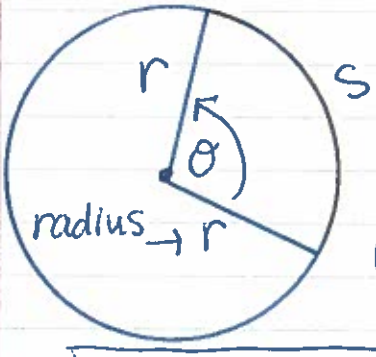
Day 63 warm-ups

13.3 Notes Continued...

Finding the Length of an arc



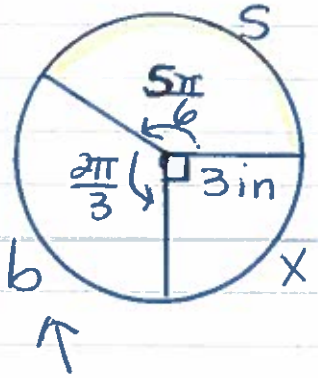
p. 730

θ = central angle (must be in radians!)
↑ theta (greek letter)

s = length of the intercepted arc

Formula: $s = r\theta$

1. Example: For the circle below find the length s, to the nearest tenth.



$s = r\theta$

$s = 3 \cdot \frac{5\pi}{6}$ ← use the π button on the calculator

$s \approx 7.9$ in

$b = 3 \cdot \frac{2\pi}{3}$

$b \approx 6.3$ in

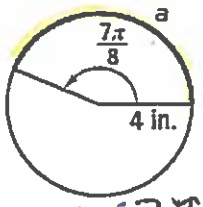
Remember: Central Angle must Be in radians!

$\theta = 90° = \frac{\pi}{2}$ radians

$x = 3 \cdot \frac{\pi}{2}$ $x = 4.7$ in

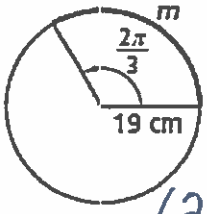
Length of the intercepted arc $s = r \cdot \theta$ (r: radius; θ: angle measure in radians)

Use each circle to find the length of the indicated arc. Round your answer to the nearest tenth.

34. 

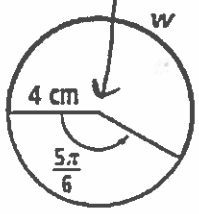
$s = 4\left(\frac{7\pi}{8}\right)$

$s = 11.0$ in

35. 

$s = 19\left(\frac{2\pi}{3}\right)$

$s = 39.8$ cm

36. 

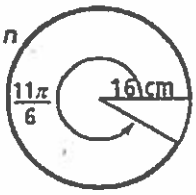
$\theta = 2\pi - \frac{5\pi}{6}$

$\theta = \frac{7\pi}{6}$

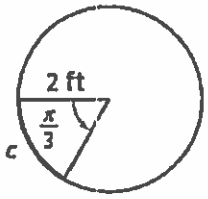
$w = 4 \cdot \frac{7\pi}{6}$

~~000.00~~ cm

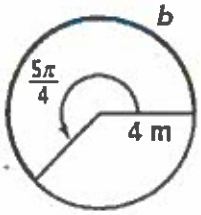
14.7 cm

37. 

92.2 cm

38. 

2.1 ft

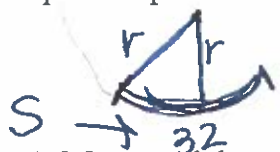
39. 

15.7 m

$\theta = 1.8$ central $\angle$

40. A pendulum swings through an angle of 1.8 radians. The distance the tip of the pendulum travels is 32 in. How long is the pendulum?

