

$$1. 18 + 2n = 4n - 9$$

$$27 = 2n$$

$$\boxed{\frac{27}{2} = n}$$

$$2. \frac{1}{2}y = \frac{1}{3}y + 2$$

$$\frac{1}{6}y = 2$$

$$\boxed{y = 12}$$

$$3. \frac{3}{5}d + 5 = \frac{1}{3}d - 3$$

$$\frac{4}{15}d = -8$$

$$\boxed{d = -30}$$

$$4. \frac{2x - 4}{-7} = 3x + 5 \quad (-7)$$

$$2x - 4 = -21x - 35$$

$$23x = -31$$

$$\boxed{x = -31/23}$$

$$5. 3(2x - 1) = 9(x + 3) - 2(x - 1)$$

$$6x - 3 = 9x + 27 - 2x + 2$$

$$6x - 3 = 7x + 29$$

$$\boxed{-32 = x}$$

$$6. -8\left(\frac{1}{4}n - 3\right) = n + 2$$

$$-2n + 24 = n + 2$$

$$22 = 3n$$

$$\boxed{\frac{22}{3} = n}$$

$$7. 3x - 2y = 4$$

$$+ 2x + 2y = 6$$

$$5x = 10$$

$$x = 2$$

$$2(2) + 2y = 6$$

$$4 + 2y = 6$$

$$2y = 2$$

$$y = 1$$

$$\boxed{(2, 1)}$$

$$8. 4x + 3y = -5 \rightarrow 4x + 3y = -5$$

$$(-2x + 2y = 6) \cdot 2 \rightarrow -4x + 4y = 12$$

$$7y = 7$$

$$y = 1$$

$$4x + 3(1) = -5$$

$$4x + 3 = -5$$

$$4x = -8$$

$$x = -2$$

$$\boxed{(-2, 1)}$$

$$\begin{array}{l}
 9. \quad 5x + 6y = 3 \rightarrow 5x + 6y = 3 \\
 \quad (-3x - 2y = -5) \cdot 3 \rightarrow -9x - 6y = -15 \\
 \hline
 \quad \quad \quad -4x = -12 \\
 \quad \quad \quad x = 3
 \end{array}
 \quad \leftarrow \quad
 \begin{array}{l}
 5(3) + 6y = 3 \\
 15 + 6y = 3 \\
 6y = -12 \\
 y = -2
 \end{array}$$

$(3, -2)$

$$\begin{array}{l}
 10. \quad (4x - 3y = 6) \cdot 3 \rightarrow 12x - 9y = 18 \\
 \quad (-3x + 2y = 5) \cdot 4 \rightarrow -12x + 8y = 20 \\
 \hline
 \quad \quad \quad -y = -2 \\
 \quad \quad \quad y = 2
 \end{array}
 \quad \leftarrow \quad
 \begin{array}{l}
 12x - 9(2) = 18 \\
 12x - 18 = 18 \\
 12x = 36 \\
 x = 3
 \end{array}$$

$(3, 2)$

$$11. \quad \sqrt{12} = 2\sqrt{3} \quad 12. \quad \sqrt{54} = 3\sqrt{6}$$

$(2 \cdot 2 \cdot 3)$ $(3 \cdot 3 \cdot 3 \cdot 2)$

$$13. \quad -\sqrt{200} = -10\sqrt{2} \quad 14. \quad \sqrt{\frac{4}{9}} = \frac{2}{3}$$

$(10 \cdot 10 \cdot 2)$

$$15. \quad \sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{2} \quad 16. \quad \sqrt{\frac{20}{45}} = \sqrt{\frac{4}{9}} = \frac{2}{3}$$

$$17. \quad 7\sqrt{2} + 4\sqrt{12} - \sqrt{50} = 7\sqrt{2} + 8\sqrt{3} - 5\sqrt{2}$$

$(2 \cdot 2 \cdot 3)$ $(5 \cdot 5 \cdot 2)$

$2\sqrt{2} + 8\sqrt{3}$

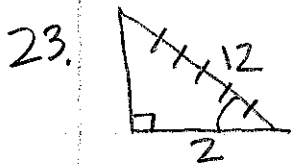
$$18. \quad \sqrt[4]{\frac{8}{9a^3}} = \sqrt[4]{\frac{8}{3 \cdot 3 \cdot a \cdot a \cdot a}} \cdot 3 \cdot 3 \cdot a = \frac{\sqrt[4]{72a}}{3a}$$

