

11.1 #12-18, 24, 33, 35

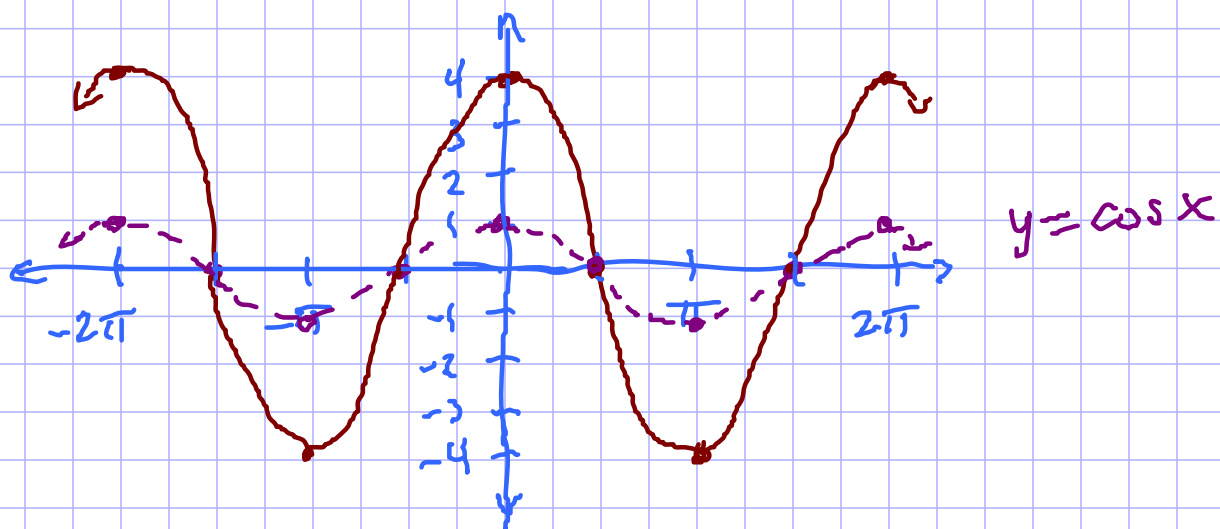
12. not periodic — the branches of the graph are not EXACTLY the same

