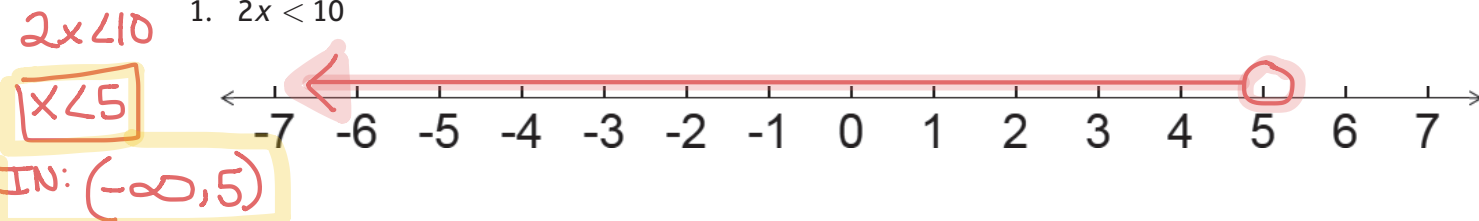NAME: _____ PERIOD: _____ DATE: _____
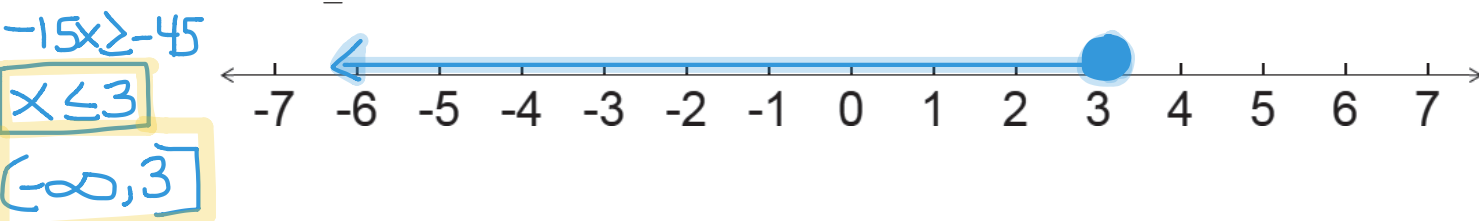
Homework Problem Set

Find the solution set to each inequality. Express the solution graphically on the number line and give the solution in interval notation.
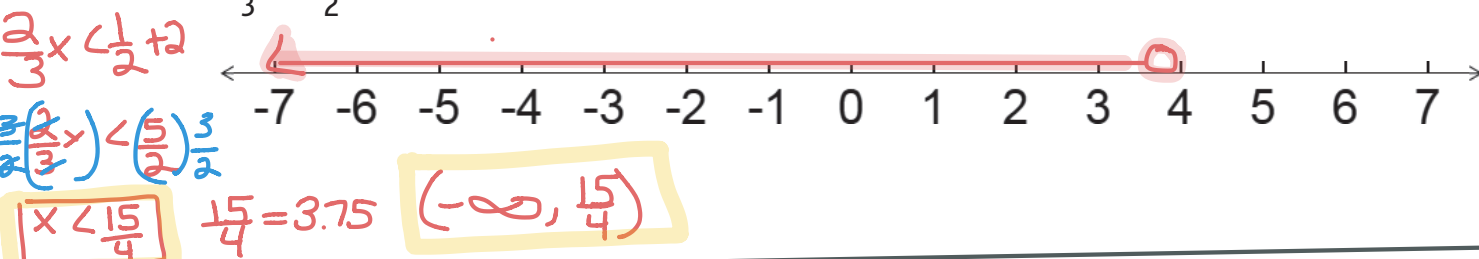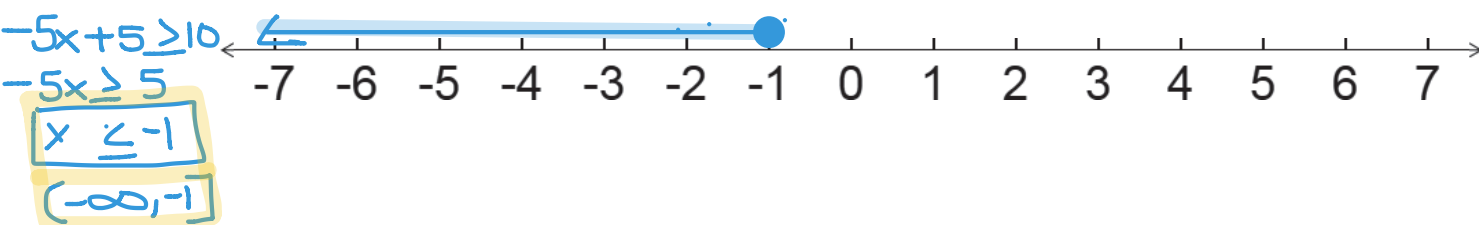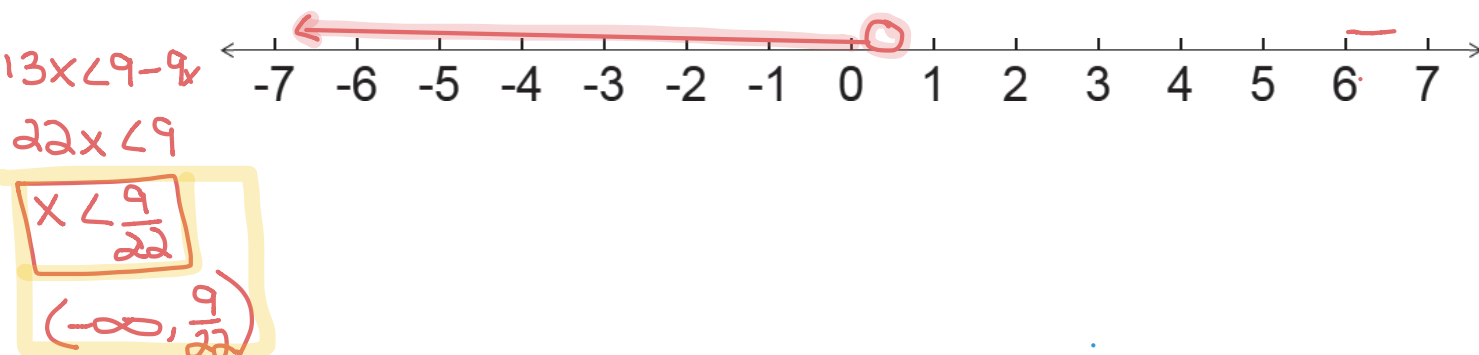
1. $2x < 10$

