13.5 Notes The Cosine Function Day 65

A S T C

$y = \cos x$ ← I → ← II → ← III → ← IV →

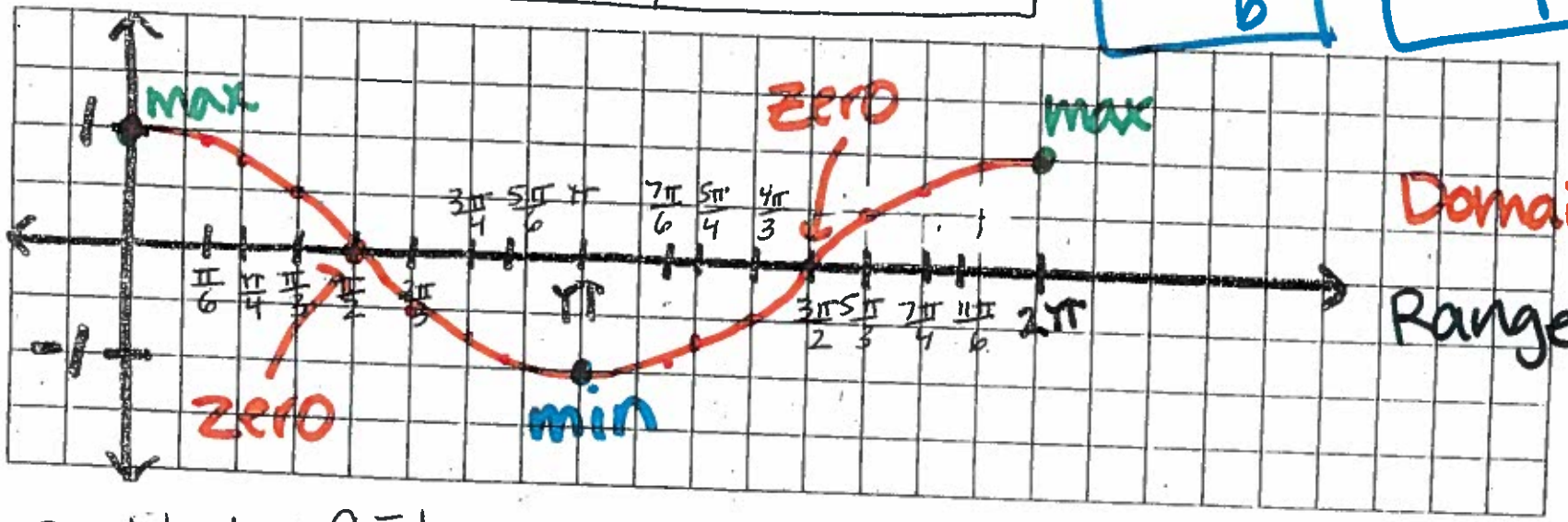
	0°	30°	45°	60°	90°	120°	135°	150°	180°	210°	225°	240°	270°	300°	315°	330°	360°
x	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π	$\frac{7\pi}{6}$	$\frac{5\pi}{4}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{5\pi}{3}$	$\frac{7\pi}{4}$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

.87 .7

remember they are the "X" values

$y = a\cos bx$ or $y = a\cos b\theta$

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



amplitude: $a = 1$

period: $P = 2\pi$

zeros: $\frac{\pi}{2}$, $\frac{3\pi}{2}$

max: (0, 1) and $(2\pi, 1)$

min: $(\pi, -1)$

5 points:

max – zero – min – zero – max

13.5

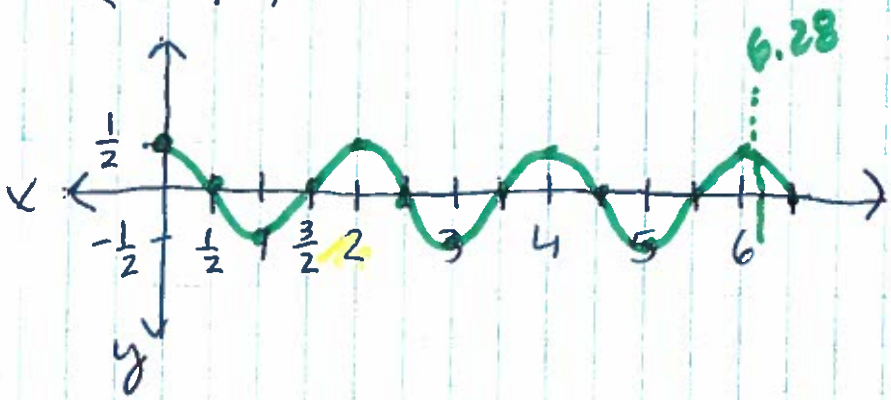
Sketch the interval from 0 to 2π.

