Absolute Value Test

1a) $|-3+9-11|$
$= |-5|$
$= 5$
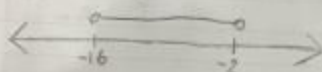
1b) $|3+\sqrt{5} - \sqrt{30}|$
$= -3 - \sqrt{5} + \sqrt{30}$

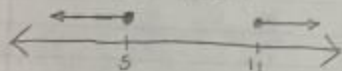2a) $|a+9| < 7$
$-16 < a < -2$

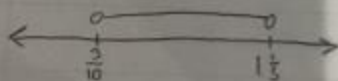2b) $|m - 8| \geq 3$
$m \leq 5$ OR $m \geq 11$

2c) $|4y - 3| < 1\frac{4}{5}$
$\frac{3}{10} < y < 1\frac{1}{5}$

2d) $5 \leq |2a - 5| \leq 11$

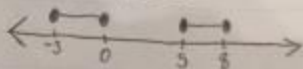| Positive Case	Negative Case
$5 \leq 2a - 5 \leq 11$	$5 \leq -(2a-5) \leq 11$
$10 \leq 2a \leq 16$	$-5 \geq 2a - 5 \geq -11$
$5 \leq a \leq 8$	$0 \geq 2a \geq -6$
	$0 \geq a \geq -3$

$5 \leq a \leq 8$
$0 \geq a \geq -3$

2e) $-6 < |2b+5| < 0$

Positive Case	Negative Case
$-6 < 2b+5 < 0$	$-6 < -(2b+5) < 0$
$-11 < 2b < -5$	$6 > 2b+5 > 0$
$-5\frac{1}{2} < b < -2\frac{1}{2}$	$1 > 2b > -5$
	$\frac{1}{2} > b > -2\frac{1}{2}$

No Solution

2f) $\dfrac{2b-7}{5} - 4b = \dfrac{|b+6|}{2}$

$4b - 14 - 40b = |5b+30|$

Positive Case	Negative Case
$4b-14-40b = 5b+30$	$4b-14-40b = -(5b+30)$
$-41b = 44$	$4b - 14 - 40b = -5b - 30$
$b = -1\frac{3}{41}$	$-31b = -16$
	$b = \frac{16}{31}$

Try both $\longrightarrow \frac{16}{31}$ doesn't work

$-1\frac{3}{41}$

2g) $\left|3(|x+4|)-2\right| < 9$

Region A: $x < -4$
$|-3(x+4)-2| < 9$
$|-3x-14| < 9$

Region C: $x < -4\frac{2}{3}$
$-(-3x-14) < 9$
$3x+14 < 9$
$3x < -5$
$x < -1\frac{2}{3}$
∴ $x < -4\frac{2}{3}$

Region D: $x \geq -4\frac{2}{3}$
$-3x+14 < 9$
$-3x < -5$
$x > 1\frac{2}{3}$
∴ No Solution

Region B: $x \geq -4$
$|3(x+4)-2| < 9$
$|3x+10| < 9$

Region E: $x < -3\frac{1}{3}$
$-(3x+10) < 9$
$-3x-10 < 9$
$-3x < 19$
$x > -6\frac{1}{3}$
∴ $-4 \leq x < -3\frac{1}{3}$

Region D: $x \geq -3\frac{1}{3}$
$3x+10 < 9$
$3x < -1$
$x < -\frac{1}{3}$
∴ $-3\frac{1}{3} \leq x < -\frac{1}{3}$
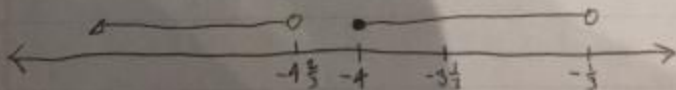
2b) $6|4-3d| - 2|d+5| > 9$
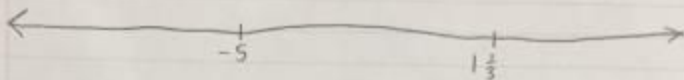
Region A: $d < -5$
$6(4-3d) + 2(d+5) > 9$
$24 - 18d + 2d + 10 > 9$
$\quad -16d + 34 > 9$
$\quad\quad -20d > -25$
$\quad\quad\quad d < 1\frac{1}{4}$
$\therefore x < -5$

Region B: $-5 \leq d < 1\frac{1}{3}$
$6(4-3d) - 2(d+5) > 9$
$24 - 18d - 2d - 10 > 9$
$\quad -20d + 14 > 9$
$\quad\quad -20d > -5$
$\quad\quad\quad d < \frac{1}{4}$
$\therefore -5 \leq d < \frac{1}{4}$

Region C: $1\frac{1}{3} \geq x$
$-6(4-3d) - 2(d+5) > 9$
$-24 + 18d - 2d - 10 > 9$
$\quad\quad 16d - 34 > 9$
$\quad\quad\quad 16d > 43$
$\quad\quad\quad\quad d > 2\frac{11}{16}$
$\therefore d > 2\frac{11}{16}$

$d < \frac{1}{4}$
$d > 2\frac{11}{16}$