13. periodic ; period = 2π

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

14. $f(x) = 4 \cos x$

$y = a \cos(bx)$

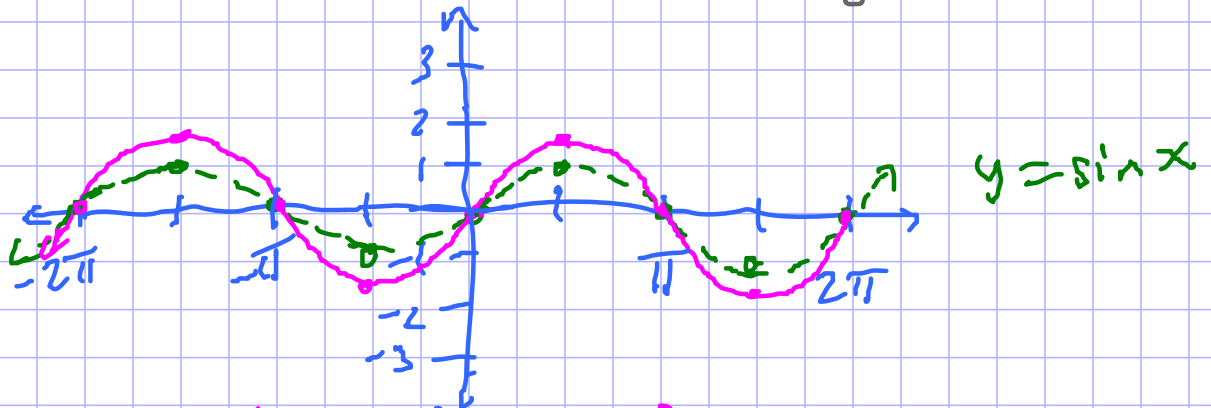


amplitude = $|a| = |4| = 4$

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

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

$$y = a \sin(bx)$$



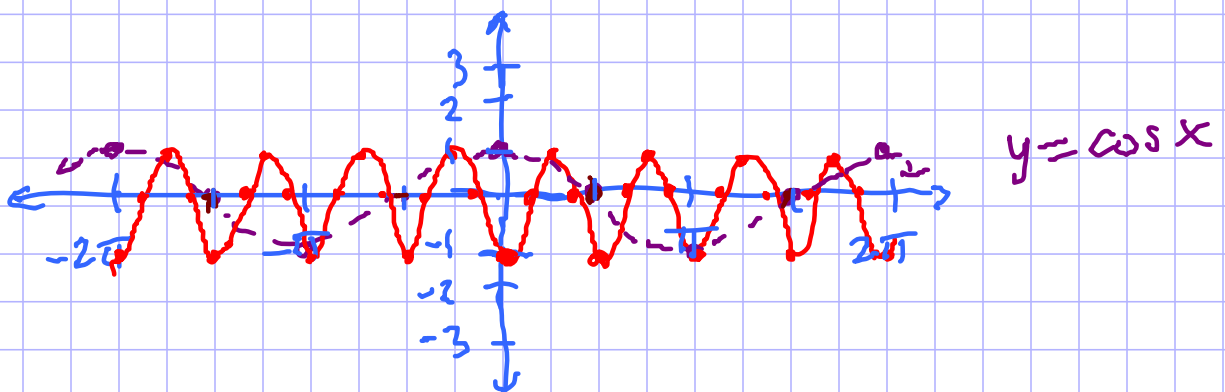
$$\text{amp} = |a| = \left| \frac{3}{2} \right| = \frac{3}{2}$$

