$$y = -20\sin\left(\frac{2\pi}{16}x\right)$$

amp

$|-20|$

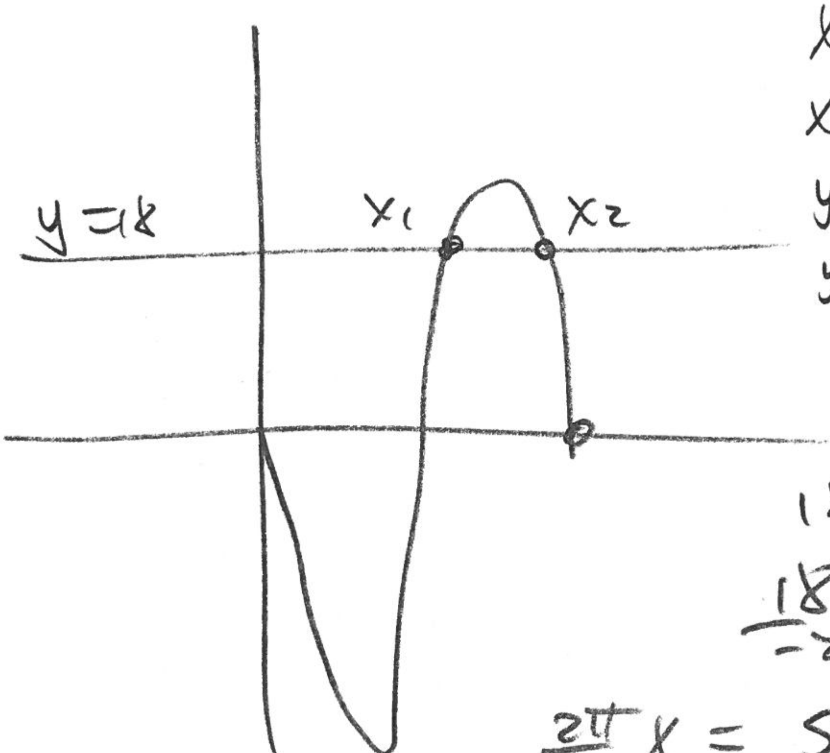
20

$PL = 16$

① $a = -20 \rightarrow amp = 20$

② $\frac{2\pi}{16} = b \rightarrow PL = 16$ or $\frac{2\pi}{\left(\frac{2\pi}{16}\right)} = \frac{2\pi}{1} \cdot \frac{16}{2\pi}$

$$\boxed{PL = 16}$$



$x_{min} = 0$
$x_{max} = 16$
$y_{min} = -25$
$y_{max} = 25$

exact

$$18 = -20\sin\left(\frac{2\pi}{16}x\right)$$

$$\frac{18}{-20} = \sin\left(\frac{2\pi}{16}x\right)$$

$$\frac{2\pi}{16}x = \sin^{-1}\left(\frac{-18}{20}\right)$$

$$x = \frac{16}{2\pi}\sin^{-1}\left(\frac{-18}{20}\right)$$

not ok

③ Solutions

So $X = \frac{16}{2\pi} \sin^{-1}\left(\frac{-18}{20}\right) \approx -2.851$

$$\boxed{X_2 = 16 + -2.851 = 13.149}$$

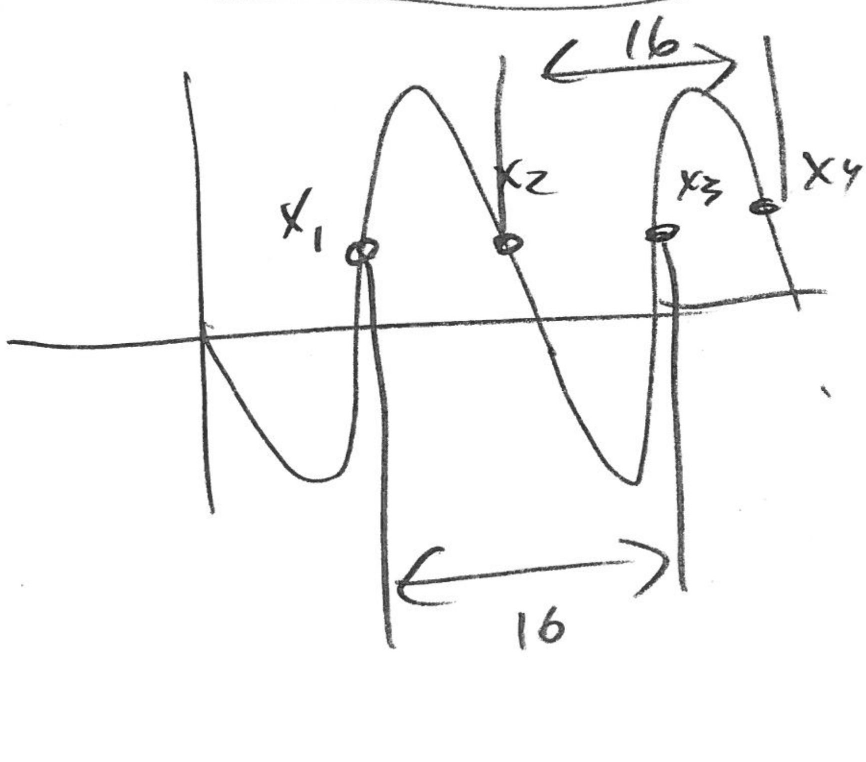
$$\boxed{X_1 = 8 + \frac{16}{2\pi}\sin^{-1}\left(\frac{18}{20}\right) \approx 10.851}$$

