1) $2x - 3y = -15$
$5x + y = 22$

$2x - 3y = -15$
$15x + 3y = 66$
$17x = 51$
$x = 3$
$y = 7$

2) $21x + 4y = -22$
$2x - 3y = -19$

$63x + 12y = -66$
$8x - 12y = -76$
$71x = -142$
$x = -2$
$y = 5$

3) $7^{3x+y} = 343 = 7^3$
$5^{2x+3y} = 25 = 5^2$

$3x + y = 3$
$2x + 3y = 2$

$-9x - 3y = -9$
$2x + 3y = 2$
$-7x = -7$
$x = 1$
$y = 0$

4) $16^{-x+2y} = 32 = 16^{1.25}$
$36^{3x+2y} = 216 = 36^{1.5}$

$-x + 2y = 1.25$
$3x + 2y = 1.5$

$-4x + 8y = 5$
$-12x - 8y = -6$
$-16x = -1$
$x = \frac{1}{16}$
$y = \frac{21}{32}$

5) $\frac{1}{x} + \frac{1}{y} = 19$
$-\frac{1}{x} + \frac{5}{y} = -7$

$\frac{6}{y} = 12$
$2 = 12y$
$12y = 2$
$y = \frac{1}{6}$
$x = \frac{1}{13}$

6) $\frac{5}{x} + \frac{9}{y} = 15$
$\frac{11}{x} - \frac{2}{y} = 21$

$\frac{55}{x} + \frac{99}{y} = 165$
$\frac{33}{x} - \frac{6}{y} = 63$
$\frac{39}{xy} = 78$
$39 = 78xy$
$78xy = 39$
$x = \frac{39}{39}$
$y = \frac{19}{10} = 1\frac{9}{10}$

7) $3x+2y=a$
$-x+y=b$
$3x+2y=a$
$-3x+3y=3b$
$5y=a+3b$
$y=\frac{a+3b}{5}$

$3x+2y=a$
$-x+y=b$
$3x+2y=a$
$2x-2y=-2b$
$5x=a-2b$
$x=\frac{a-2b}{5}$

8) $8^{x+y}=256=8^{2x}$
$81^{x-y}=243=81^{\frac{1}{2}}$

$2x+7y=2\frac{2}{3}$
$x-2y=1\frac{1}{4}$
$2x+7y=2\frac{2}{3}$
$-2x+4y=-2\frac{1}{2}$
$11y=\frac{1}{6}$
$y=\frac{1}{66}$
$x=\frac{169}{132}=1\frac{37}{132}$

9) $11^{3x-2y}=\frac{1}{121}=11^{-2}$
$5^{4y+4y}=\frac{1}{125}=5^{-3}$

$3x-2y=-2$
$4x+6y=-3$
$9x-6y=-6$
$4x+6y=-3$
$13x=-9$
$x=-\frac{9}{13}$
$y=-\frac{1}{26}$

10) $\frac{7}{5x-2}-\frac{2}{y+3}=\frac{9}{65}$
$\frac{3}{5x-2}+\frac{7}{y+3}=1\frac{41}{65}$
$\frac{24.5}{5x-2}-\frac{7}{y+3}=\frac{31.5}{65}$
$\frac{3}{5x-2}+\frac{7}{y+3}=1\frac{41}{65}$
$\frac{55}{10x-4}=\frac{55}{26}$
$10x-4=26$
$10x=30$
$x=3$
$y=2$

11) $4^{4x-2y}=1=4^{0}$
$(\sqrt{3})^{2x+0}=(\sqrt{5})^{2y+3}$
$4x-2y=0$
$2x+0=2y+3$
$-4x+2y=0$
$2x-2y=-7$
$-2x=-7$
$x=3.5$
$y=-7$

12) $7(3^{x+2y}) = \sqrt{1323}$

$3^{x+2y} = 3\sqrt{3}$

$\sqrt{3}^{2x+4y} = \sqrt{3}^{3}$

$2x+4y = 3$

$8(7^{2y-x}) = \frac{1}{7}$

$7^{2y-x} = \frac{1}{7}$

$7^{2y-x} = 7^{-1}$

$2y-x = -1$

$$\begin{array}{r} 2x+4y = 3 \\ -x+2y = -1 \\ \hline 2x+4y = 3 \\ -2x+4y = -2 \\ \hline 8y = 1 \\ y = \frac{1}{8} \\ \frac{5}{8} = 1\frac{1}{4} \end{array}$$