Handwritten:
$2x < 10$
$x < 5$
IN: $(-\infty, 5)$

(Number line marked from -7 to 7, open circle at 5, shaded to the left)

2. $-15x \geq -45$

Handwritten:
$-15x \geq -45$
$x \leq 3$
$(-\infty, 3]$

(Number line marked from -7 to 7, closed circle at 3, shaded to the left)

3. $\frac{2}{3}x < \frac{1}{2} + 2$

Handwritten:
$\frac{2}{3}x < \frac{1}{2} + 2$
$\frac{3}{2}\left(\frac{2}{3}x\right) < \left(\frac{5}{2}\right)\frac{3}{2}$
$x < \frac{15}{4}$ $\frac{15}{4} = 3.75$ $\left(-\infty, \frac{15}{4}\right)$

(Number line marked from -7 to 7, open circle near 3.75, shaded to the left)

4. $-5(x - 1) \geq 10$

Handwritten:
$-5x + 5 \geq 10$
$-5x \geq 5$
$x \leq -1$
$(-\infty, -1]$

(Number line marked from -7 to 7, closed circle at -1, shaded to the left)

5. $13x < 9(1 - x)$

Handwritten:
$13x < 9 - 9x$
$22x < 9$
$x < \frac{9}{22}$
$\left(-\infty, \frac{9}{22}\right)$

(Number line marked from -7 to 7, open circle near 0, shaded to the left)

6. Solve $-\dfrac{x}{16} + 1 \geq -\dfrac{5x}{2}$, for x without multiplying by a negative number. Then, solve by multiplying on both sides by -16.

Solving without multiplying by a negative number	Solving by multiplying by −16
$-\dfrac{x}{16} + 1 \geq -\dfrac{5x}{2}$	$-\dfrac{x}{16} + 1 \geq -\dfrac{5x}{2}$

Solving without multiplying by a negative number:

$$-\frac{x}{16} + \frac{5}{2}x + 1 \geq 0$$

$$-\frac{x}{16} + \frac{40}{16}x \geq -1$$

$$\frac{39x}{16} \geq -1$$

$$\boxed{x \geq -\frac{16}{39}}$$

← SAME

Solving by multiplying by −16:

$$\overset{-16}{\left(-\frac{x}{16} + 1\right)} \geq \overset{-8}{\left(-\frac{5x}{2}\right)}^{16}$$

$$\begin{array}{rcl} x - 16 & \leq & 40x \\ -x & & -x \\ \hline \end{array}$$

$$\frac{-16}{39} \leq \frac{39x}{39}$$

$$\frac{-16}{39} \leq x$$

$$\boxed{x \geq -\frac{16}{39}}$$

7. Lisa brought half of her savings to the bakery and bought 12 croissants for $14.20. The amount of money she brings home with her is <u>more than</u> $2.00. Use an inequality to find how much money she had in her savings before going to the bakery. (Write the inequality that represents the situation, and solve it.)

