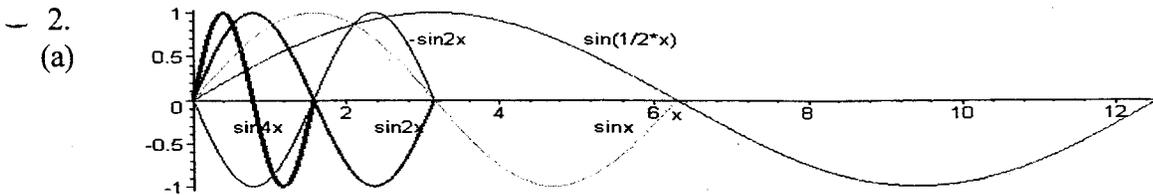


19.1

3. (a) $\frac{12}{13}$ (b) $\frac{5}{13}$ (c) $-\frac{12}{13}$ (d) $\frac{5}{13}$
 (e) $\frac{12}{13}$ (f) $\frac{5}{13}$ (g) $2w$ is in quadrant II so $\cos(2w) < 0$
4. (a) $-\frac{1}{3}$ (b) $\frac{2\sqrt{2}}{3}$ (c) $-\frac{2\sqrt{2}}{3}$ (d) $-\frac{1}{3}$
 (e) $-\frac{2\sqrt{2}}{3}$ (f) $\frac{2\sqrt{2}}{3}$ (g) < 0 as $t + \frac{\pi}{2}$ is in quadrant III.

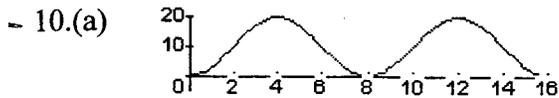
19.2



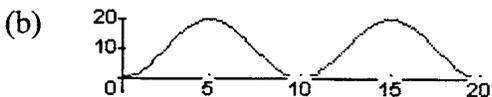
(b) The period, or horizontal stretch. Also there is reflection across the x -axis if $B < 0$.

6. (a) $b = \text{half period} \Rightarrow B(b) = \pi \Rightarrow B = \frac{\pi}{b}$
 $2(\text{amplitude}) = |k|$
 $y = \frac{|k|}{2} \cos\left(\frac{\pi}{b}x\right) + \frac{k}{2}$ (note k is neg)
- (b) $2 = \text{half period} \Rightarrow B(2) = \pi \Rightarrow B = \frac{\pi}{2}$
 $2(\text{amplitude}) = \frac{6\pi}{4}$
 $y = -\frac{3\pi}{4} \sin\left(\frac{\pi}{2}x\right) - \frac{\pi}{2}$
- (c) $3 = \text{half period} \Rightarrow B(3) = \pi \Rightarrow B = \frac{\pi}{3}$
 $2(\text{amplitude}) = 3$
 $y = -\frac{3}{2} \cos\left(\frac{\pi}{3}x\right) + \frac{3}{2}$
- (d) $12 = \frac{3}{2} \text{ period} \Rightarrow B(12) = 3\pi \Rightarrow B = \frac{\pi}{4}$
 $2(\text{amplitude}) = 6$
 $y = -3 \sin\left(\frac{\pi}{4}x\right) + 6$

9. (a) $p = \frac{2\pi}{3}$, $a = 0.5$, balance value = 0 (b) $p = 6\pi$, $a = 4$, balance value = 0
 (c) $p = 10\pi$, $a = \frac{1}{\pi}$, balance value = 1 (d) $p = 2$, $a = 4$, balance value = -4
 (e) $p = 2$, $a = 4$, balance value = 0



$B(8) = 2\pi \Rightarrow B = \frac{\pi}{4}$ with phase shift $-\frac{\pi}{2}$
 $h = 10 \sin\left(\frac{\pi}{4}t - \frac{\pi}{2}\right) + 10 = -10 \cos\left(\frac{\pi}{4}t\right) + 10$



$B(10) = 2\pi \Rightarrow B = \frac{\pi}{5}$ with phase shift $-\frac{\pi}{2}$
 $h = 10 \sin\left(\frac{\pi}{5}t - \frac{\pi}{2}\right) + 10 = -10 \cos\left(\frac{\pi}{5}t\right) + 10$

13. (a) *ii* (b) *iv* (c) *v*
 (d) *iii* (e) *i* (f) *vi*