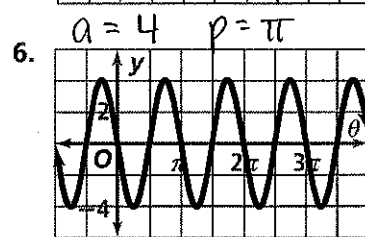
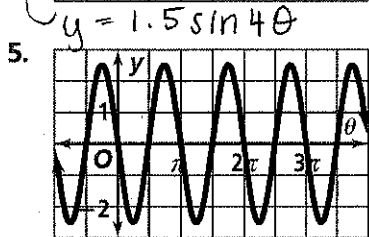
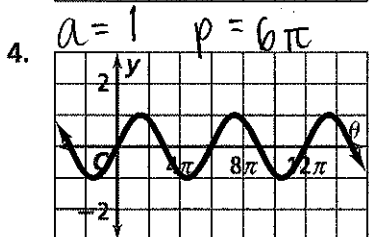
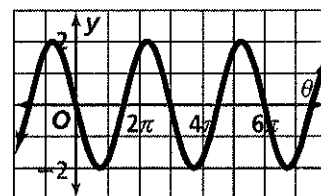
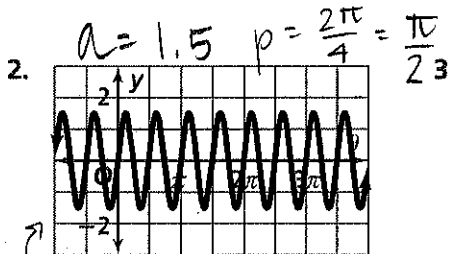
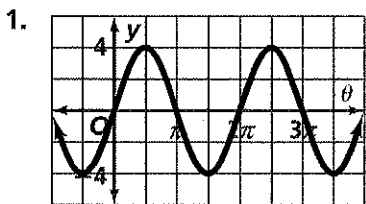


Practice 13-4

The Sine Function

Find the amplitude and period of each sine curve. Then write an equation for each curve.



Sketch one cycle of each sine curve. Assume $a > 0$. Write an equation for each graph.

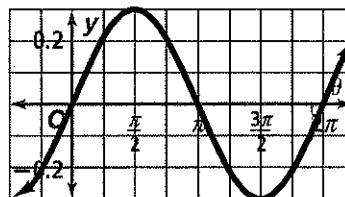
- | | |
|---|---|
| 7. amplitude = 2; period = π | 8. amplitude = 3; period = 2π |
| 9. amplitude = 2; period = $\frac{\pi}{2}$ | 10. amplitude = 2; period = $\frac{\pi}{4}$ |
| 11. amplitude = 1.5; period = $\frac{\pi}{3}$ | 12. amplitude = 2.5; period = 2π |

Sketch one cycle of the graph of each sine function.

- | | | |
|-----------------------------------|---------------------------|------------------------------------|
| 13. $y = 2 \sin \theta$ | 14. $y = -2 \sin 4\theta$ | 15. $y = \sin 2\theta$ |
| 16. $y = 3 \sin \frac{\theta}{2}$ | 17. $y = -\sin 2\theta$ | 18. $y = -5 \sin 3\theta$ |
| 19. $y = -3 \sin 2\theta$ | 20. $y = 4 \sin 5\theta$ | 21. $y = -4 \sin \frac{\theta}{2}$ |

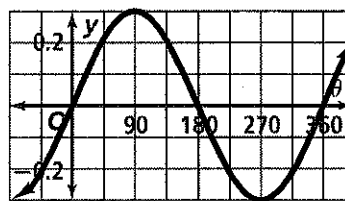
Use the graph at the right to find the value of $y = 0.3 \sin \theta$ for each value of θ .

- | | |
|------------------------------------|-----------------------------|
| 22. 6 radians -0.1 | 23. $\frac{\pi}{4}$ radians |
| 24. $\frac{3\pi}{4}$ radians 0.2 | 25. $\frac{\pi}{2}$ radian |



Use the graph at the right to find the value of $y = 0.3 \sin \theta$ for each value of θ .