$x =$ Lisa's savings

$$\boxed{\frac{x}{2} - 14.20 > 2}$$

$$\cancel{2}\left(\frac{x}{\cancel{2}}\right) > 16.20 \,(2)$$

$$\boxed{x > 32.40} \Longrightarrow \text{Lisa's savings}$$

8. Solve $-18 - 16t > -6 - 100t$, for t in two different ways: first without ever multiplying on both sides by a negative number and then by first multiplying on both sides by $-\frac{1}{2}$ or dividing by -2.

Solving without multiplying by a negative number	Solving by multiplying by $-\frac{1}{2}$ or dividing by -2
$-18 - 16t > -6 - 100t$	$-18 - 16t > -6 - 100t$
$-18 - 16t > -6 - 100t$ $\quad +100t \qquad +100t$ _____ $-18 + 84t > -6$ $+18 \qquad\quad +18$ _____ $\dfrac{84t}{84} > \dfrac{12}{84}$ $\boxed{t > \frac{1}{7}}$	$\dfrac{-18 - 16t}{-2} > \dfrac{-6 - 100t}{-2}$ $9 + 8t < 3 + 50t$ $\quad -50t \qquad -50t$ _____ $9 - 42t < 3$ $-9 \qquad\quad -9$ _____ $\dfrac{-42t}{-42} < \dfrac{-6}{-42}$ $\boxed{t > \frac{1}{7}}$

$\boxed{t > \frac{1}{7}} \leftarrow$ SAME $\rightarrow \boxed{t > \frac{1}{7}}$

Find the solution set to each inequality. Express the solution in interval notation.

9. $2x + 4 \geq 24$

$2x + 4 \geq 24$
$2x \geq 20$
$\boxed{x \geq 10}$
$\boxed{[10, \infty)}$

10. $\frac{m}{3} - 3 \leq -6$

$\frac{m}{3} - 3 \leq -6$
$\frac{m}{3} \leq -3$
$\boxed{m \leq -9}$
$\boxed{(-\infty, -9]}$

11. $-3(p + 1) < 18$

$-3p - 3 < 18$
$-3p < 21$
$\boxed{p > -7}$
$\boxed{(-7, \infty)}$

12. $-4(-4 + x) > 56$

$16 - 4x > 56$
$-4x > 40$
$\boxed{x < 10}$
$\boxed{(-\infty, -10)}$

13. $-b - 2 > 8$

$-b > 10$
$\boxed{b < 10}$
$\boxed{(-\infty, -10)}$

14. $-4(3 + n) > -32$

$3 + n < 8$
$\boxed{n < 5}$
$\boxed{(-\infty, 5)}$

15. $4 + \frac{n}{3} < 6$

$\frac{n}{3} < 2$

$n < 6$

$(-\infty, 6)$

16. $-3(r - 4) \geq 0$

$\frac{-3}{-3} \quad \frac{}{-3}$

$r - 4 \leq 0$

$r \leq 4$

$(-\infty, 4]$

17. $\frac{3(p - 7)}{3} > \frac{-21}{3}$

$p - 7 > -7$

$p > 0$

$(0, \infty)$

18. $7x - 7 < -56$

$7x < -49$

$x < -7$

$(-\infty, -7)$

19. $\frac{-9 + a}{15} > 1$

$15 \left(\frac{-9 + a}{15} \right) > (1) 15$

$-9 + a > 15$

$a > 24$

$(24, \infty)$

20. $-11x - 4 > -15$

$-11x > -11$

$x < 1$

$(-\infty, 1)$

Spiral REVIEW—Solving Absolute Value Equations

Solve each absolute value equation for the variable. Be sure to check your solution.

21. $|3x| = 9$

$x = 3, -3$

22. $|-3r| = 9$

$r = -3, 3$

23. $\left| \frac{b}{5} \right| = 1$

$b = -5, 5$

24. $|-6m| = 30$

$m = -5, 5$

25. $\left| \frac{n}{3} \right| = 2$

$n = -6, 6$

26. $|-4 + 5x| = 16$

$x = -\frac{12}{5}, 4$

27. $|-2r - 1| = 11$

$r = -6, 5$

28. $|1 - 5a| = 29$

$a = -\frac{28}{5}, 6$

29. $3|-8x| + 8 = 80$

$x = -3, 3$