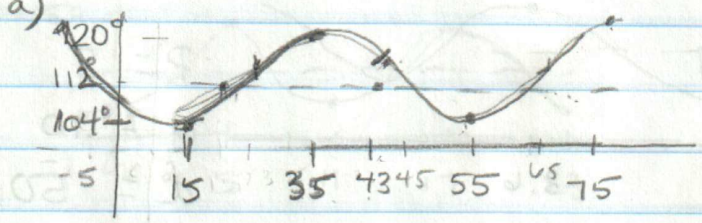
① a)



$\frac{2\pi}{b} = 40$

$P = 40 \quad b = \frac{\pi}{20}$

$a = 8$

$c = 35$

$d = 112°$

b) $T = 8\cos\frac{\pi}{20}(t-35) + 112°$

c) $= 8\cos\frac{\pi}{20}(-35) + 112°$

$T = 117.657°$

d) $114 = 8\cos\frac{\pi}{20}(t-35) + 112°$

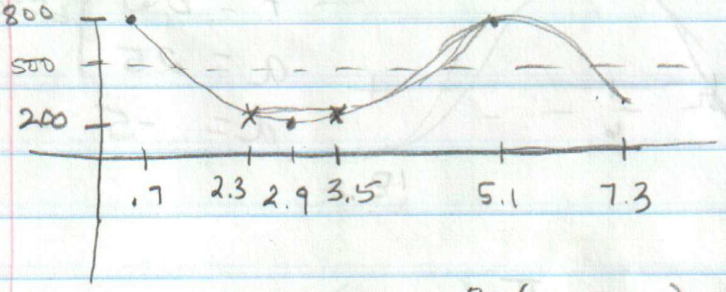
$\frac{1}{4} = \cos\frac{\pi}{20}(t-35)$

$\cos^{-1}\frac{1}{4} = \frac{\pi}{20}(t-35)$

$1.318 = \frac{\pi}{20}(t-35)$

$t = 43.39, 23.39, 3.39$

② a)



$P = 4.4 = \frac{2\pi}{b} \quad b = 1.43$

$a = 300$

$d = 500$

b) $t = 300\cos\frac{2\pi}{4.4}(t-.7) + 500$

d) $300 = 300\cos\frac{2\pi}{4.4}(t-.7) + 500$

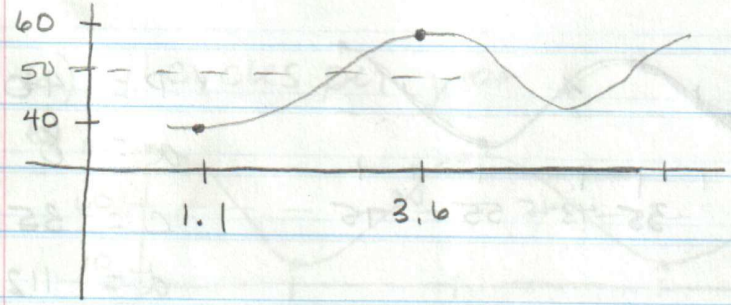
$-2.3 = \frac{2\pi}{4.4}(t-.7)$

$t = 2.3, 3.5$

2.3

c) ≈ 200

(3) a)



$P = 5 \quad \frac{2\pi}{b} = 5 \quad b = \frac{2\pi}{5}$

$a = 10$

$d = 50$

b) $h = -10 \cos \frac{2\pi}{5}(t - 1.1) + 50$

c) max: 3.6, 8.6, 13.6, 18.6

min: 1.1, 6.1, 11.1, 16.1, 21.1

$\approx 4\,B$

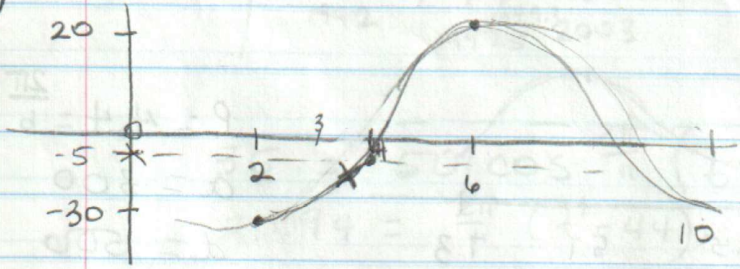
$h = -10 \cos \frac{2\pi}{5}(14.1) + 50 = 48.126\,cm$

d) $h = -10 \cos \frac{2\pi}{5}(-1.1) + 50$

$h = 48.126\,cm$

(4)

a)