$r = 17.8$ in



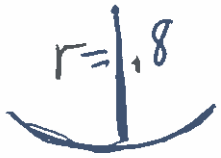
$\frac{32}{1.8} = \frac{1.8r}{1.8}$

arc length = radius · central $\angle$

$32 = r(1.8)$

41. A 0.8 m pendulum swings through an angle of 1.5 radians. What distance does the tip of the pendulum travel?

$s = 1.2$ m



θ

$s = r \cdot \theta$

$= .8(1.5)$

$= 1.2$ m

13.4

$y = \sin x$

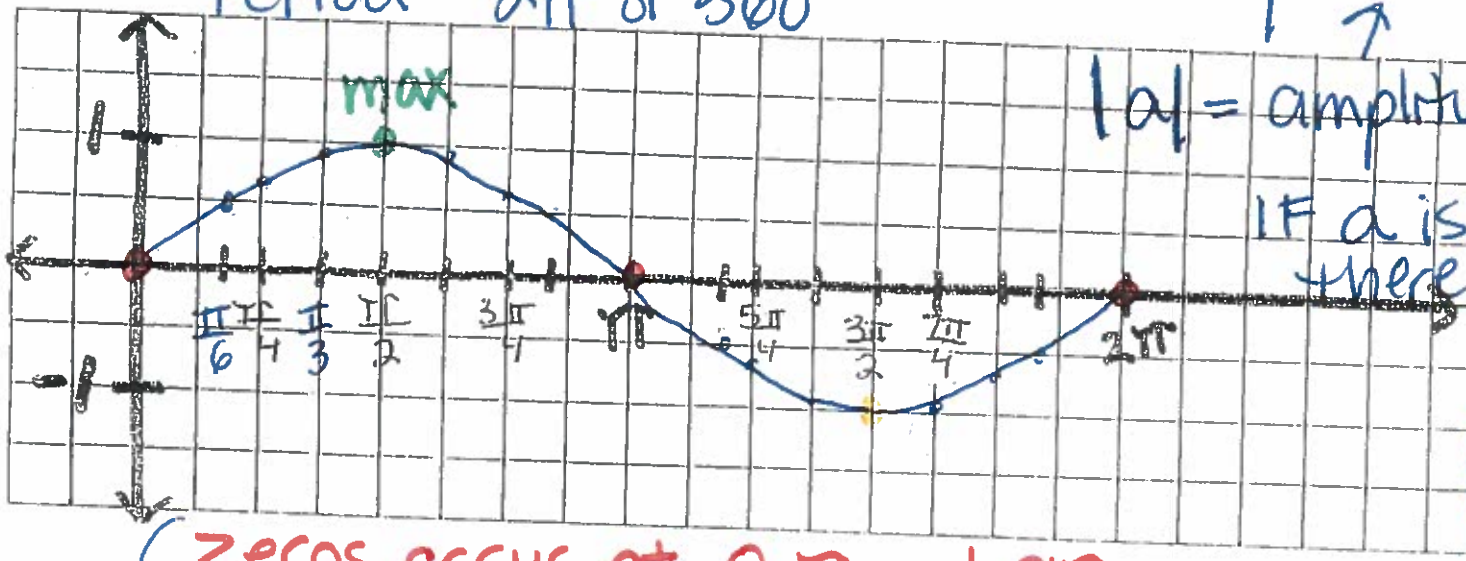
Sine

$y = a \sin b\theta$

	30°	45°	60°	90°	120°	135°	150°	180°	210°	225°	240°	270°	300°	315°	330°	360
x	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π	$\frac{7\pi}{6}$	$\frac{5\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{7\pi}{4}$	$\frac{11\pi}{6}$	2π
y	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0	$-\frac{1}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{\sqrt{3}}{2}$	-1	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{2}}{2}$	$-\frac{1}{2}$	0
	zero	.5	.7	.9	max			zero				min				zero	

amplitude = 1

Period = 2π or $360°$



$y = a \sin bx$

$|a|$ = amplitude

IF a is negative there is a reflection

# of cycles from 0 to 2π

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

and

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

5 main points

zeros occur at $0, \pi$ and 2π

max at $\left(\frac{\pi}{2}, 1\right)$

min at $\left(\frac{3\pi}{2}, -1\right)$

up, down, down, up

amplitude

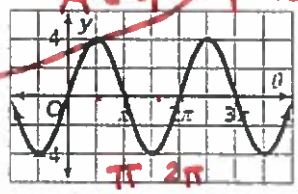
Name _____ Class _____ Date _____

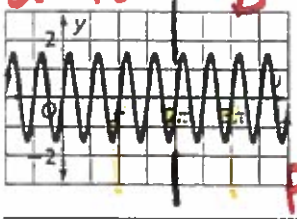
Practice 13-4

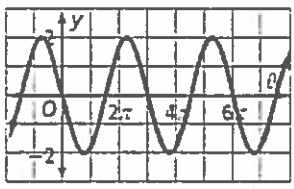
$y = a \sin bx$

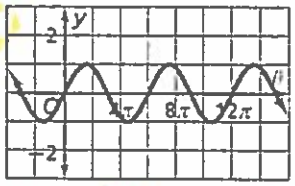
The Sine Function

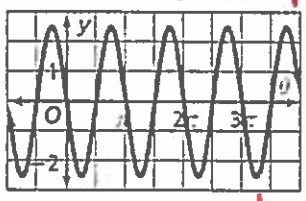
Find the amplitude and period of each sine curve. Then write an equation for each curve.

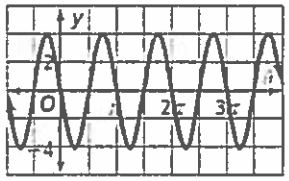
1. 

2. 

3. 

4. 

5. 

6. 

1. $y = 4 \sin 1x$
2. $y = 1.5 \sin 4x$
3. _____
4. _____
5. _____
6. _____

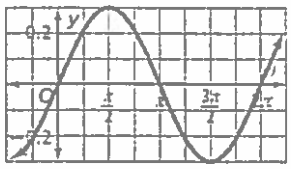
Sketch one cycle of each sine curve. Assume $a > 0$. Write an equation for each graph.

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.



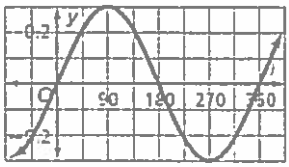
22. 6 radians

23. $\frac{\pi}{4}$ radians

24. $\frac{3\pi}{4}$ radians

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°

27. 135°

28. 270°

29. 225°