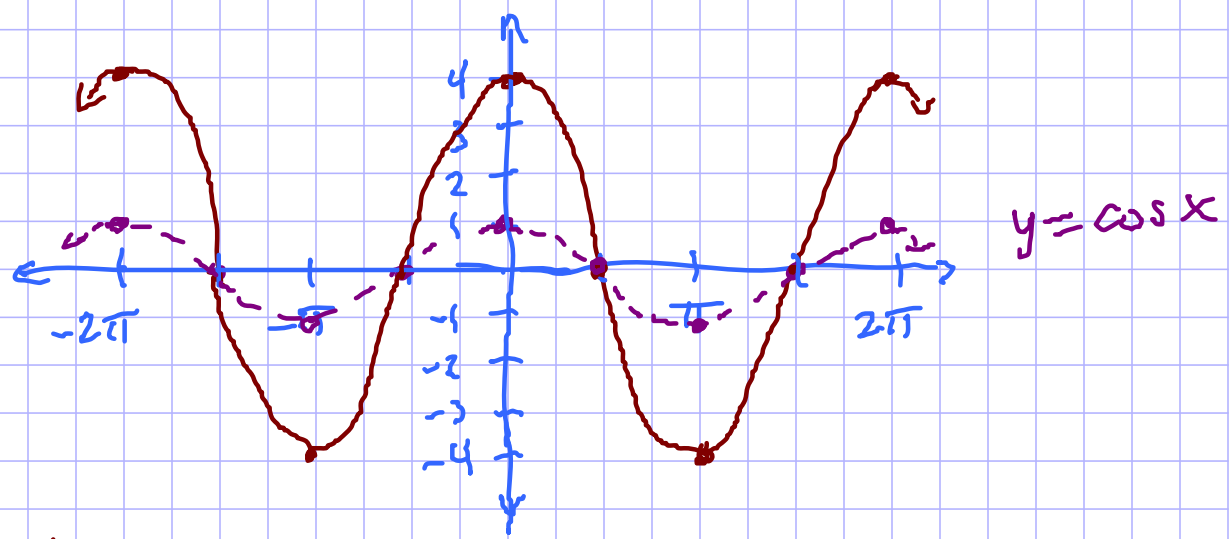
11.1a #12-18, 24, 33, 35

12. not periodic – the branches of the graph are not EXACTLY the same

13. periodic ; period = 2π

repeating points @ $(-\frac{\pi}{2}, 0)$ and $(\frac{3\pi}{2}, 0)$

14. $f(x) = 4\cos x$ $\qquad$ $y = a\cos(bx)$

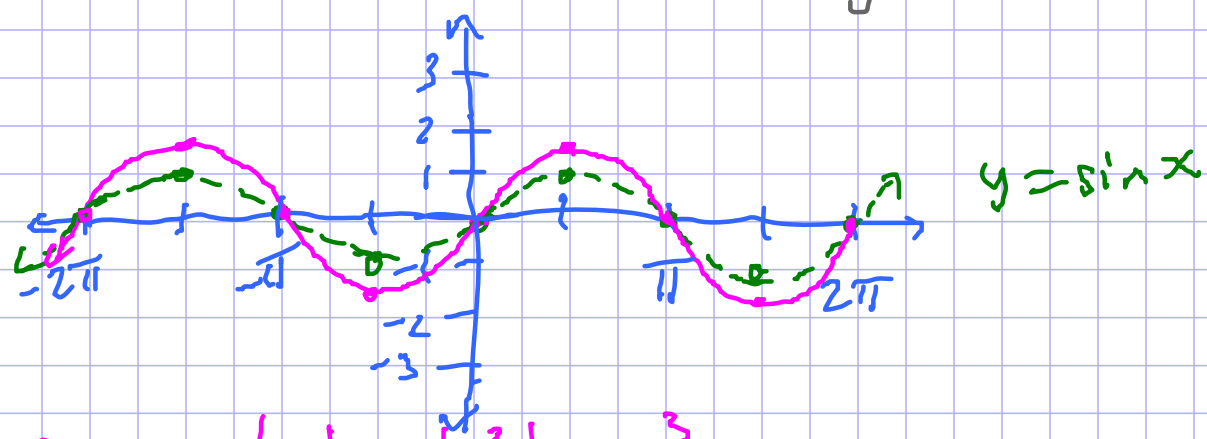


