

1

- | | | |
|---------|---------|---------|
| (a) Yes | (c) No | (e) Yes |
| (b) Yes | (d) Yes | (f) Yes |

2. $f(x) = \sin x$

Phase shift = 60° (60° to the right)

$$y = 20$$

$$y = \sin(x - 60) + 20$$

3 Period = 40 seconds

amplitude = 3

$$y = -3$$

$$y = 3 \sin(x + 40) - 3$$

using $a \sin(bx - c) + d$ to find variables

$$a = 3$$

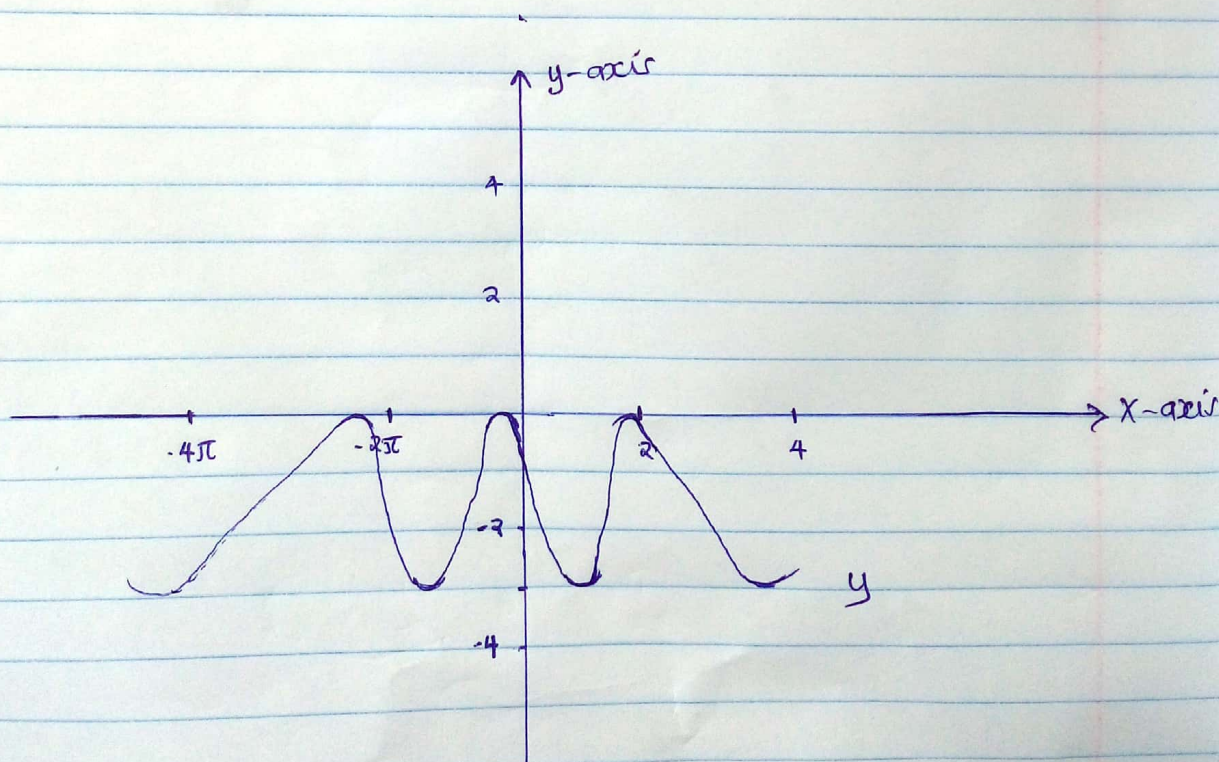
$$b = 1$$

$$c = -40$$

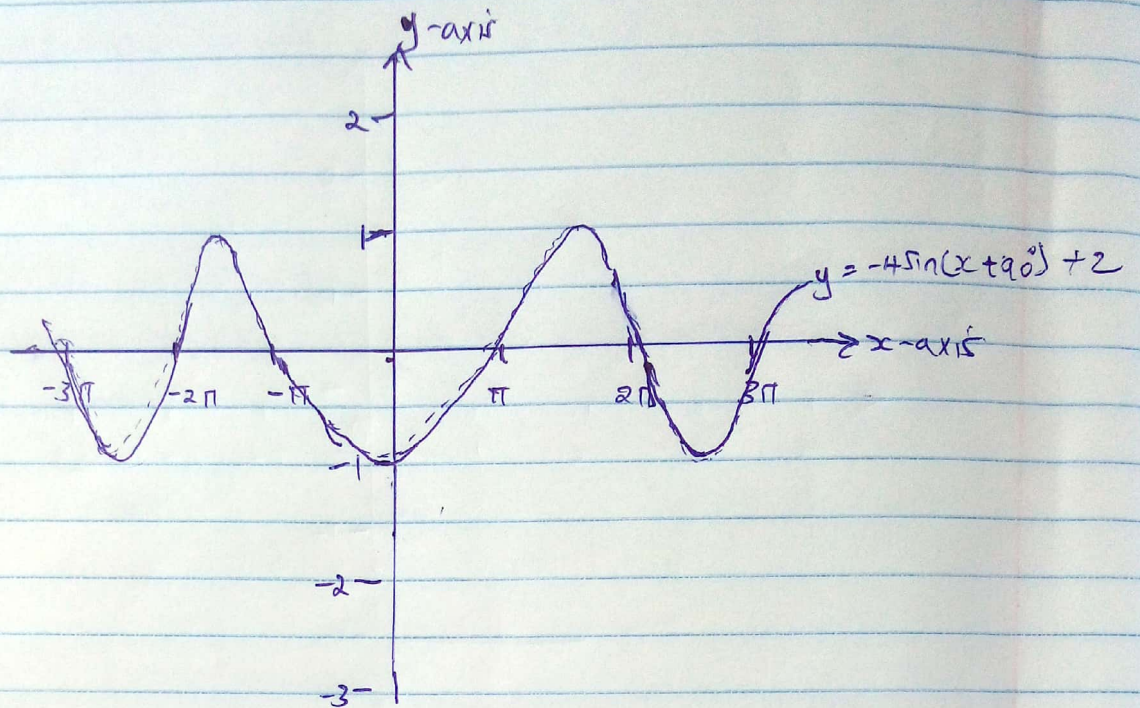
$$d = -3$$

Domain $(-\infty, \infty)$

Range $[-6, 0]$



4
(9)



x, y	x	y	Image pointer
$(0, 0)$	0	-1	$(0, -1)$
$(90, 1)$	90	-1	$(90, -1)$
$(180, 0)$	180	0	$(180, 1)$
$(270, -1)$	270	1	$(270, 1)$
$(360, 0)$	360	0	$(360, 0)$

(b) Domain $(-\infty, \infty)$

Range $(-2, 6)$

57

a) $y = 5 \sin \frac{2\pi}{6.5} x + 9$

$2\pi r - x$ for rotations
 $8 + x \frac{2\pi}{P} \text{ rev} = 1$

b) Amplitude = 5 metres

$2 = \text{amplitude}$

c) $\frac{2\pi}{6.5} \approx 5 \text{ seconds}$

$\frac{2\pi}{P} = \text{frequency}$

d) 5 metres high from the ground

(e) $y = 5 \sin \frac{2\pi}{6.5} x + 9$

$y = 5 \sin \frac{2\pi}{6.5} (25) + 9$

$= 4.885$

$= 5 \text{ Revolutions}$

f $\text{Speed} = \frac{2\pi r}{P}$

where; $r = 5$

$\pi = 3.14$

$P = 55 \text{ sec}$

$\frac{2 \times 3.14 \times 5}{55}$

