

Precalculus 4.5 Review Worksheet

Name _____

Identify the amplitude, period, and phase shift of the given function.

1. $y = 3 \cos(x + \frac{\pi}{4}) + 1$
 Amp = 3
 Per = 2π
 P.S. = $\frac{\pi}{4}$ to left
 $\frac{3}{2\pi} \frac{\pi}{4}$

2. $y = 5 \sin(2x - \frac{\pi}{3}) \rightarrow 5 \sin[2(x - \frac{\pi}{6})]$
 Amp = 5
 Per = $\frac{2\pi}{2} = \pi$
 P.S. = $\frac{\pi}{6}$ to right

Write the indicated function of each graph.

3.
 Start @ midline means sine
 decreases from midline means neg (reflected)
 $a = 3$
 Per = π so $b = 2$ $c = 0$ $d = 0$
 Sine: $y = -3 \sin 2x$

4.
 $a = 1$
 Per = $\frac{\pi}{2} = \frac{2\pi}{b}$
 $b = 4$
 $c = 0$ $d = 0$
 Cosine: $y = \cos 4x$

Write the equation of a function with the given characteristics.

5. Cosine Function
 Amplitude = 2
 Period = $\frac{\pi}{3} = \frac{2\pi}{b}$ so $b = 6$
 Vertical shift = 1
 $a = 2$
 $c = 0$
 $d = 1$
 $y = 2 \cos 6x + 1$

6. Sine Function
 Amplitude = 3
 Period = $8\pi = \frac{2\pi}{b}$ so $b = \frac{1}{4}$
 Phase Shift = $\frac{\pi}{2}$ $c = \frac{\pi}{4}$
 Reflection in the x-axis neg @ start
 $y = -3 \sin(\frac{1}{4}(x - \frac{\pi}{4}))$ or
 $y = -3 \sin(\frac{1}{4}x - \frac{\pi}{8})$

Match the function to its graph.

7. B. $y = 2 \sin(2x)$
 A.
 8. A. $y = 2 - \sin(2x)$
 Up 2
 C.
 9. C. $y = -2 \sin x$
 No shift, reflect, start @

1. $y = 3 \cos(x + \frac{\pi}{4}) + 1$



Graph each of the functions. Include all relative extrema and intercepts. Graph as many periods of the function that will fit on the grid provided. List the amplitude, period, phase shift, and vertical shift for each function.

10. $y = -\sin(x - \frac{\pi}{4})$ reflect. Key pts: $(\frac{\pi}{4}, 0), (\frac{3\pi}{4}, -1), (\frac{5\pi}{4}, 0), (\frac{7\pi}{4}, 1)$
 Amp: 1 Per: 2π P.S.: $\frac{\pi}{4}$ vs: 0

11. $y = 2 \cos \frac{1}{4}x$ Per: $\frac{2\pi}{1/4} = 8\pi$ Key pts: $(0, 2), (4\pi, 0), (8\pi, -2), (12\pi, 0), (16\pi, 2)$
 Amp: 2 Per: 8π P.S.: 0 vs: 0

12. $y = -3 \cos(x - \pi) + 4$ reflect. Key pts: $(\pi, 4), (\frac{3\pi}{2}, 1), (2\pi, 4), (\frac{5\pi}{2}, 1)$
 Amp: 3 Per: 2π P.S.: π vs: 4

13. $y = \cos(x + \frac{\pi}{3}) + 1$ Key pts: $(-\frac{\pi}{3}, 2), (0, 1), (\frac{\pi}{3}, 0), (\frac{2\pi}{3}, 1), (\pi, 2)$
 Amp: 1 Per: 2π P.S.: $-\frac{\pi}{3}$ vs: 1

14. $y = -1 + 3 \sin(x + \pi)$ Key pts: $(-\pi, 2), (-\frac{3\pi}{2}, 0), (-\pi, -2), (-\frac{1\pi}{2}, 0), (0, 2)$
 Amp: 3 Per: 2π P.S.: $-\pi$ vs: -1

15. $y = 3 \sin(x - \frac{3\pi}{2}) - 2$ Key pts: $(\frac{3\pi}{2}, -2), (2\pi, 1), (\frac{5\pi}{2}, -2), (3\pi, 1), (3\frac{1}{2}\pi, -2)$
 Amp: 3 Per: 2π P.S.: $\frac{3\pi}{2}$ vs: -2

16. $y = -\cos(\frac{1}{2}x) - 2$ Per: $\frac{2\pi}{1/2} = 4\pi$ Key pts: $(0, -3), (\pi, -2), (2\pi, -3), (3\pi, -2), (4\pi, -3)$
 Amp: 1 Per: 4π P.S.: 0 vs: -2

17. $y = -2 \cos(x + \frac{\pi}{6})$ Key pts: $(-\frac{\pi}{6}, 2), (0, 1), (\frac{\pi}{6}, 0), (\frac{2\pi}{6}, 1), (\frac{3\pi}{6}, 2)$
 Amp: 2 Per: 2π P.S.: $-\frac{\pi}{6}$ vs: 0