- | | |
|------------------------|-----------------|
| 26. 160° 0.1 | 27. 135° |
| 28. 270° -0.3 | 29. 225° |



Practice 13-5

The Cosine Function

Sketch the graph of each function in the interval from 0 to 2π .

- | | | |
|--------------------------|---------------------------------------|--------------------------------|
| 1. $y = \cos \theta$ | 2. $y = 2 \cos \pi\theta$ | 3. $y = 5 \cos \theta$ |
| 4. $y = -\cos \theta$ | 5. $y = -5 \cos \theta$ | 6. $y = \cos 2\pi\theta$ |
| 7. $y = -2 \cos 2\theta$ | 8. $y = 3 \cos 4\theta$ | 9. $y = \cos \frac{\theta}{2}$ |
| 10. $y = 3 \cos 8\theta$ | 11. $y = -4 \cos \pi\theta$ | 12. $y = 0.5 \cos \pi\theta$ |
| 13. $y = -\cos 2\theta$ | 14. $y = -3 \cos \frac{\pi}{2}\theta$ | 15. $y = 4 \cos \pi\theta$ |

16. Suppose 12 in. waves occur every 5 s. Write an equation using a cosine function that models the height of a water particle as it moves from crest to crest.

$$y = 6 \cos \frac{2\pi}{5} \theta$$

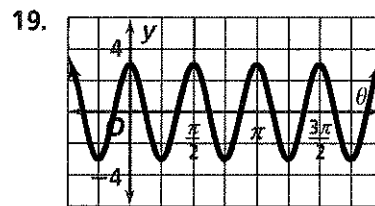
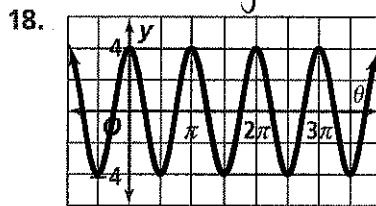
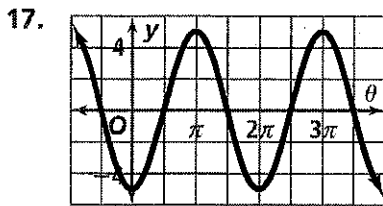
$$p = 5 = \frac{2\pi}{b}$$

$$p = 5 = \frac{2\pi}{b}$$

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

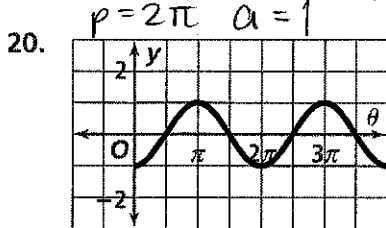
$$b = \frac{2\pi}{5}$$

Write the equation of a cosine function for each graph.

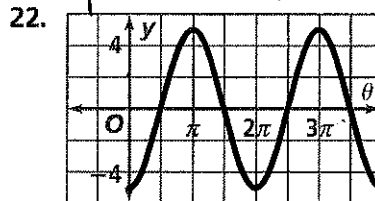
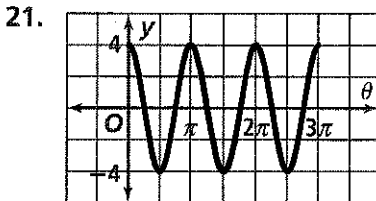


$$y = 4 \cos 2\theta$$

Find the period and amplitude of each cosine function. Identify where the maximum value, minimum value, and zeros occur in the interval from 0 to 2π .



$$p = 2\pi \quad a = 1$$



$$p = 2\pi \quad a = 5$$

min: 0, 2π max: π zeros: π/2, 3π/2

Solve each equation in the interval from 0 to 2π . Round to the nearest hundredth.

