

Introduction to Piecewise Functions

Represented by a combination of equations, each corresponding to a part of the domain

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| <p>1. Equation</p> $y = -\frac{1}{3}x + 1$ <p style="text-align: right;">$m = -\frac{1}{3} \downarrow$ $b = 1$</p> | <p>2. Equation</p> $y = \frac{2}{3}x - 4$ <p style="text-align: right;">$m = \frac{2}{3} \uparrow$ $b = -4$</p> |
| <p>1. Graph</p> | <p>2. Graph</p> |
| <p>Highlight the PIECE where x is less than 0</p> <p style="text-align: center;">$x < 0$ (Constraint)</p> | <p>Highlight the PIECE where x is greater than or equal to 0</p> <p style="text-align: center;">$x \geq 0$ (Constraint)</p> |

Combine both PIECES into ONE FUNCTION called a Piecewise Function

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| <p>Equation</p> $f(x) = \begin{cases} -\frac{1}{3}x + 1, & \text{if } x < 0 \quad (\text{open circle}) \\ \frac{2}{3}x - 4, & \text{if } x \geq 0 \quad (\text{closed circle}) \end{cases}$ | <p>Graph</p> |
| <p>*Steps to graph on calc:</p> <ol style="list-style-type: none"> ① press $y=$ ② place expressions in a set of () ③ place constraints in a set of () using and mem1 key + the symbols ④ press graph | |

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| <p>3. Equation</p> $y = -2x - 4$ <p>$m = -\frac{2}{1} \downarrow$ $B = -4$</p> | <p>4. Equation <i>horizontal line</i></p> $y = -4$ <p>$m = 0$ $b = -4$</p> | <p>5. Equation</p> $y = \frac{1}{2}x + 3$ <p>$m = \frac{1}{2} \rightarrow$ $B = 3$</p> |
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| <p>Highlight the PIECE where x is less than -3</p> <p>$x < -3$ (constraint)</p> | <p>Highlight the PIECE where x is greater than -3 and less than 2</p> <p>$-3 < x < 2$ (constraint)</p> | <p>Highlight the PIECE where x is greater than or equal to 2</p> <p>$x \geq 2$ (constraint)</p> |

Combine all PIECES into ONE FUNCTION called a Piecewise Function

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| <p>Equation</p> $f(x) = \begin{cases} -2x - 4, & \text{if } x < -3 & \text{(open circle)} \\ -4, & \text{if } -3 < x < 2 & \text{(open circles)} \\ \frac{1}{2}x + 3, & \text{if } x \geq 2 & \text{(closed circle)} \end{cases}$ |
| <p>Graph</p> |