$$\text{per} = \frac{2\pi}{|b|} = \frac{2\pi}{|1|} = 2\pi$$

16. $g(x) = \ominus \cos 4x$ $y = a \cos(bx)$

flip over x-axis

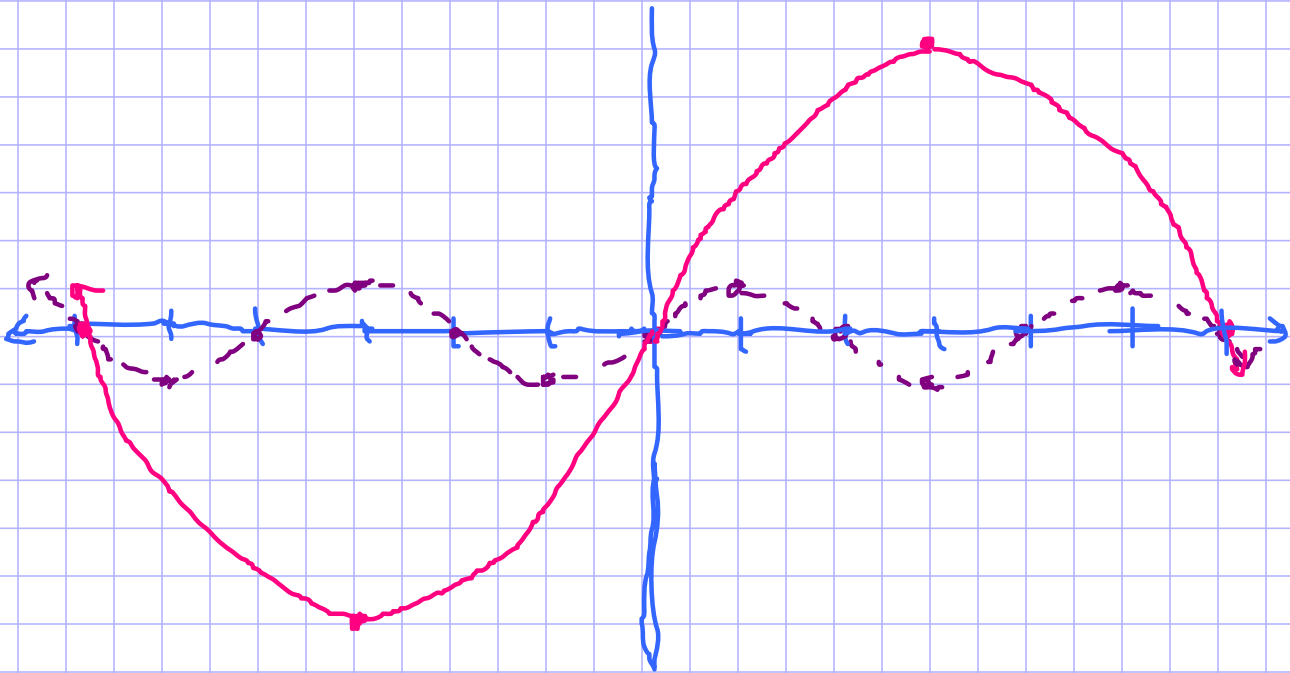
4 times as many revolutions



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

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

17. $y(x) = 6 \sin\left(\frac{1}{3}x\right)$ $\frac{1}{3}$ as many revolutions



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

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

18. amp = 5

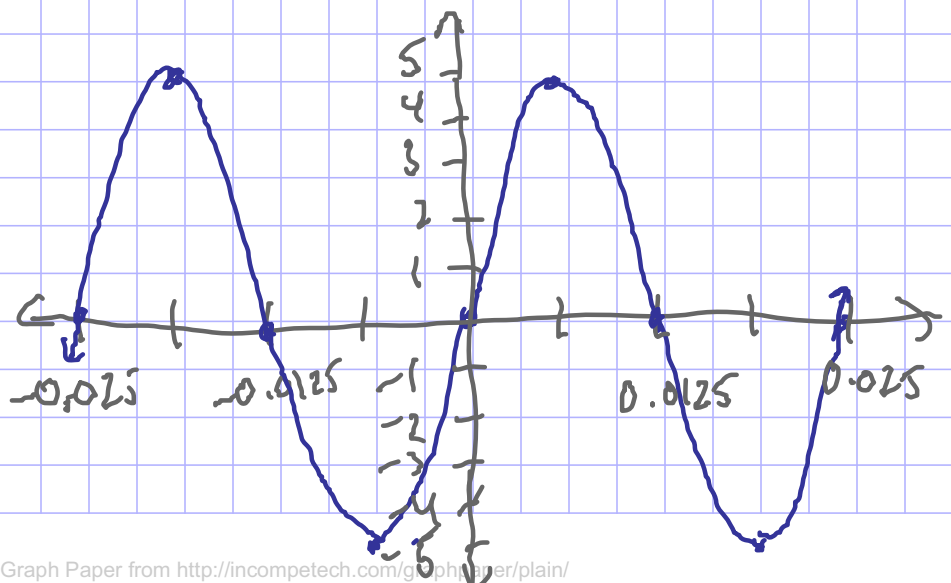
sine function

per = 0.025

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

= $\frac{1}{0.025}$

= **40 Hz**

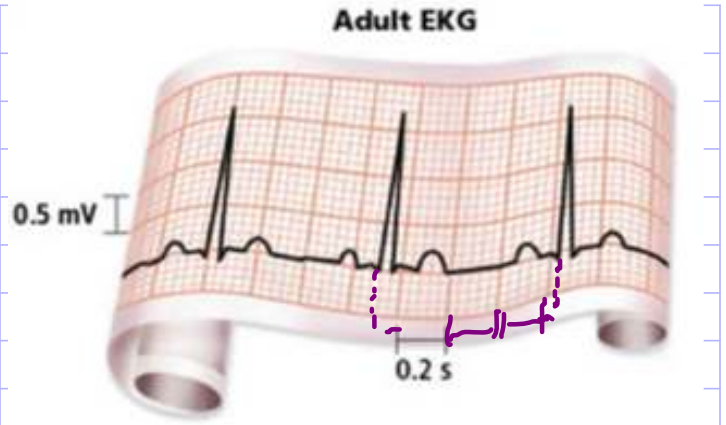


24.

(a) period ≈ 0.8 seconds

(b) $\frac{1 \text{ beat}}{0.8 \text{ sec}} \times \frac{60 \text{ sec}}{1 \text{ min}}$

75 beats/min



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

frequency = $\frac{1}{0.8} = 1.25 \text{ Hz}$

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

the frequency is in cycles/second.

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

33. amp = 6 ; Per = π

$|a| = 6$

$a = \pm 6$

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

$2 = |b|$

$\pm 2 = b$

one of each

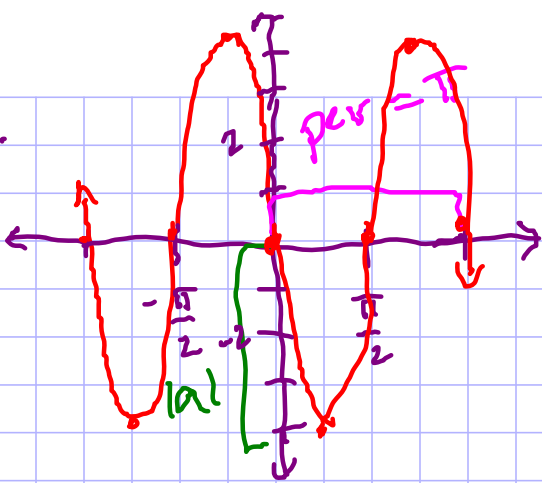
$f(x) = 6 \sin(2x)$ $f(x) = 6 \cos(2x)$

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

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

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

35.