- | | | |
|--|---|---|
| 23. $2 \cos 3\theta = 1.5$ | 24. $\cot \frac{t}{3} = 1 \quad 0$ | 25. $1.5 \cos \pi\theta = -1.5$ |
| 26. $3 \cos \frac{\pi}{5} \theta = 2 \quad 1.34$ | 27. $3 \cos t = 2$ | 28. $0.5 \cos \frac{\theta}{2} = 0.5 \quad 0$ |
| 29. $4 \cos \frac{\pi}{4} \theta = -2$ | 30. $3 \cos \frac{\theta}{4} = 1.5 \quad 1.3$ | 31. $3 \cos \theta = -3$ |

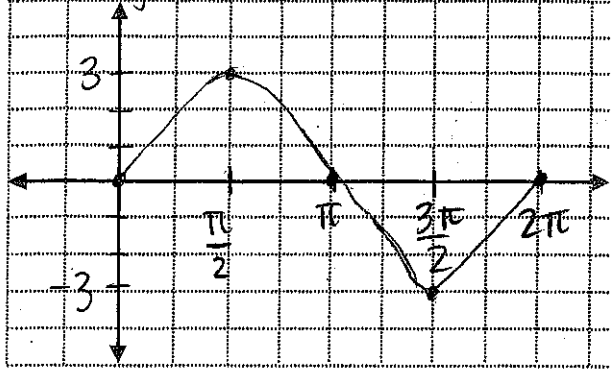
Write a cosine function for each description. Assume that $a > 0$.