① $y = \frac{1}{2}\cos \pi\theta$

amplitude: $\frac{1}{2}$

period: $P = \frac{2\pi}{\pi}$ $P = 2$

increments: $\frac{2}{4} = \frac{1}{2}$ $\left(= \frac{P}{4}\right)$



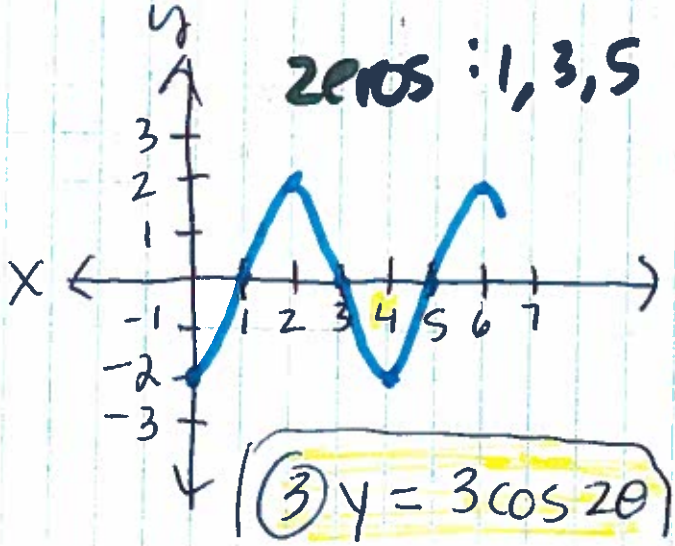
② $y = -2\cos \frac{\pi}{2}\theta$

reflection ↑ ↑ ↓ ↓

amp: $a = |-2| = 2$

period: $\frac{2\pi}{\pi/2} = 2\pi \cdot \frac{2}{\pi} = 4$

increments: $\frac{P}{4}$ $\frac{4}{4} = 1$



zeros: 1, 3, 5

interval 0 to 2π

Range: $[-2, 2]$

max (2, 2) (6, 2)

min (0, -2) (4, -2)

③ $y = 3\cos 2\theta$

③ $y = 3\cos 2\theta$

amp: $a = 3$

period: $P = \frac{2\pi}{2} = \pi$

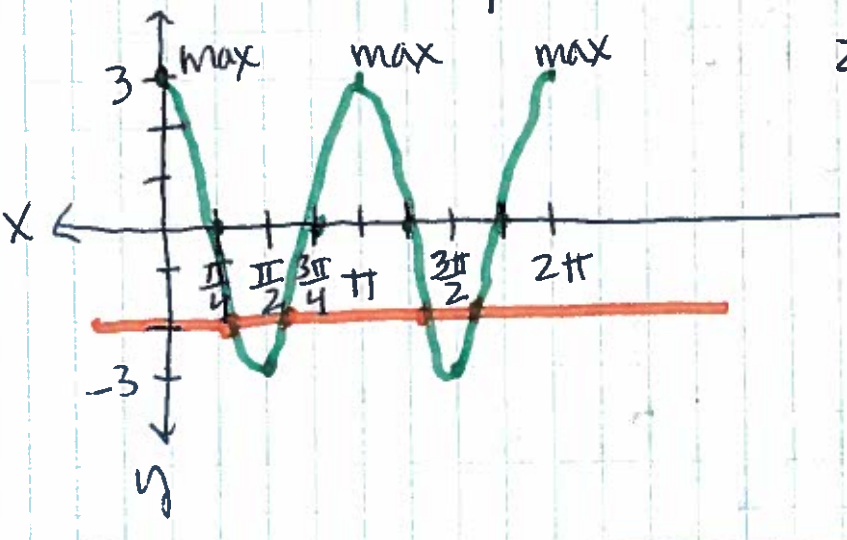
increments: $\frac{\pi}{4}$

range: $[-3, 3]$

max: $(0,3)(\pi,3)(2\pi,3)$

min: $(\frac{\pi}{2},-3)(\frac{3\pi}{2},-3)$

zeros: $\frac{\pi}{4}, \frac{3\pi}{4}, \frac{5\pi}{4}, \frac{7\pi}{4}$



Write a cosine function

ⓐ amplitude = 4 Period = 6π

$y = a\cos b\theta$ $\quad \boxed{y = 4\cos\frac{1}{3}\theta}$

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

$b = \frac{2\pi}{6\pi} = \frac{1}{3}$

ⓑ amp = 2.5 $\quad P = 8$

$\boxed{y = 2.5\cos\frac{\pi}{4}\theta}$

$b = \frac{2\pi}{8}$

$\frac{1}{4}\pi$.

open book to p. 745

p. 745

✓ #4 $3\cos 2t = -2$

Find all solutions From 0 to 2π.

$y_1 = 3\cos 2t$

$y_2 = -2$

window:

x-min: 0

x-max: 2π

2nd trace

intersect.

Finding the x-values (or t)

$t = 1.15, 2, 4.3, 5.1$