Absolute Value

Solving equations with absolute value

1. Isolate the absolute value part of the equation
2. Set the quantity inside the absolute value equal to + and – the quantity on the other side of the equals sign
3. Solve each for the variable
4. Check your answers by plugging them back into the equation

✓Ex) Solve $|2x - 1| = 5$

$2x-1=5$ $\quad 2x-1=-5$

$2x=6$ $\quad 2x=-4$

$x=3$ $\quad x=-2$

$|2(3)-1|=5$ $\quad |2(-2)-1|=5$

$|6-1|=5$ $\quad |-4-1|=5$

$|5|=5$ ✓ $\quad |-5|=5$ ✓

✓Ex) Solve $4 + 2|2 + 3x| = 28$

$2|3+3x|=24$

$|3+3x|=12$

$3+3x=12$ $\quad 3+3x=-12$

$3x=9$ $\quad 3x=-15$

$x=3$ $\quad x=-5$

$4+2|3+3(3)|=28$ $\quad 4+2|3+3(-5)|=28$

$4+2|12|=28$ $\quad 4+2|-12|=28$

$4+24=28$ ✓ $\quad 4+24=28$ ✓

Finding x and y intercepts of equations with absolute value

- y intercept → set x equal to 0, solve for y. $(0, y)$
- x intercept → set y equal to 0, solve for x using rules above. $(x, 0)$

✓ Ex) Find the x and y intercepts of a) $y = |2x+5| - 3$ ✓b) $y = -|x + 10|$

a) xint: $0=|2x+5|-3$

$3=|2x+5|$

$-3=2x+5$ $\quad 3=2x+5$

$-8=2x$ $\quad -2=2x$

$x=-4$ $\quad x=-1$

b) yint: $y=|2(0)+5|-3$

$y=|5|-3$

$y=2$

b) xint: $0=-|x+10|$

$0=x+10$

$x=-10$

yint: $y=-|0+10|$

$y=-|10|$

$y=-10$

xint: $x=-10$

yint: $x=-10$

$-10=-|x+10|$

$-10=-x-10$

Radian and Degree Conversions

Converting from degrees to radians: multiply the degree measure by $\frac{\pi}{180}$

✓ Ex) Convert 60° to radians

$$\frac{60}{1} \cdot \frac{\pi}{180} = \frac{6\pi}{18} = \frac{\pi}{3}$$

Converting from radians to degrees: multiply the radian measure by $\frac{180}{\pi}$

✓ Ex) Convert $\frac{3\pi}{4}$ to degrees

$$\frac{3\pi}{4} \cdot \frac{180}{\pi} = \frac{540}{4} = 135°$$