32. amplitude = 2π , period = 1
33. amplitude = $\frac{1}{2}$, period = π

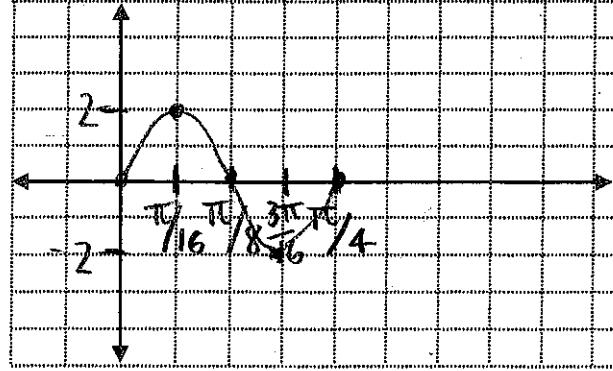
$$2\pi \cos 2\pi\theta$$

/30

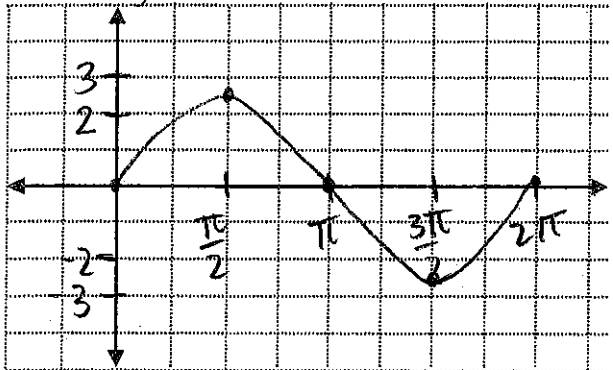
11. 8 $y = 3 \sin \theta$



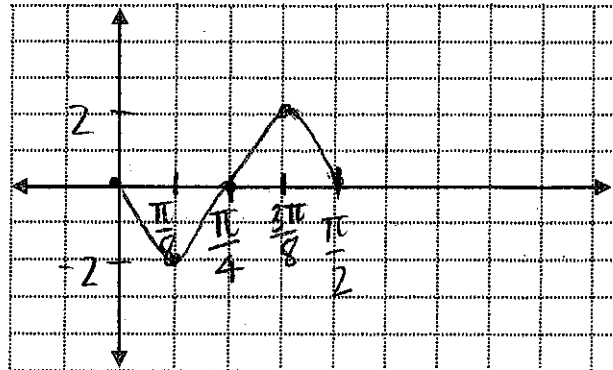
11. 10 $y = 2 \sin 8\theta$



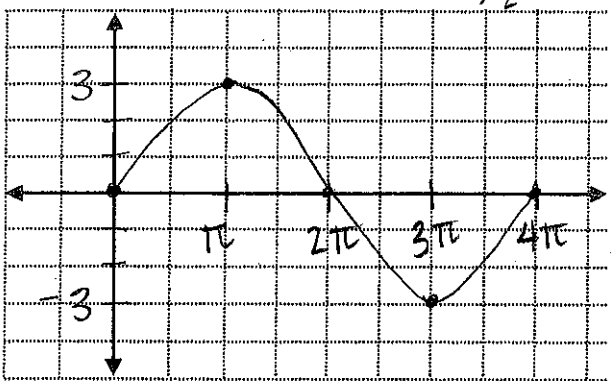
11. 12 $y = 2.5 \sin \theta$



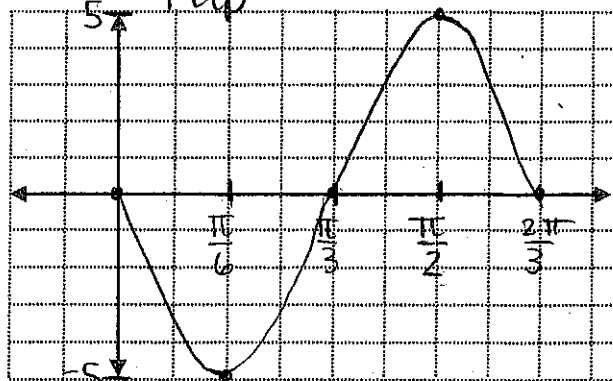
11. 14 flip $p = \frac{2\pi}{4}$ $p = \frac{\pi}{2}$



11. 16 $3 \sin \frac{\theta}{2}$ $p = \frac{2\pi}{1/2}$ $p = 4\pi$

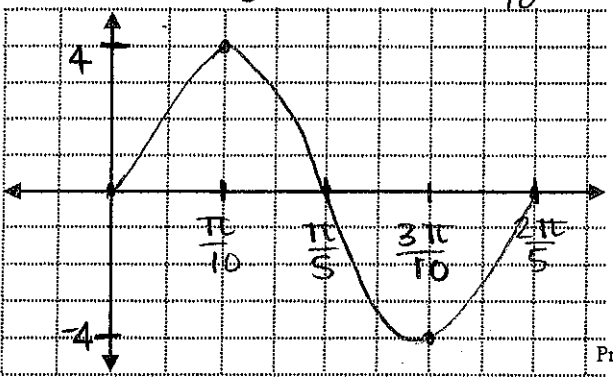


11. 18 $-5 \sin 3\theta$ flip $p = \frac{2\pi}{3}$ $\frac{2\pi}{3} \cdot \frac{1}{4}$

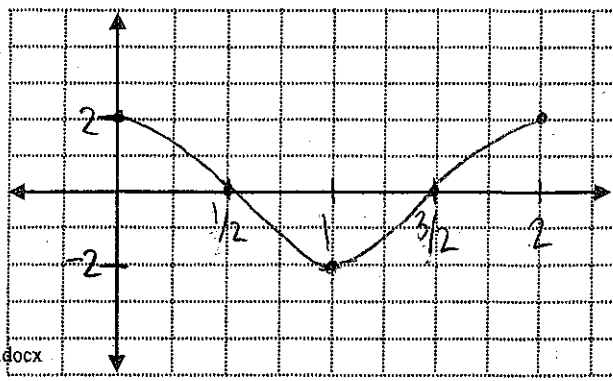


$\frac{2\pi}{12} = \frac{\pi}{6}$

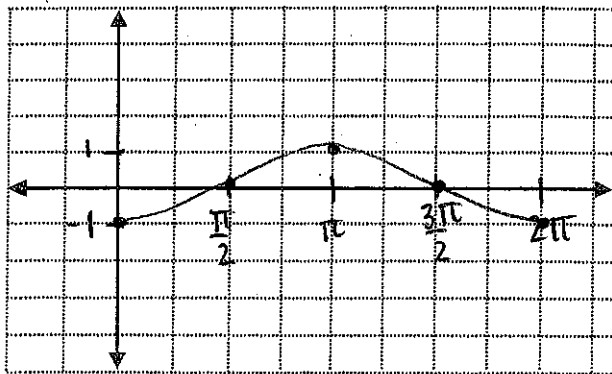
11. 20 $p = \frac{2\pi}{5} \cdot \frac{1}{4} = \frac{2\pi}{20} = \frac{\pi}{10}$ Practice 13.5