positive

So 1st 2 positive solutions

#3

$$\boxed{\begin{aligned} X_1 &= 10.851 \\ X_2 &= 13.149 \end{aligned}}$$



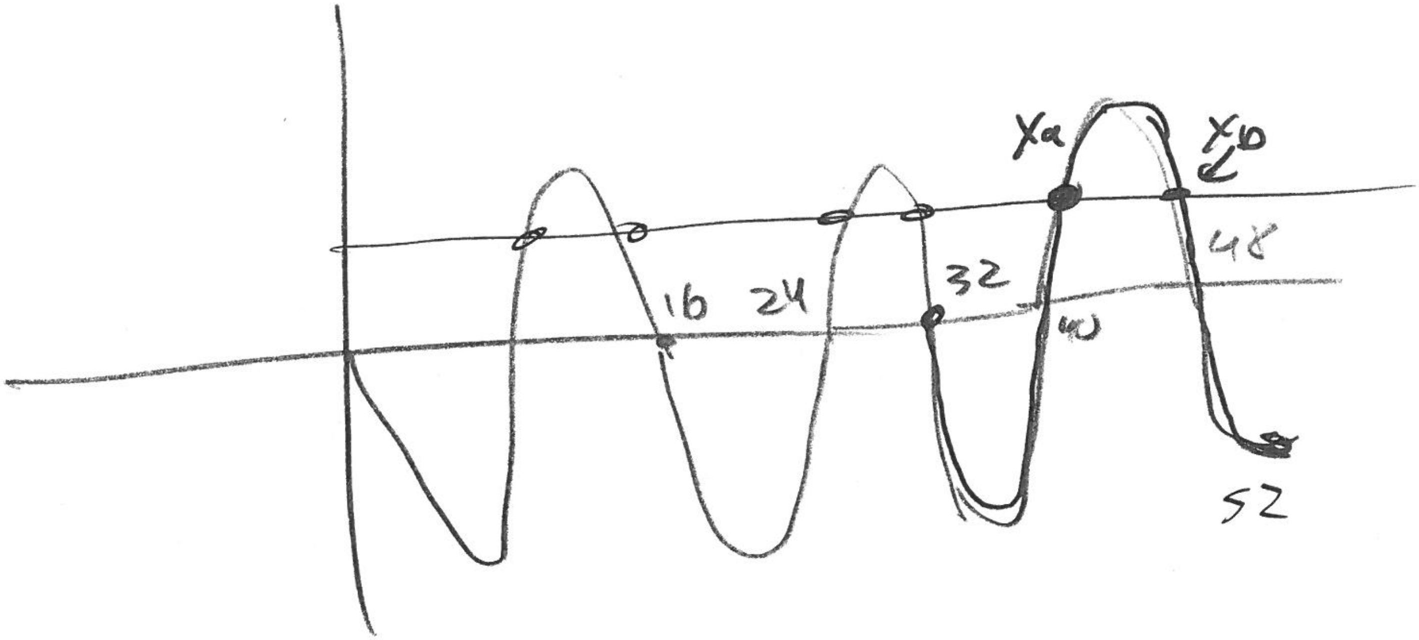
#4

All solutions

$$X = \begin{cases} 10.851 + 16n \\ 13.149 + 16n \end{cases}$$

$n \in \mathbb{Z}$

⑤ Solutions over [32, 52]



