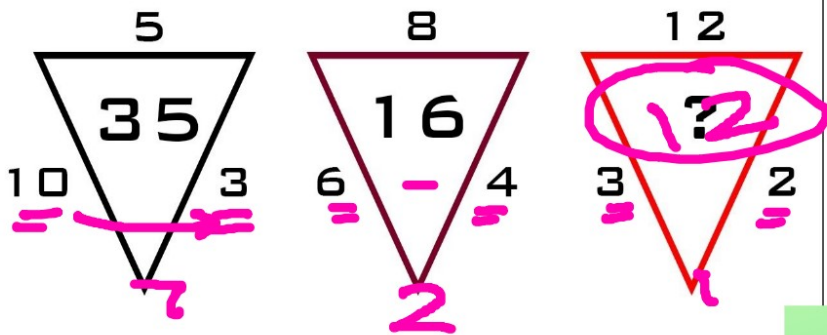
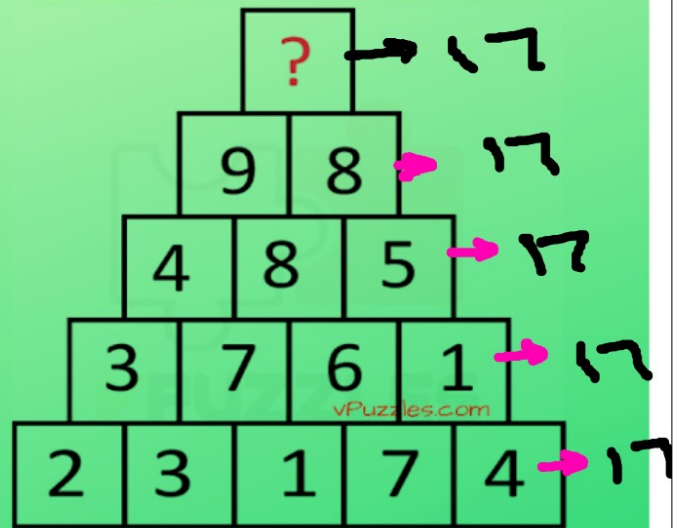


# MATH PUZZLE



## FIND THE MISSING NUMBER !



$$\textcircled{1} f(x) = -2 \sin(4x - \pi) + 3$$

$$\text{amp: } 2 = -2 \sin(4(x - \frac{\pi}{4})) + 3$$

$$\text{midline: } y = 3 \quad * \text{ Tick Marks}$$

$$\text{min: } 1$$

$$\text{max: } 5$$

$$\text{period: } \frac{\pi}{2}$$

$$\text{horizontal shift: Right } \frac{\pi}{4}$$

Reflected over x-axis

\* Sine fct  
start  
midline

$$\frac{\pi}{2} \cdot \frac{1}{4} = \frac{\pi}{8}$$

$$f(x) = -6 \cos\left(2x - \frac{\pi}{3}\right) - 4$$

Amp: 6

midline:  $y = -4$

min: midline - amp = -10

max: midline + amp = 2

$$\text{period: } \frac{2\pi}{\frac{1}{3}} = \frac{2\pi}{2} = \pi$$

$$\frac{\text{tick marks}}{\pi \cdot \frac{1}{3}} = \frac{\pi}{\frac{1}{3}}$$

horizontal shift:  $\frac{\pi}{3} \cdot \frac{1}{2} = \frac{\pi}{6}$  Right

$$f(x) = -4 \cos\left(3x - \frac{\pi}{2}\right) + 1$$

$$= -4 \cos 3\left(x - \frac{\pi}{6}\right) + 1$$

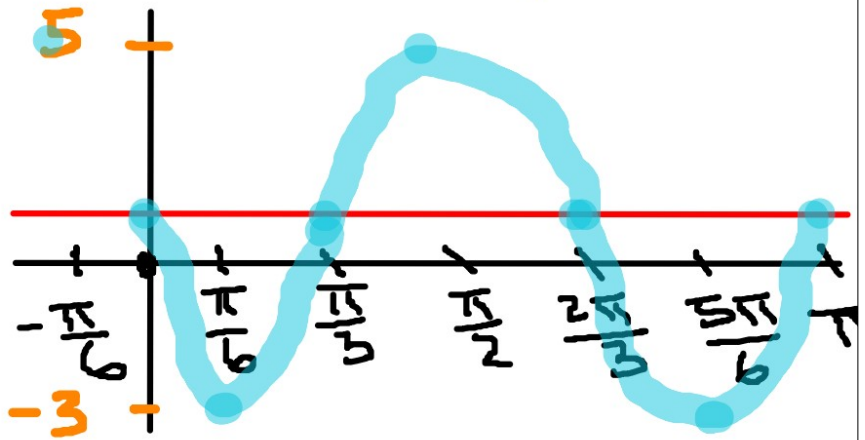
amp: 4

midline:  $y = 1$

min: -3

max: 5

period:  $\frac{2\pi}{3}$



horizontal shift

Right  $\frac{\pi}{6}$

Period  $\left(\frac{1}{3}\right)$

Tick mark every:  $\frac{2\pi}{3} \cdot \frac{1}{4} = \frac{2\pi}{12} = \frac{\pi}{6}$

X-axis

Graph:

$$y = 5 \sin \left( 4x + \frac{\pi}{4} \right) + 2$$
$$= 5 \sin \left( 4 \left( x + \frac{\pi}{16} \right) \right) + 2$$