amplitude $= |a| = |4| = 4$

period $= \frac{2\pi}{|b|} = \frac{2\pi}{|1|} = 2\pi$

15. $g(x) = \frac{3}{2}\sin x$

$y = a\sin(bx)$



$\text{amp} = |a| = \left|\frac{3}{2}\right| = \frac{3}{2}$

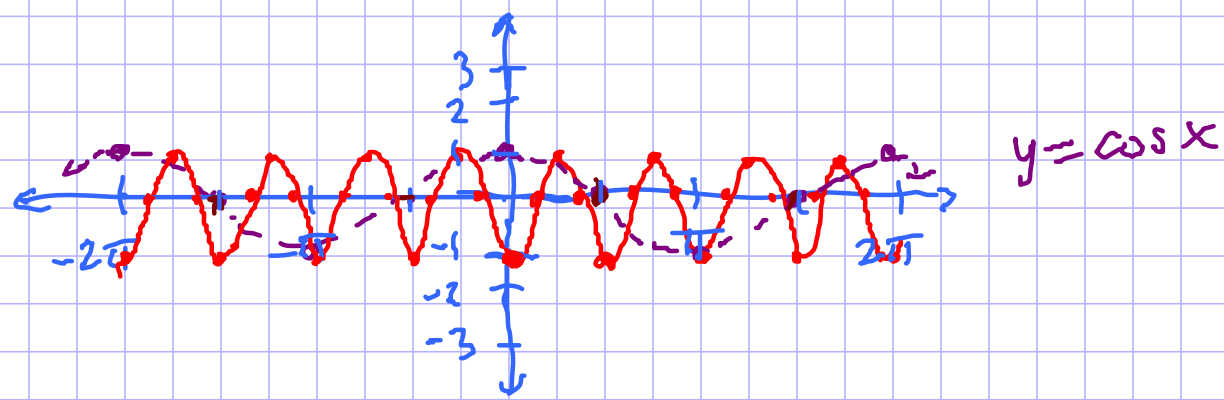
$\text{per} = \frac{2\pi}{|b|} = \frac{2\pi}{|2|} = 2\pi$