two solutions

X_{min} 32 $\rightarrow$ $32 = 10.851 + 16n$

$32 - 10.851 = 16n$

$\frac{32-10.851}{16} = \frac{16n}{16}$

$n = 1.32$

round up

$n = 2$

$X = 10.851 + 16(2)$

$\boxed{X = 42.851}$

(5) second solution

$52 = 13.145 + 16n$

$52 - 13.145 = 16n$

$\frac{52 - 13.145}{16} = \frac{16n}{16}$

$n = 2.428$

round down

$x_{2nd} = 13.145 + 16(2)$

$\boxed{x_{2nd} = 45.145}$

So 2 solutions are

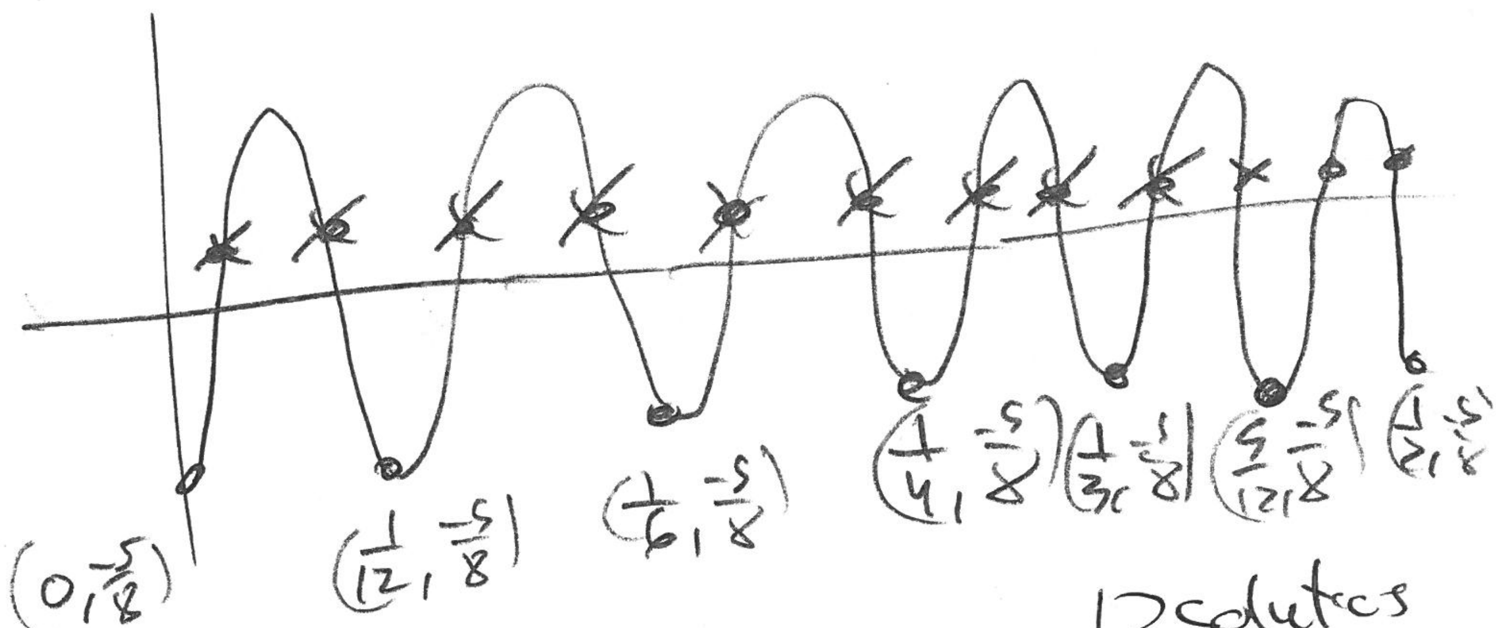
$x = \{42.851 \text{ \& } 45.145\}$

are $x \in [32, 52]$

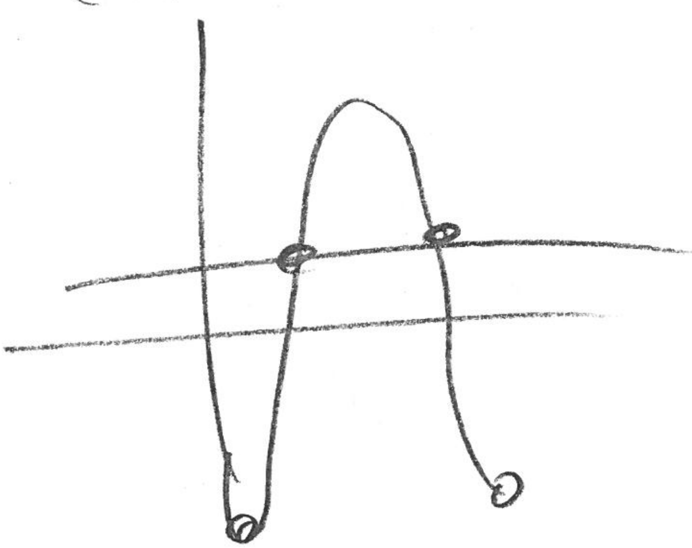
$f(x) = \frac{-5}{8}\cos(24\pi x)$

② $\boxed{amp = |a| = \left|\frac{-5}{8}\right| = \frac{5}{8}}$

① $\boxed{PL = \frac{2\pi}{b} = \frac{2\pi}{24\pi} = \frac{1}{12}}$



12 solutions over $x \in [0, \frac{1}{2}]$



Xmin 0
xmax $\frac{1}{12}$
ymin -1
ymax = 1

2 solutions over $[0, \frac{1}{12}]$

Exact solutions

$0.2 = \frac{-5}{8} \cos(24\pi x)$

$\frac{0.2}{1} \cdot \frac{8}{-5} = \cos(24\pi x)$

$-\frac{1.6}{5} = \cos(24\pi x)$

$24\pi x = \cos^{-1}\left(-\frac{1.6}{5}\right)$

$\boxed{x = \frac{1}{24\pi} \cos^{-1}\left(-\frac{1.6}{5}\right)}$ → calculate will give $+\angle$ because ever Id

