Solving equations
Higher worksheet

Solve the following equations

1) $4x + 8y = 44$
    $-4x + 4y = 64$

2) $9x - 6y = 30$
    $-9x - 9y = 90$

3) $2x + 5y = 31$
    $-9x + 5y = 53$

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4) $4x + 9y = -7$
    $8x - 9y = -2$

5) $4x - 6y = 28$
    $2x + 4y = -42$

6) $-2x + y = -11$
    $-7x + 4y = -40$

Solving equations
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7) $2x + 6y = -46$
$-3x + 19y = -71$

8) $y = 6x - 12$
$y = 9x + 3$

9) $y = 7x + 11$
$4x + 8y = 148$

Solving equations
Higher worksheet

Solve the following equations

1) $4x + 8y = 44$ [1]
        $-4x + 4y = 64$ [2]

        $12y = 108$ (adding [1] and [2] together)   [3]
        $y = 9$ (dividing each side of [3] by 12)   [4]
        $4x + 72 = 44$ (substituting [4] into [1])   [5]
        $4x = -28$ (subtracting 72 from each side of [5])   [6]
        $x = -7$ (dividing each side of [6] by 4)   [7]
        So $x = -7, y = 9$ (from [7] and [4])   [8]

2) $9x - 6y = 30$ [1]
        $-9x - 9y = 90$ [2]

        $-15y = 120$ (adding [1] and [2] together)   [3]
        $y = -8$ (dividing each side of [3] by −15)   [4]
        $9x - (-48) = 30$ (substituting [4] into [1])   [5]
        $9x + 48 = 30$ (rewriting [5])   [6]
        $9x = -18$ (subtracting 48 from each side of [6])   [7]
        $x = -2$ (dividing each side of [7] by 9)   [8]
        So $x = -2, y = -8$ (from [8] and [4])   [9]

3) $2x + 5y = 31$ [1]
        $-9x + 5y = 53$ [2]

        $9x - 5y = -53$ (multiplying [2] by −1)   [3]
        $11x = -22$ (adding [1] and [3] together)   [4]
        $x = -2$ (dividing each side of [4] by 11)   [5]
        $-4 + 5y = 31$ (substituting [5] into [1])   [6]
        $5y = 35$ (adding 4 to each side of [6])   [7]
        $y = 7$ (dividing each side of [7] by 5)   [8]
        So $x = -2, y = 7$ (from [5] and [8])   [9]

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4) $4x + 9y = -7$ [1]
    $8x - 9y = -2$ [2]

    $12x = -9$ (adding [1] and [2] together)   [3]
    $x = -\frac{3}{4}$ (dividing each side of [3] by 12)   [4]
    $-3 + 9y = -7$ (substituting [4] into [1])   [5]
    $9y = -4$ (adding 3 to each side of [5])   [6]
    $y = -\frac{4}{9}$ (dividing each side of [6] by 9)   [7]
    So $x = -\frac{3}{4}, y = -\frac{4}{9}$ (from [4] and [7])   [8]

5) $4x - 6y = 28$ [1]
    $2x + 4y = -42$ [2]

    $-4x - 8y = 84$ (multiplying [2] by -2)   [3]
    $-14y = 112$ (adding [1] and [3] together)   [4]
    $y = -8$ (dividing each side of [4] by -14)   [5]
    $2x + (-32) = -42$ (substituting [5] into [2])   [6]
    $2x - 32 = -42$ (rewriting [6])   [7]
    $2x = -10$ (adding 32 to each side of [7])   [8]
    $x = -5$ (dividing each side of [8] by 2)   [9]
    So $x = -5, y = -8$ (from [9] and [5])   [10]

6) $-2x + y = -11$ [1]
    $-7x + 4y = -40$ [2]

    $8x - 4y = 44$ (multiplying [1] by -4)   [3]
    $x = 4$ (adding [2] and [3] together)   [4]
    $-8 + y = -11$ (substituting [4] into [1])   [5]
    $y = -3$ (adding 8 to each side of [6])   [6]
    So $x = 4, y = -3$ (from [4] and [8])   [7]

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7) $2x + 6y = -46$ [1]
        $-3x + 19y = -71$ [2]

        $6x + 18y = -138$ (multiplying [1] by 3)   [3]
        $-6x + 38y = -142$ (multiplying [2] by 2)   [4]

        $56y = -280$ (adding [3] and [4] together)   [5]
        $y = -5$ (dividing each side of [5] by 56)   [6]
        $2x + (-30) = -46$ (substituting [6] into [1])   [7]
        $2x - 30 = -46$ (rewriting [7])   [8]
        $2x = -16$ (adding 30 to each side of [8])   [9]
        $x = -8$ (dividing each side of [9] by 2)   [10]
        So $x = -8, y = -5$ (from [10] and [6])   [11]

8) $y = 6x - 12$ [1]
        $y = 9x + 3$ [2]

        $6x - 12 = 9x + 3$ (substituting [1] into [2])   [3]
        $-15 = 3x$ (adding $-6x - 3$ to each side of [3])   [4]
        $-5 = x$ (dividing each side of [4] by 3)   [5]
        $y = -30 - 12 = -42$ (substituting [5] into [1])   [6]
        So $x = -5, y = -42$ (from [5] and [6])   [7]

9) $y = 7x + 11$ [1]
        $4x + 8y = 148$ [2]

        $4x + 8(7x + 11) = 148$ (substituting [1] into [2])   [3]
        $60x + 88 = 148$ (expanding brackets and simplifying in [3]) [4]
        $60x = 60$ (subtracting 88 from each side of [4])   [5]
        $x = 1$ (dividing each side of [5] by 60)   [6]
        $y = 7 + 11 = 18$ (substituting [6] into [1])   [7]
        So $x = 1, y = 18$ (from [6] and [7])   [8]