flip over x-axis

16. $g(x) = -\cos 4x$

$y = a\cos(bx)$

4 times as many revolutions

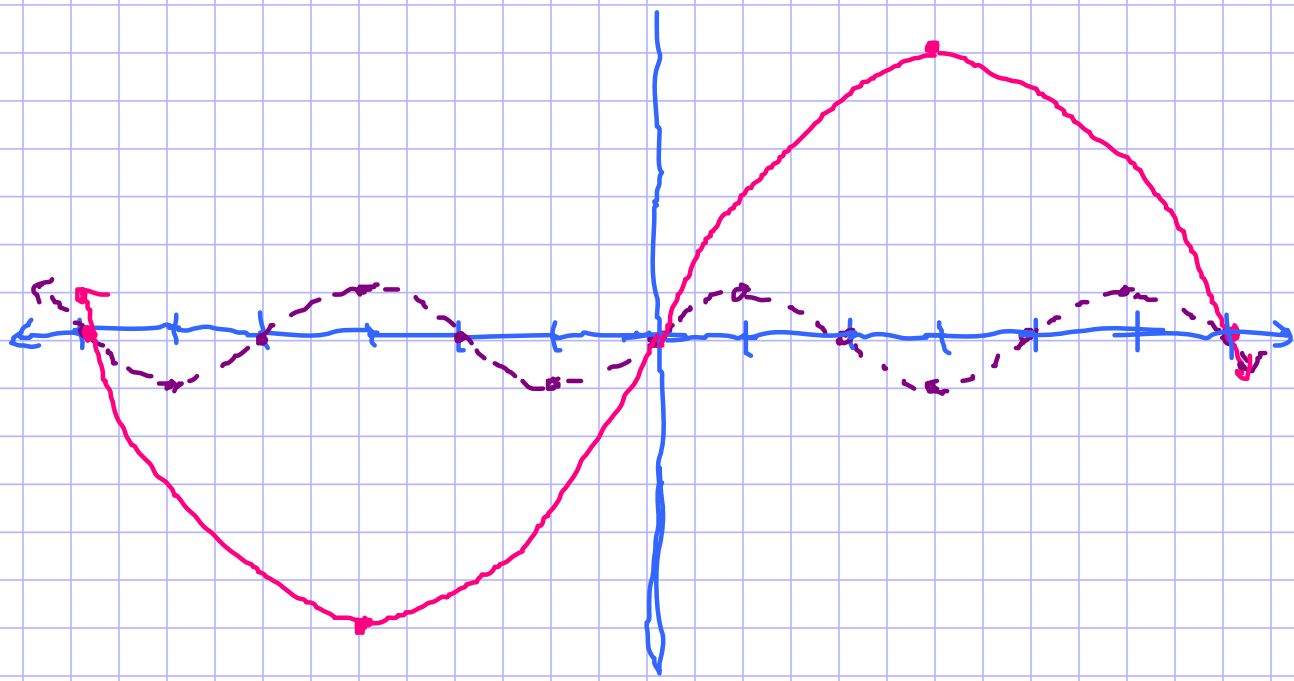


$\text{amp} = |a| = |-1| = 1$

$\text{per} = \frac{2\pi}{|b|} = \frac{2\pi}{|4|} = \frac{\pi}{2}$

17. $j(x) = 6\sin\left(\frac{1}{3}\right)x$

$\frac{1}{3}$ as many revolutions



amp $= |a| = |6| = 6$

per $= \dfrac{2\pi}{|b|} = \dfrac{2\pi}{|1/3|} = \dfrac{2\pi}{1} \cdot \dfrac{3}{1} = 6\pi$