$$19. 7^n \cdot 7^{n-1} = 7^{n+n-1} = \boxed{7^{2n-1}}$$

$$20. (3^{1/2} \cdot 5^{2/3})^{3/2} = 3^{3/4} 5^1 = \boxed{5 \cdot 3^{3/4}} \text{ or } \boxed{5\sqrt[4]{27}}$$

$$21. \sqrt[3]{\sqrt{x}} \cdot \sqrt{\sqrt[3]{x}} = \sqrt[6]{x} \cdot \sqrt[6]{x} = x^{1/2} \cdot x^{1/6} = \boxed{x^{2/3}} \text{ or } \boxed{\sqrt[3]{x^2}}$$

$$22. (-8)^{-2/3} = (\sqrt[3]{-8})^{-2} = \frac{1}{(\sqrt[3]{-8})^2} = \frac{1}{(-2)^2} = \boxed{\frac{1}{4}}$$



$$\cos \theta = \frac{2}{12}$$

$$\theta = \cos^{-1}\left(\frac{1}{6}\right)$$

$$\boxed{\theta = 80.41^\circ}$$

$$24. (3 \cdot 5) + 4$$

$$15 + 4$$

$$\boxed{19}$$

$$25. 12 \div 3 + 2 \cdot 8$$

$$4 + 16$$

$$\boxed{20}$$

$$26. [(9-7)^2 + 5] + 26$$

$$(4+5) + 26$$

$$9 + 26$$

$$\boxed{35}$$

$$27. \frac{8 \cdot 2 + 5}{12 + 2^2 - 9} = \frac{16 + 5}{12 + 4 - 9}$$

$$\frac{21}{7}$$

$$\boxed{3}$$

$$28. \frac{2}{5} \cdot \frac{10}{3} = \boxed{\frac{4}{3}}$$

$$29. \frac{4}{5} \cdot \frac{1}{2} = \boxed{\frac{2}{5}}$$

$$30. 4 \cdot 2 = \boxed{8}$$

$$31. \frac{3}{5} \cdot 15 = \boxed{9}$$

$$32. \frac{2}{5} + \frac{3}{4}$$

$$33. \frac{3}{8} + \frac{1}{6}$$

$$\frac{8}{20} + \frac{15}{20} = \boxed{\frac{23}{20}}$$

$$\frac{9}{24} + \frac{4}{24} = \boxed{\frac{13}{24}}$$

$$34. \frac{2}{5} - \frac{3}{4}$$

$$35. \frac{2}{9} - \frac{3}{9} = \boxed{-\frac{1}{9}}$$

$$\frac{8}{20} - \frac{15}{20} = \boxed{-\frac{7}{20}}$$

$$36. \frac{7}{5} - \frac{7}{3}$$

$$37. (4x^3y^5)(-2xy^3) = \boxed{-8x^4y^8}$$

$$\frac{21}{15} - \frac{35}{15} = \boxed{-\frac{14}{15}}$$

$$38. (-5x^4)^2 = \boxed{25x^8}$$

$$39. (3x^4)(4x^5)(-2x^2) = \boxed{-24x^{11}}$$

$$40. \left(\frac{1}{3}x^8y^4\right)^3 = \boxed{\frac{1}{27}x^{24}y^{12}}$$

$$41. -2(-2x)^3(-3)^2 = \boxed{144x^3}$$

$$42. 6p^3 p^2 = \boxed{6p^5}$$

$$43. \frac{3x^{12}y^5}{18x^4y^2} = \boxed{\frac{x^8y^3}{6}}$$

$$44. (3xy^{-2})^{-3} = \frac{1}{(3xy^{-2})^3} = \frac{1}{27x^3y^{-6}} = \boxed{\frac{y^6}{27x^3}}$$

$$45. \left(\frac{1}{4}x^2y^3z^2\right)\left(\frac{2}{3}xy^4z^5\right) = \boxed{\frac{1}{6}x^3y^7z^7}$$

$$46. (-3x^5y^{-2})(2x^2y^7) = \boxed{-6x^7y^5}$$

$$47. (2x^3y^0z^3)^4(xy)^0 = \boxed{16x^{12}z^{12}}$$

$$48. \frac{-10x^{-2}y^{-8}}{15x^8y^2} = \frac{-2x^{-10}y^{-10}}{3} = \boxed{\frac{-2}{3x^{10}y^{10}}}$$