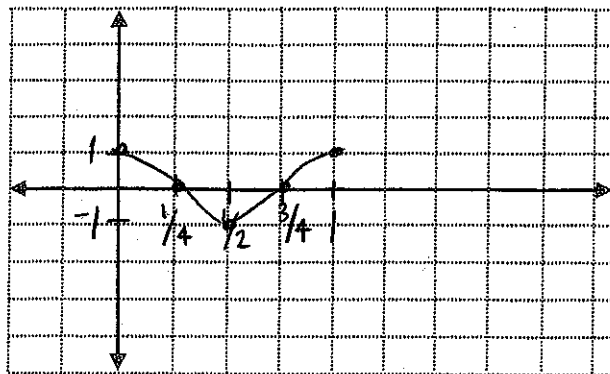
11. 2 $p = \frac{2\pi}{\pi} = 2$



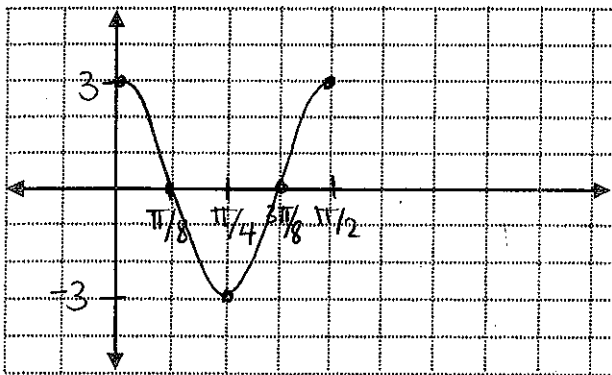
Prob. 4 flip



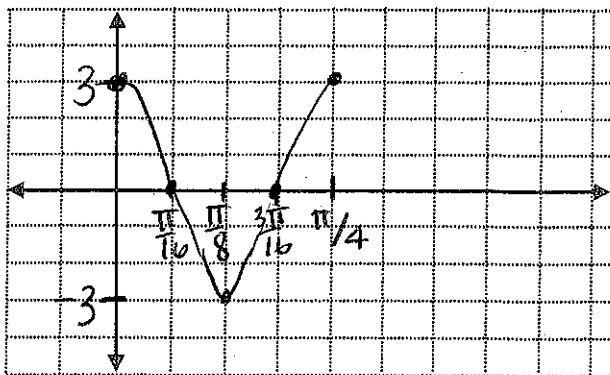
#6. $P = \frac{2\pi}{2\pi} = 1$



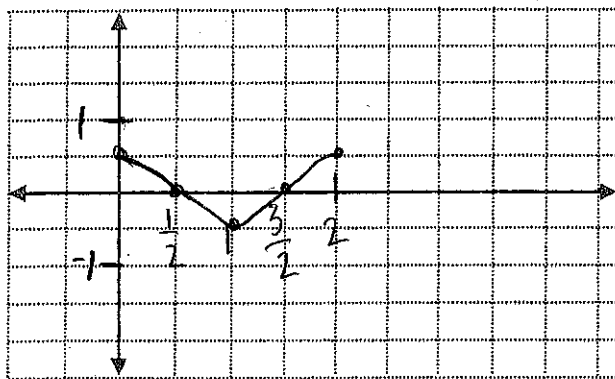
Prob. 8 $P = \frac{2\pi}{4} = \pi/2$



Prob. 10 $\frac{2\pi}{8} = \pi/4$



Prob. 12 $P = \frac{2\pi}{\pi} = 2$



Prob. 14 flip $\frac{2\pi}{\pi/2} = 2\pi \cdot \frac{2}{\pi} = 4$

