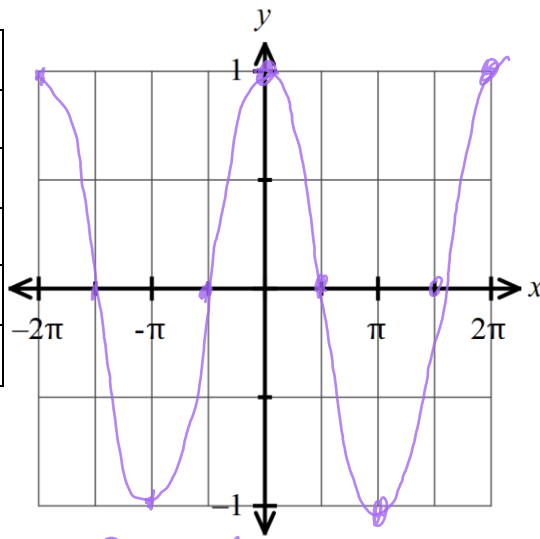


Parent Functions #11

Name of Graph: cosine

Equation: $f(x) = \cos x$

x	f(x)
0	1
$\frac{\pi}{2}$	0
π	-1
$\frac{3\pi}{2}$	0
2π	1



Key Features

- Domain: $(-\infty, \infty)$
- Range: $[-1, 1]$
- x-intercept(s): $x = \frac{\pi}{2} + \pi k$
- y-intercept: $(0, 1)$
- Increasing: periodically
- Decreasing: periodically
- Constant: N/A
- Amplitude: 1
- Period: 2π
- Positive: periodically
- Negative: periodically
- Maximums / Minimums: absolute 1, -1
- Symmetry: even
- End Behavior:
 - $\lim_{x \rightarrow -\infty} f(x) = N/A$
 - $\lim_{x \rightarrow \infty} f(x) = N/A$
- Phase Shift: 0
- Vertical Shift: 0
- Midline: $y = 0$

Cycle: how many waves

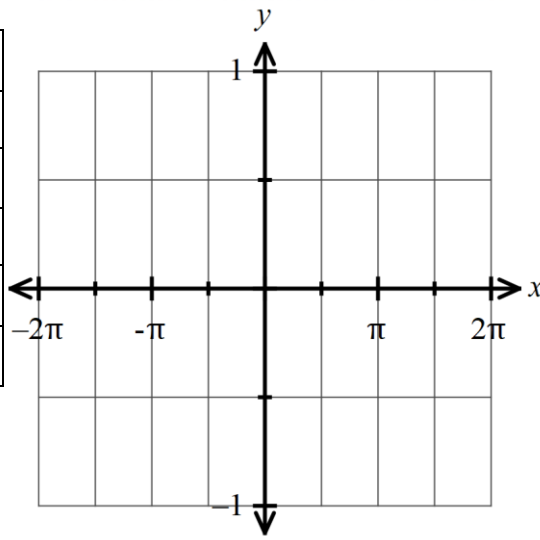
Transformation Equation:
 $y = a \cos(b(x-c)) + d$

Parent Functions #11

Name of Graph: _____

Equation: _____

x	f(x)



Key Features

- Domain:
- Range:
- x-intercept(s):
- y-intercept:
- Increasing:
- Decreasing:
- Constant:
- Amplitude:
- Period:
- Positive:
- Negative:
- Maximums / Minimums
- Symmetry:
- End Behavior:
 - $\lim_{x \rightarrow -\infty} f(x) =$
 - $\lim_{x \rightarrow \infty} f(x) =$
- Phase Shift:
- Vertical Shift:
- Midline:

Cycle:

Transformation Equation:

Steps for solving cosine equation:

1. Get cosine by itself
 - a. do inverse operations
 - b. factor—"U" substitution
 - c. use identity to change
2. Use "All Students Take Calculus" to draw triangles in correct quadrants
3. Label the sides of the triangles—adjacent over hypotenuse
4. Find the reference angle
5. Find the angles in standard position
Stop here if you are given an interval in the directions
6. If directions say to find ALL angles, write the equations
 $\theta = \text{angle} + 2\pi k$ or $\theta = \text{angle} + 360^\circ k$

EX. $3 \cos^2 x - 4 \cos x = 4$

EX. $2\sqrt{2} - 6 \cos x = 5\sqrt{2}$

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