$P = 8 \quad \frac{2\pi}{b} = 8 \quad b = \frac{\pi}{4}$

$a = 25$

$d = -5$

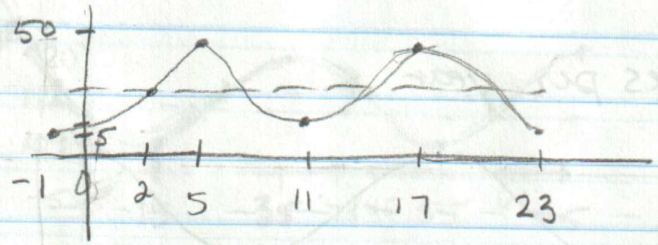
b) $P = -25 \cos \frac{\pi}{4}(t - 2) - 5$

c) i] $= -25 \cos \frac{1.5\pi}{\frac{\pi}{4}} - 5 = -14.567\,ft$

ii] $= -25 \cos \frac{12\pi}{4} - 5 = 18.097\,ft$

d) -5

(5) a)



$P = 12 \quad \frac{2\pi}{b} = 12 \quad b = \frac{\pi}{6}$

$a = 22.5$

$d = 27.5$

b) 5 ft

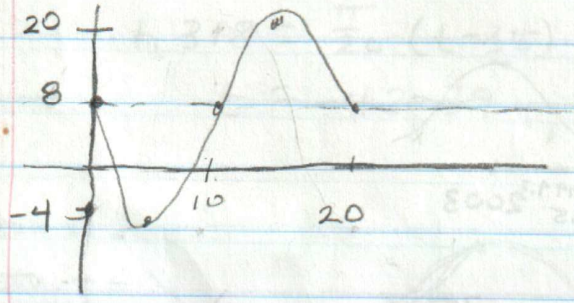
c) $h = 22.5 \cos \frac{\pi}{6}(t-5) + 27.5$

d) i) 5 ft

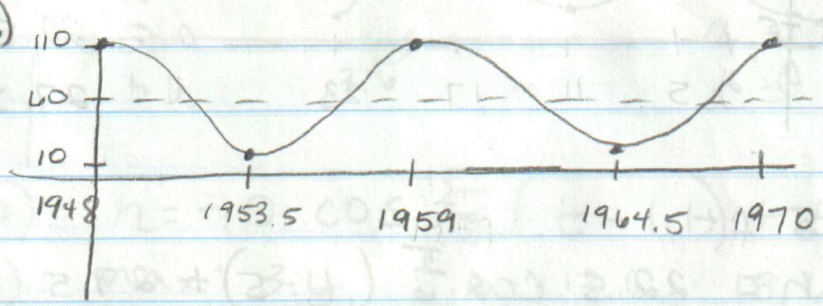
ii) ≈ 48 actual = 46.986

iii) $\approx 15.8?$ actual = 18.348

(6)



(7) a) 11 cycles per year

b) 

$P = 11$ or $\frac{2\pi}{b} = 11$

$\frac{2\pi}{11}$

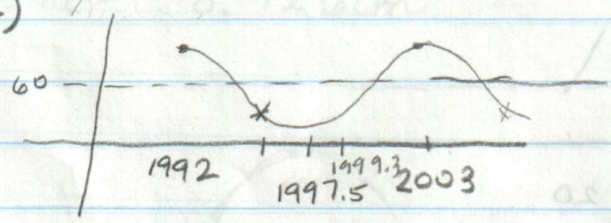
$a = 50$

$d = 60$

c) $C = 50 \cos \frac{2\pi}{11} Y + 60$

d) $= 50 \cos \frac{2\pi}{11}(52) + 60 \approx 52.884$

$= 50 \cos \frac{2\pi}{11}(65) + 60 \approx 102.063$

e) 

$35 = 50 \cos \frac{2\pi}{11}(t - 44) + 60$

$2.094 = \frac{2\pi}{11}(t - 44)$

$t = 47.66 \approx 1995$

2004

2003