$$|a| = 4$$

flipped so $a < 0$
 $\therefore a = -4$

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

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

$$f(x) = -4 \sin 2x$$

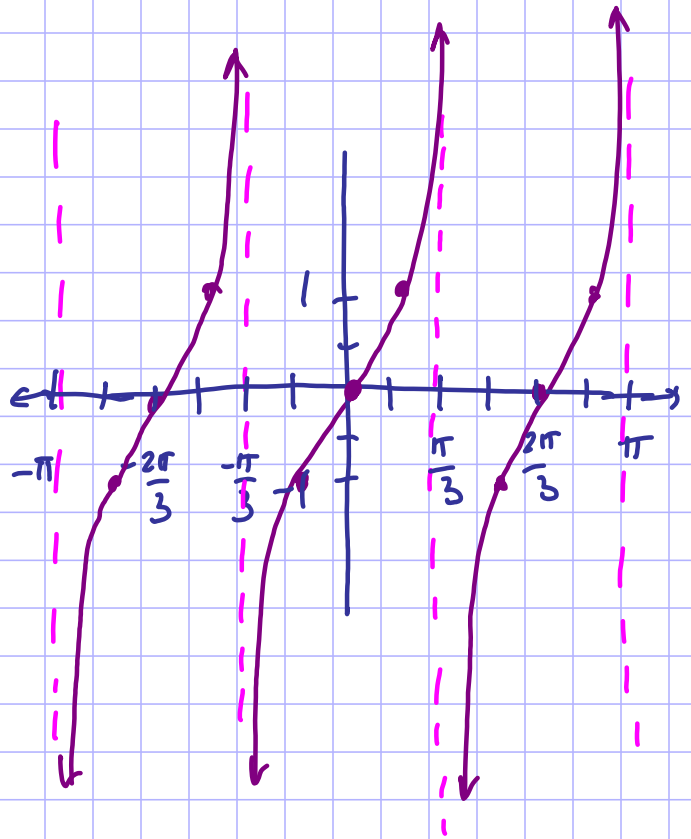
11.2 # 10, 12, 13, 21

$$10. p(x) = \tan \frac{3}{2}x$$

$$\text{period} = \frac{\pi}{|b|} = \frac{\pi}{|3/2|} = \frac{2\pi}{3}$$

$$\text{x-int: } -\frac{2\pi}{3}, 0, \frac{2\pi}{3} = \frac{2n\pi}{3}$$

$$\begin{aligned} \text{asymptotes: } & \frac{\pi}{2|b|} + \frac{n\pi}{|b|} \\ & = \frac{\pi}{2|3/2|} + \frac{n\pi}{|3/2|} \\ & = \frac{\pi}{3} + \frac{2n\pi}{3} \end{aligned}$$

