Mr. Ward

1 EXPLORE Graphing $f(\theta) = \sin\theta$

Graph $f(\theta) = \sin\theta$ for $0 \le \theta \le 2\pi$.

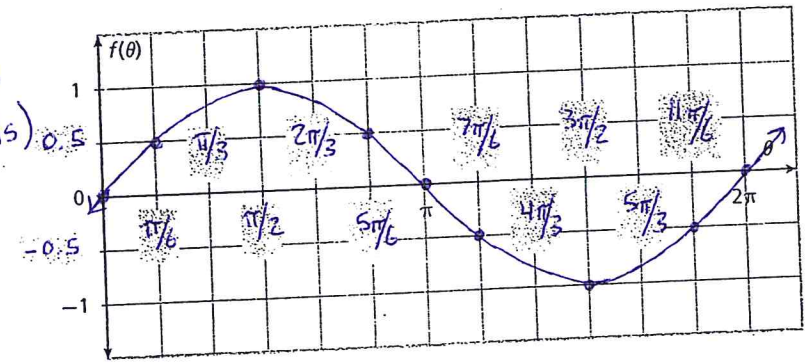
A Complete the axis labels on the coordinate plane below. The θ-axis shows angle measures in radians. The $f(\theta)$-axis shows the function values.

B Complete the table of values.

θ	0	$\frac{\pi}{6}$	$\frac{\pi}{2}$	$\frac{5\pi}{6}$	π	$\frac{7\pi}{6}$	$\frac{3\pi}{2}$	$\frac{11\pi}{6}$	2π
$f(\theta) = \sin\theta$	0	0.5	1	0.5	0	-0.5	-1	-0.5	0

C Plot the points from the table and draw a smooth curve through them.

(count by $\pi/6$ for intervals)



REFLECT

1a. Give a decimal approximation of $\sin\frac{\pi}{3}$. Check to see if the curve that you drew passes through the point $\left(\frac{\pi}{3}, \sin\frac{\pi}{3}\right)$. What other points can you check based on the labeling of the θ-axis?

0.866, yes it is on the curve

other points to check: $\sin 2\pi/3$, $\sin 4\pi/3$, $\sin 5\pi/3$

1b. On the interval $0 \le \theta \le 2\pi$, where does the sine function have positive values? Where does it have negative values?

Positive: $0 < \theta < \pi$ Negative: $\pi < \theta < 2\pi$

1c. List the θ-intercepts of the graph of $f(\theta) = \sin\theta$ on the interval $0 \le \theta \le 2\pi$. What do you think the next positive θ-intercept will be? Explain.

θ-intercepts: $0, \pi$, and 2π next at 3π (at multiples of π)

1d. What are the minimum and maximum values of $f(\theta) = \sin\theta$ on the interval $0 \le \theta \le 2\pi$? Where do the extreme values occur in relation to the θ-intercepts?

min = -1 max = 1 extreme values occur half way between the θ-intercepts

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2 EXPLORE Graphing $f(\theta) = \cos\theta$

Graph $f(\theta) = \cos\theta$ for $0 \le \theta \le 2\pi$.

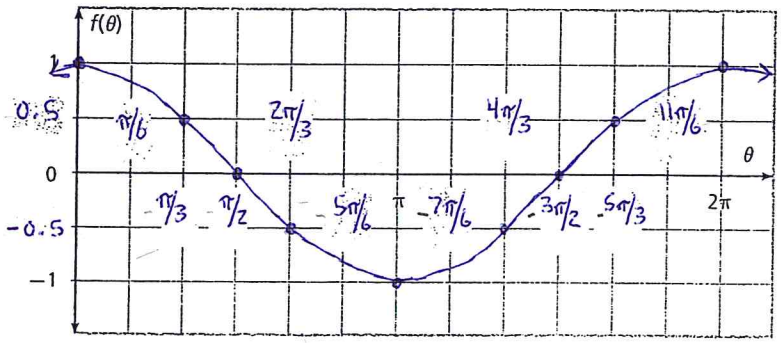
A Complete the axis labels on the coordinate plane below. The θ-axis shows angle measures in radians. The $f(\theta)$-axis shows the function values.

B Complete the table of values.

θ	0	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	π	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	2π
$f(\theta) = \cos\theta$	1	0.5	0	-0.5	-1	-0.5	0	0.5	1

C Plot the points from the table and draw a smooth curve through them.

(count by $\pi/6$ for intervals)



REFLECT

2a. On the interval $0 \le \theta \le 2\pi$, where does the cosine function have positive values? Where does it have negative values?

Positive: $0 < \theta < \pi/2$ and $3\pi/2 < \theta < 2\pi$ Negative: $\pi/2 < \theta < 3\pi/2$

2b. List the θ-intercepts of the graph of $f(\theta) = \cos\theta$ on the interval $0 \le \theta \le 2\pi$. What do you think the next positive θ-intercept will be? Explain.

θ-intercepts: $\pi/2$ and $3\pi/2$ next at $5\pi/2$ (odd multiples of $\pi/2$)

2c. What are the minimum and maximum values of $f(\theta) = \cos\theta$ on the interval $0 \le \theta \le 2\pi$? Where do the extreme values occur in relation to the θ-intercepts?

min = -1 max = 1 extreme values occur half way between the θ-intercepts