

## 6.4 Transformations of Trigonometric Functions

**Math Learning Target:**

"I can identify and graph any transformations of the trigonometric functions studied."

Ex.1: Graph for one period:  $f(x) = -2\cos\left(\frac{1}{2}x - \frac{\pi}{2}\right) + 1$

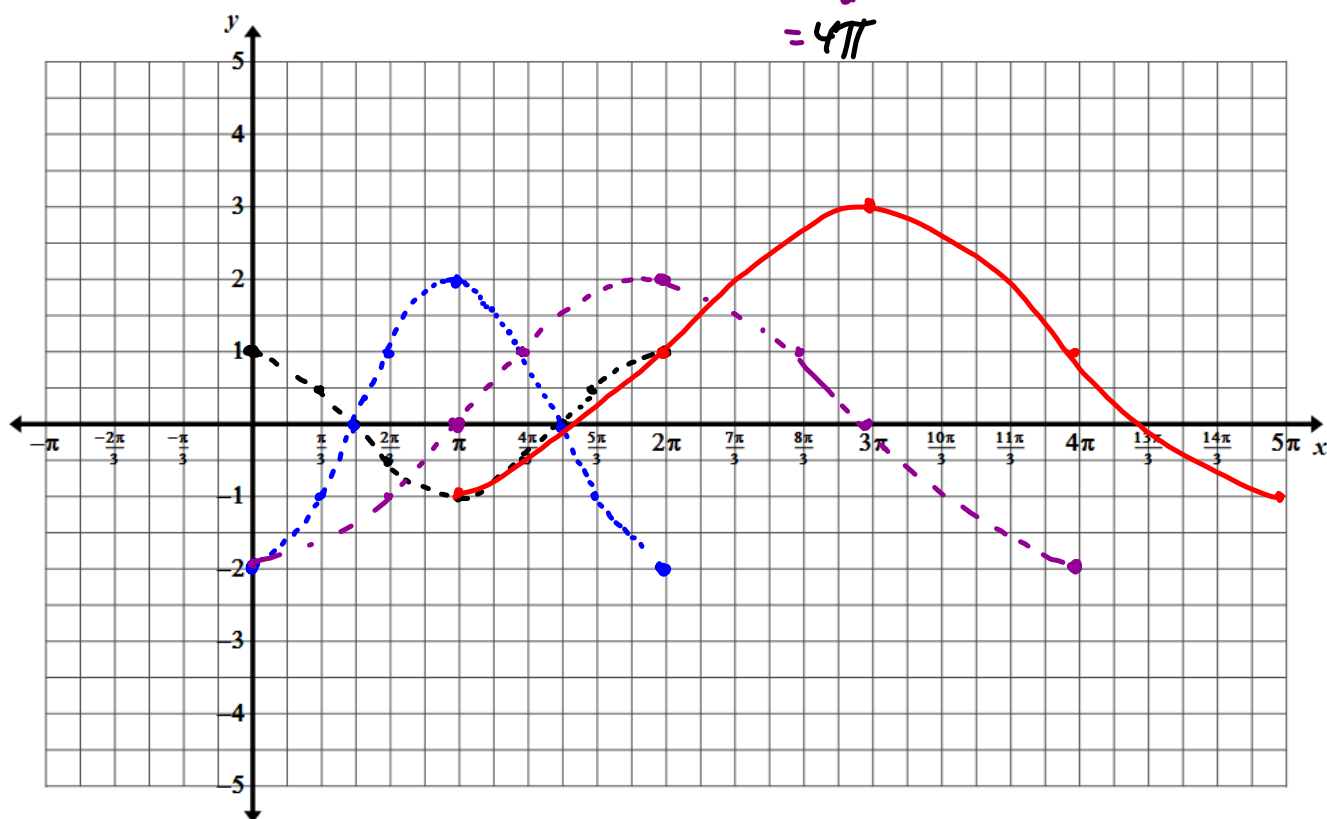
RST

$$\text{period} = \frac{2\pi}{k}$$

$$= -2\cos\left(\frac{1}{2}(x - \pi)\right) + 1$$

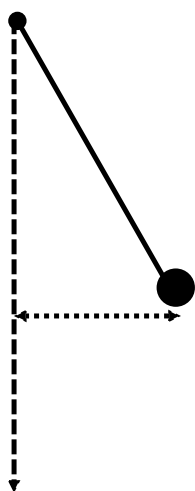
$$k = \frac{2\pi}{\text{period}}$$

$$\text{period} = \frac{2\pi}{\frac{1}{2}} = 4\pi$$

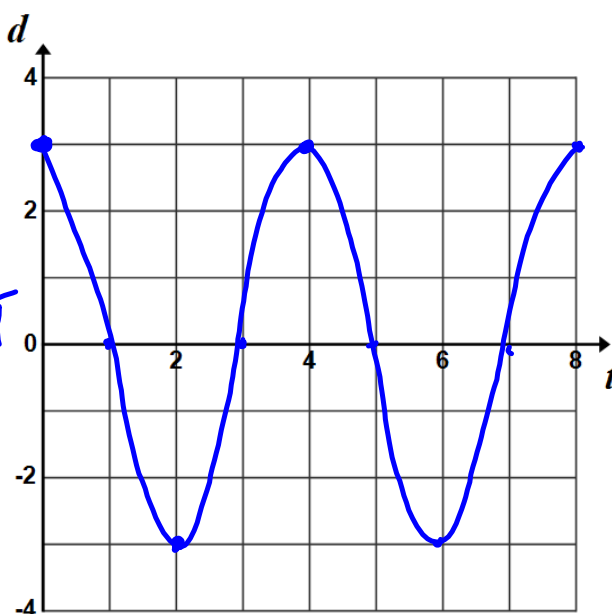


Ex. 2: A large pendulum swings back and forth with a maximum of a 3 m horizontal distance from its centre, and completes one cycle every 4 seconds.

- Graph this motion for two cycles, beginning it at the end of its swing.
- Write one equation to model the horizontal distance from its centre,  $d$ , over time,  $t$ .



$$\begin{aligned}
 a &= 3 \\
 c &= 0 \\
 d &= 0 \\
 k &= \frac{2\pi}{\text{period}} \\
 &= \frac{2\pi}{4} \\
 &= \frac{\pi}{2}
 \end{aligned}$$



$$\begin{aligned}
 y &= a \cos(k(x-d)) + c \\
 d &= 3 \cos\left(\frac{\pi}{2}(t-0)\right) + 0 \\
 d &= 3 \cos\left(\frac{\pi}{2}t\right)
 \end{aligned}$$

Entertainment: pp.343-346 #1ad, 4bc, 5ac, 6c, 7bc, 8c\*d\* graph (do not sketch), 9, 10\* graph (do not sketch), 11, 12, 14a