right) (0,0)(\frac{1}{8},4)$

$4\sin\left(\frac{2\pi}{4.5}(t-1.5)\right) + 8$

~~(0,8)(~~

~~(-1.5,8)(1.5,12)~~

$4\cos\left(\frac{2\pi}{4.5}(t-1.5)\right) + 8$

~~(0,~~ ~~(1.5,12)(1.5~~

~~(1.5,12)(~~

(1.5,12)(2.625,8)

P = 4.5 + 6.5 = 5

$4\cos\left(\frac{2\pi}{5}(t-1.5)\right) + 8$

$\frac{2\pi}{5} = \frac{\pi}{2} \times \frac{5}{2\pi} = \frac{5\pi}{4\pi}$

$\frac{5}{4} = 1,125$

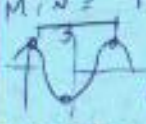
$4\cos\left(\frac{2\pi}{5}(t-1.5)\right) + 8$

166

MAX = -27

P = 3s u = 1.3

MIN = -44



$AMP = \frac{-27+44}{2}$

$AMP = \frac{17}{2}$

AMP = 8.5

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

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

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

MID = -27 + 8.5 =

MID = 18.5

~~$8.5\cos\left(\frac{2\pi}{3}(t-3)\right) + 18$~~

MID = -27 - 8.5 = 35.5

~~$8.5\cos\left(\frac{2\pi}{3}(t-3)\right) + 35.5$~~

$8.5\cos\left(\frac{2\pi}{3}(t-1.3)\right) + 35.5$

$8.5\cos\left(\frac{2\pi}{3}(2.5-1.3)\right) - 35.5$

= 42,3766445

167

$T(x) = \frac{2}{1000}\sin\left(\frac{2\pi}{P}(t-0.2)\right)$

~~P(t) MID = 0,002~~

MID = 0

168

T(t) TEMPERATURE

DAILY LOW

P = 365 DAYS

JULY 26 = MAX 78°F

+ HALF YEAR = MIN 99°F

JULY 26 = $\frac{206}{365}$ YEAR

AFTER JANUARY 1.

cos(x) MAX

$P = \frac{2\pi}{365}$ $\cos\left(\frac{2\pi}{365}t\right)$

$\cos\left(\frac{2\pi}{365}t\right) = \frac{\pi}{2} \times \frac{365}{2\pi}$

$\cos\left(\frac{2\pi}{365}t\right) = \frac{365\pi}{4\pi} = 91,25$

$AMP = \frac{78-49}{2} = \frac{29}{2} = 14,5$

MID = 78 - 14,5 = 63,5

~~$14.5\cos\left(\frac{2\pi}{365}(t-\frac{206}{365})\right) + 63.5$~~

P = 1 $\frac{365}{365}$

$14.5\cos\left(2\pi\left(t-\frac{206}{365}\right)\right) + 63.5$

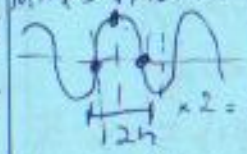
MIN 3°C

MAX 18°C

169

MID = 10 AM, 10pm

MAX = AFTERNOON



×2 = 24

P = 24 $\frac{2\pi}{24}$ MID = 10.5

$AMP = \frac{18-3}{2} = \frac{15}{2} = 7.5$

$7.5\sin\left(\frac{2\pi}{24}(t-10)\right) + 10.5$

170 18/08/18

$T(t) = 24 - 5.5\sin\left(\frac{2\pi}{24}(t+2)\right)$

$-5.5\sin\left(\frac{2\pi}{24}(t+2)\right) + 24$

~~AMP = 24~~ AMP = |-5.5|

AMP = 5.5

MAX = 24 + 5.5 = 29.5

MIN = 24 - 5.5 = 18.5

MIN = 5 AM

171

MIN = 3°C

MAX = 18°C

~~AMP~~ P = 12 × 2

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

$AMP = \frac{18-3}{2} = \frac{15}{2} = 7.5$

AMP = |7.5| = 7.5

MID = 18 - 7.5 = 10.5

sin(x) $\sin\left(\frac{2\pi}{24}t\right)$

$7.5\sin\left(\frac{2\pi}{24}t\right) + 10.5$

(0,0)(6,18)

$7.5\sin\left(\frac{2\pi}{24}(t-10)\right) + 10.5$

(10,10.5)(16,18)

(10,10.5)(16,18)

172

MAX = 0.01 Nm

MIN = -0.01 Nm

MAX = 1.2 m(s)

$MAX_2 = 0.3$ m

$AMP = \frac{0.01-(-0.01)}{2}$

$AMP = \frac{0.02}{2} = |0.01| = 0.$

P = 1.2 m $\frac{2\pi}{1.2}$

0 = MAX cos(x) $\cos\left(\frac{2\pi}{1.2}\right)$

$\cos\left(\frac{2\pi}{1.2}t\right) = \frac{\pi}{2} \times \frac{1.2}{2\pi} = \frac{1.2\pi}{4\pi} = 0$

(1,0)($\frac{7}{10}$,0) MID = 0

$0.01\cos\left(\frac{2\pi}{1.2}(t-0.3)\right) + 0$

$\frac{1}{100}\cos\left(\frac{2\pi}{1.2}(t-\frac{3}{10})\right)$

$T(t) = 0.01\cos\left(\frac{2\pi}{1.2}(t-\frac{3}{10})\right)$

$D(t) = -25\sin(\pi(t+0.23))$

MID = $\frac{\pi}{2} \times \frac{2}{\pi} = \frac{\pi}{2\pi}$

(0.77,50)($\frac{1}{2}$+$\frac{23}{10}$,50)

$\frac{1}{2} + \frac{23}{10} = \frac{50+23}{100} = \frac{73}{100} = 0.73$

MIN = 27 MAX = 73

MIN = 2.8 MID = 50

MID = 0.73

2022/10/14