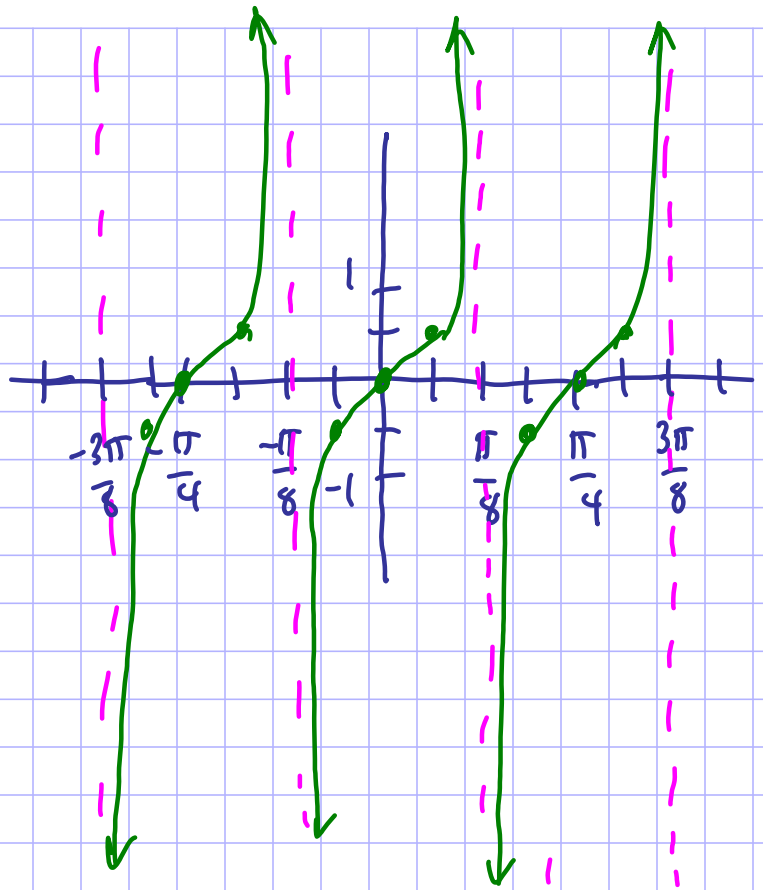


$$12. h(x) = \frac{1}{2} \tan 4x$$

$$\text{period} = \frac{\pi}{|b|} = \frac{\pi}{4}$$

$$\text{asympt: } \frac{\pi}{2|b|} + \frac{n\pi}{|b|} = \frac{\pi}{8} + \frac{n\pi}{4}$$

$$\text{x-int: } -\frac{\pi}{4}, 0, \frac{\pi}{4} = \frac{n\pi}{4}$$

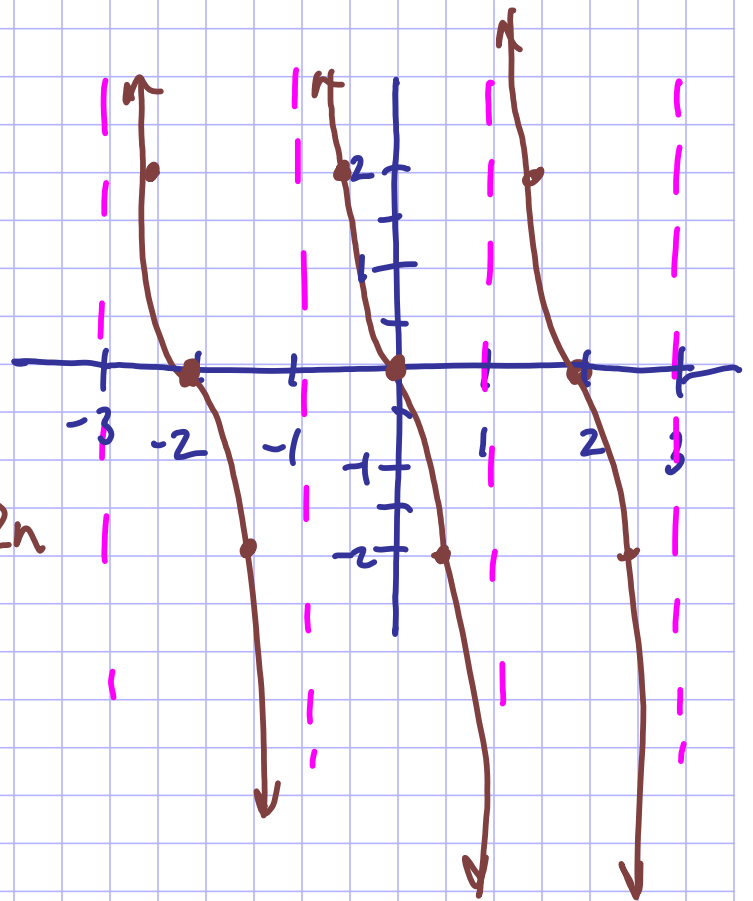


$$13. f(x) = \overset{\text{flip}}{\ominus} 2 \tan \frac{\pi}{2} x$$

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

$$\text{asympt: } \frac{\pi}{2|b|} + \frac{n\pi}{|b|} = 1 + 2n$$

$$\text{x-int: } -2, 0, 2 = 2n$$



$$21. f(\theta) = \tan \theta = \frac{\sin \theta}{\cos \theta}$$

$$\theta = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \dots$$

$$\theta = \frac{\pi}{2} + n\pi$$

$\tan \theta$ is undefined
when $\cos \theta = 0$