$= 0.571 \text{ m/s}$

6

(a) Equation of x-axis

$$y = 6 \sin \frac{\pi}{9} x + 8$$

b) Amplitude = 6

c) Period = $\frac{\pi}{9}$

$$7. y = -\frac{1}{2} \sin(x - 25^\circ) - 14$$

$$y = \sin(x)$$

Combine $\sin(x - 25^\circ)$ and $\frac{1}{2}$,

$$y = -\frac{\sin(x - 25^\circ)}{2} - 14$$

assume that, $y = \sin(x)$ is $f(x) = \sin(x)$ and

$$y = -\frac{1}{2} \sin(x - 25^\circ) - 14$$

$$g(x) = -\frac{\sin(x - 25^\circ)}{2} - 14$$

$$f(x) = \sin(x)$$

$$g(x) = -\frac{\sin(x - 25^\circ)}{2} - 14$$

using the form $a \sin(bx - c) + d$ to find variables i.e. amplitude, period, phase shift, and vertical shift.

$$a = -\frac{1}{2}$$

$$b = 1$$

$$c = 25^\circ$$

$$d = -14$$

For amplitude $|a|$

$$\text{amplitude} = \frac{1}{2}$$

phase shift = 25° (25 to the right)

$$\text{Period} = \frac{360}{|b|}$$

Vertical shift d

$$= -14$$

$$= \frac{360}{1}$$

$$= 360$$

8

$$y = 6 \sin(x - 50^\circ) + 15$$

Amplitude	$(x) \sin = 11$ $= 6$
Period	$2\pi = \frac{(x - 50^\circ) \sin = 11}{6}$
Equation of axis	$y = 6 \sin(x - 50^\circ) + 15$
Phase shift	50 (50 to the right)
Range	$[9, 21]$

$$d = 0$$

$$p = 1$$

$$c = 32$$

$$q = -14$$

for amplitude

$$\frac{1}{6} - \text{amplitude}$$

$$\frac{(x - 50^\circ) \sin = 11}{6}$$

$$\frac{360}{11}$$

$$11$$

$$360$$

$$1$$