$\boxed{x_1 = 0.025}$

$x_2 = \frac{1}{12} - 0.025$

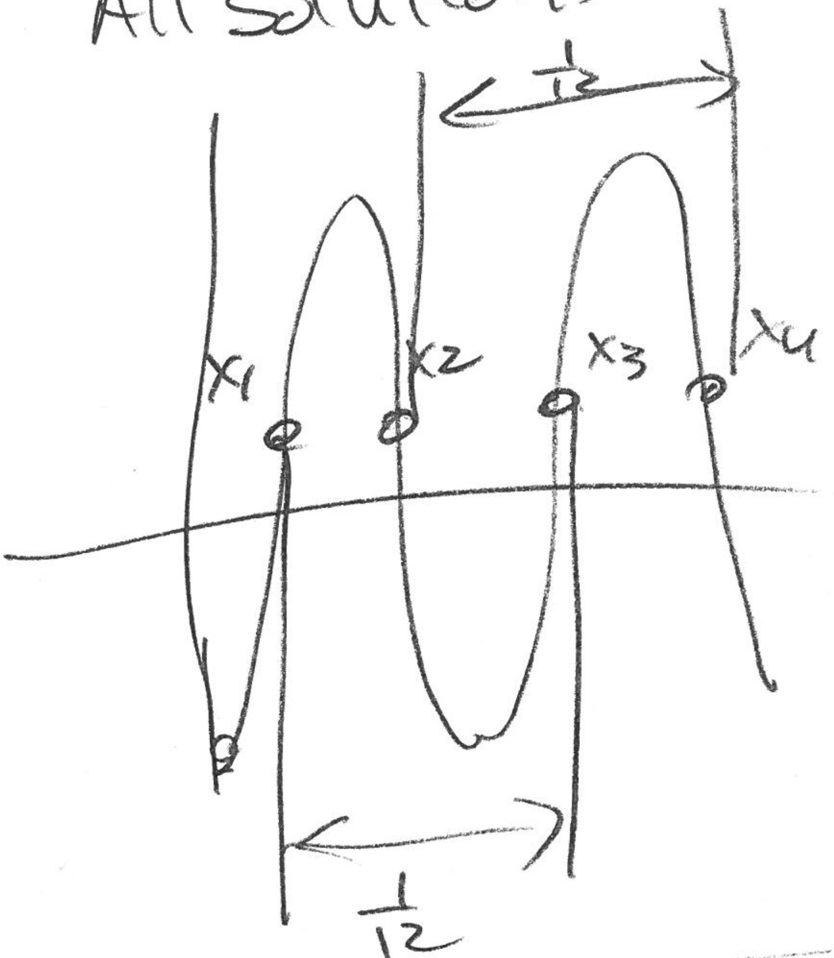
$\boxed{x_2 = 0.058}$

So 1st 2 positive solutions

$\boxed{x_1 = 0.028 \quad x_2 = 0.058}$

#3 →

All solutions

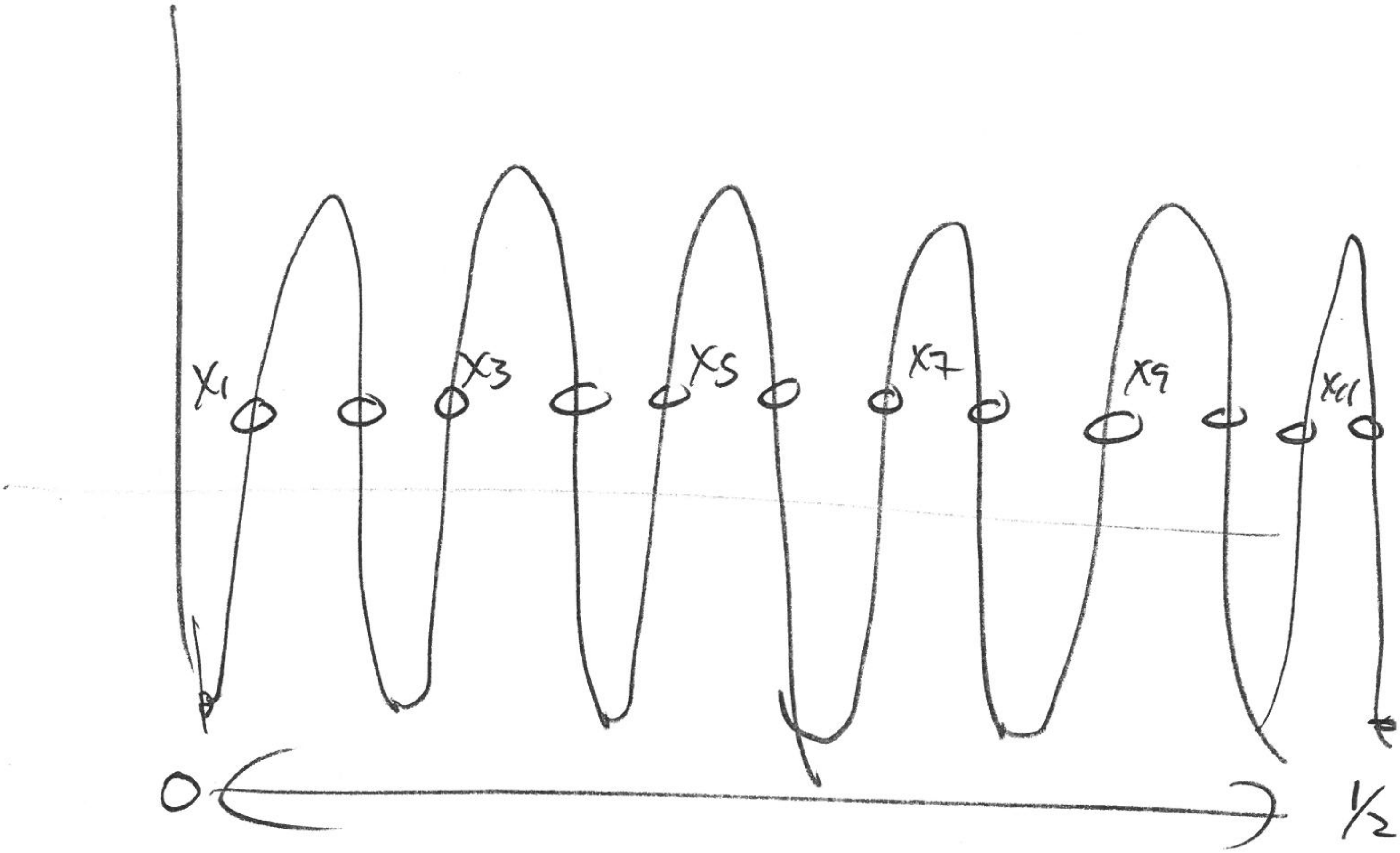


$$x \in \begin{cases} 0.025 + \frac{1}{12}n \\ 0.058 + \frac{1}{12}n \end{cases} \quad n \in \mathbb{Z}$$

all solutions ↗

#9

Recall



There are 12 solutions over this $x \in [0, \frac{1}{2}]$ $n \in \{0, 1, 2, 3, 4, 5\}$

$x_{ODD} = 0.025 + \frac{1}{12} n$

$$\boxed{x_{ODD} = \{0.025, 0.108, 0.192, 0.275, 0.358, 0.442\}}$$

6 of 12 solutions

other 6 solutions

$x_{even} = 0.058 + \frac{1}{12} n$

$x_{even} \{0.058, 0.141, 0.225, 0.308, 0.391, 0.475\}$

$$f(x) = 16 \sin\left(\frac{2\pi}{20} x\right)$$

$\downarrow$

a

$$\boxed{|a| = \text{amp} = |16| = 16}$$

when $b = \frac{2\pi}{20} \longrightarrow PL$

or $\boxed{PL = \frac{2\pi}{b} = \frac{2\pi}{\left(\frac{2\pi}{20}\right)} = \frac{\cancel{2\pi}}{1} \cdot \frac{20}{\cancel{2\pi}} = 20}$