p480 9-19 odd, 23-33 odd, 38

Key

(9) $\log_{25} x = \frac{5}{2}$

$25^{\frac{5}{2}} = x$

$5^5 = \boxed{3125}$

(11) $\log_{10} \frac{1}{36} = x$

$6^x = \frac{1}{36}$

$\boxed{x = -2}$

(13) $\log_x 27 = \frac{3}{2}$

$x^{\frac{3}{2}} = 27$

$3^2 = \boxed{9}$

(15) $\log_{12}(x^2-7) = \log_{12}(x+5)$

$x^2 - 7 = x + 5$

$x^2 - x - 12 = 0$

$(x-4)(x+3) = 0$

$\boxed{x = 4, -3}$

(17) $\log_9(x^2-4x) = \log_9(3x-10)$

$x^2 - 4x = 3x - 10$

$x^2 - 7x + 10 = 0$

$(x-5)(x-2) = 0$

$\boxed{x = 5, 2}$

(19) $\log_7(x^2-4) = \log_7(-x+2)$

$x^2 - 4 = -x + 2$

$x^2 + x - 6 = 0$

$(x+3)(x-2) = 0$

$\boxed{x = -3, 2}$

(23) $\log_4 x \geq 4$

$4^{\log_4 x} \geq 4^4$

$x \geq 4^4$ $\quad x \geq 256$

$\boxed{[256, \infty)}$

(25) $\log_2 x \leq -2$

$2^{\log_2 x} \leq 2^{-2}$

$x \leq \frac{1}{4}$

$0 < x \leq \frac{1}{4}$ $\quad \boxed{(0, \frac{1}{4}]}$

$\neq 0$ because VA: $x = 0$

(27) $\log_7 x < -1$

$7^{\log_7 x} < 7^{-1}$

$x < \frac{1}{7}$

$0 < x < \frac{1}{7}$

$\boxed{(0, \frac{1}{7})}$

(29) $\log_7(x+2) \geq \log_7(6x-3)$

$x + 2 \geq 6x - 3$ $\quad x + 2 > 0$ $\quad 6x - 3 > 0$

$-5x + 2 \geq -3$ $\quad x > -2$ $\quad x > \frac{1}{2}$

$-5x \geq -5$

$x \leq 1$ $\quad \boxed{\frac{1}{2} < x \leq 1}$ $\quad (\frac{1}{2}, 1]$

(31) $\log_5(12x+5) \leq \log_5(8x+9)$

$12x+5 \leq 8x+9$

$4x+5 \leq 9$

$4x \leq 4$

$x \leq 1$

$8x+9>0$ $\quad 12x+5>0$

$8x>-9$ $\quad 12x>-5$

$x>-\frac{9}{8}$ $\quad x>-\frac{5}{12}$

$\left(-\frac{5}{2}, 1\right]$ $\quad -\frac{5}{2} < x \leq 1$

(33) $\log_9(9x+4) \leq \log_9(11x-12)$

$9x+4 \leq 11x-12$

$-2x+4 \leq -12$

$-2x \leq -16$

$x \geq 8$ $\quad [8, \infty)$

(38) Ryan. Heather switched the symbol.