18. amp $= 5$

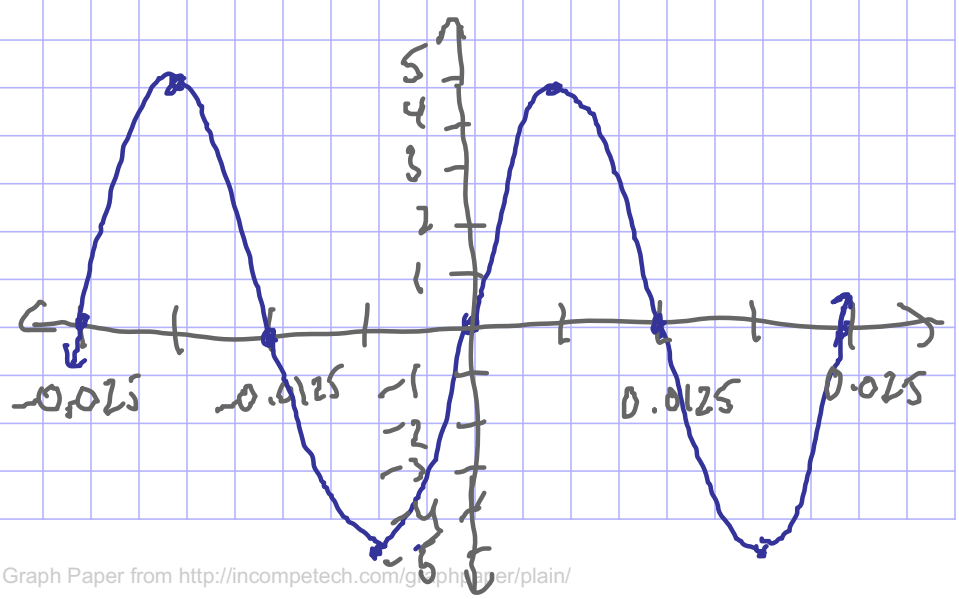
sine function

per $= 0.025$

frequency $= \dfrac{1}{\text{period}}$

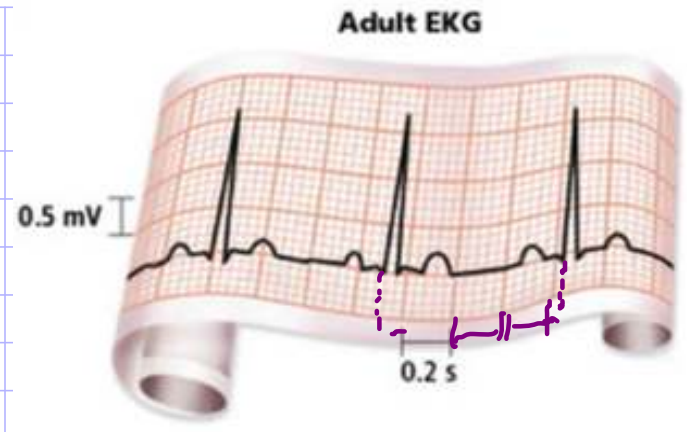
$= \dfrac{1}{0.025}$

$= \boxed{40 \text{ Hz}}$



24.

(a) period ≈ 0.8 seconds



(b) $\dfrac{1 \text{ beat}}{0.8 \text{ sec}} \cdot \dfrac{60 \text{ sec}}{1 \text{ min}}$

$\boxed{75 \text{ beats/min}}$

(c) frequency $= \dfrac{1}{\text{per}}$

frequency $= \dfrac{1}{0.8} = \boxed{1.25 \text{ Hz}}$

(d) pulse rate is measured in beats/min.

the frequency is in cycles/second.

Since a cyle represents a heart beat on an EKG, the are the same thing.

33. amp $= 6$; per $= \pi$

$|a| = 6$

$a = \pm 6$

$\dfrac{2\pi}{|b|} = \pi$

$2 = |b|$

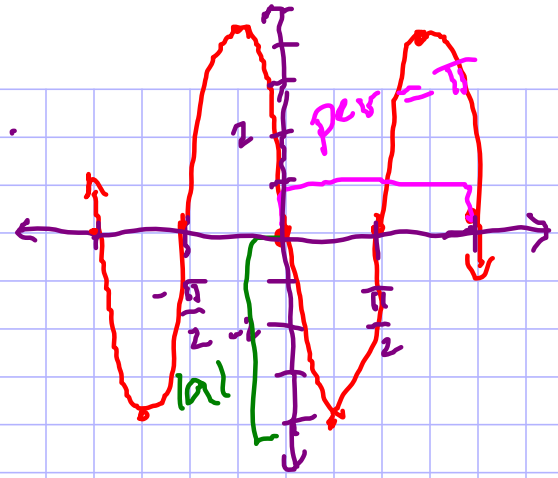
$\pm 2 = b$

one of each

$f(x) = 6\sin(2x)$ or $f(x) = -6\sin(2x)$ or $f(x) = 6\sin(-2x)$ or $f(x) = -6\sin(-2x)$

$f(x) = 6\cos(2x)$ or $f(x) = -6\cos(2x)$ or $f(x) = 6\cos(-2x)$ or $f(x) = -6\cos(-2x)$

35.



$|a| = 4$

flipped so $a < 0$

$\therefore a = -4$

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

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

$$\boxed{f(x) = -4\sin 2x}$$