$$49. \begin{array}{l} y^2 - 5y \\ \boxed{y(y-5)} \end{array}$$

$$50. \begin{array}{l} 4a^2 + 2a \\ \boxed{2a(2a+1)} \end{array}$$

$$51. \begin{array}{l} 7y^3 + 14y^2 \\ \boxed{7y^2(y+2)} \end{array}$$

$$52. \begin{array}{l} 6x^2y^3 + 21xy^2 \\ \boxed{3xy^2(2xy+7)} \end{array}$$

$$53. \begin{array}{l} x^2 - 16 \\ \boxed{(x+4)(x-4)} \end{array}$$

$$54. \begin{array}{l} 9x^2 - 25y^2 \\ \boxed{(3x+5y)(3x-5y)} \end{array}$$

$$55. \begin{array}{l} 4a^2 - 49 \\ \boxed{(2a+7)(2a-7)} \end{array}$$

$$56. \begin{array}{l} 100y^2 - 81 \\ \boxed{(10y+9)(10y-9)} \end{array}$$

$$57. \begin{array}{l} 6x^2 - 6y^2 \\ \boxed{6(x^2 - y^2)} \\ \boxed{6(x+y)(x-y)} \end{array}$$

$$58. \frac{x^2 - 144}{(x+12)(x-12)}$$

$$59. \frac{x^3 - 6x^2 + 2x + 12}{x^2(x+6) + 2(x+6)} \\ \frac{(x^2+2)(x+6)}{(x^2+2)(x+6)}$$

$$60. \frac{m^3 - m^2 - 3m + 3}{m^2(m-1) - 3(m-1)} \\ \frac{(m^2-3)(m-1)}{(m^2-3)(m-1)}$$

$$61. \frac{w^2 - 14w + 45}{(w-9)(w-5)}$$

$$62. \frac{x^2 + 2x - 24}{(x+6)(x-4)}$$

$$63. \frac{r^2 + 12r + 20}{(r+2)(r+10)}$$

$$64. \frac{y^2 - 15y + 54}{(y-9)(y-6)}$$

$$65. \frac{g^2 - 5g + 6}{(g-3)(g-2)}$$

$$66. \frac{k^2 - k - 20}{(k-5)(k+4)}$$

$$67. \frac{x^2 - 9x}{x(x-9)}$$

$$68. \frac{9x^2y - 12xy^2}{3xy(3x-4y)}$$

$$69. \frac{y^2 - 10y + 25}{(y-5)^2}$$

$$70. \frac{x^3 - 4x + 5x^2 - 20}{x(x^2-4) + 5(x^2-4)} \\ \frac{(x+5)(x^2-4)}{(x+5)(x^2-4)}$$

$$71. \frac{y^2 + 3y - 28}{(y+7)(y-4)}$$

$$\frac{(x+5)(x+2)(x-2)}{(x+5)(x+2)(x-2)}$$

$$72. \frac{x - 12\sqrt{x} + 20}{(\sqrt{x}-2)(\sqrt{x}-10)}$$

Same ⁰ Opposite ^{ALWAYS} POSITIVE

73. $27x^3 - 1 = 0$

$(3x-1)(9x^2+3x+1) = 0$

$3x-1=0$

$x = \frac{1}{3}$

$\frac{-3 \pm \sqrt{9-4(9)(1)}}{18} = \frac{-3 \pm \sqrt{-27}}{18}$

$\frac{-3 \pm 3i\sqrt{3}}{18} = \frac{-1 \pm i\sqrt{3}}{6}$

74. $x^4 - 16 = 0$

$(x^2+4)(x^2-4) = 0$

$x^2 = -4 \quad x^2 = 4$

$x = \pm 2i \quad x = \pm 2$

75. $s^2 + 10s = 0$

$s(s+10) = 0$

$s = 0, -10$

76. $x^2 - 169 = 0$

$x^2 = 169$

$x = \pm 13$

77. $2x^2 + 15x = -7$

$2x^2 + 15x + 7 = 0$

$(2x+1)(x+7) = 0$

$x = -\frac{1}{2}, -7$

78. $25x^6 - 4x^2 = 0$

$x^2(25x^4 - 4) = 0$

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

$x^2 = 0$

$x = 0$

$5x^2 = -2$

$\sqrt{x^2} = \sqrt{\frac{-2}{5}}$

$x = \pm i \frac{\sqrt{2} \cdot \sqrt{5}}{\sqrt{5} \cdot \sqrt{5}}$

$x = \pm \frac{\sqrt{10} i}{5}$

$5x^2 = 2$

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

$x = \pm \frac{\sqrt{10}}{5}$

$$79. \sqrt{3x-2} = 2$$

$$3x-2=4$$

$$3x=6$$

$$\boxed{x=2}$$

$$80. \sqrt{x+1} - 4 = 1$$

$$\sqrt{x+1} = 5$$

$$x+1=25$$

$$\boxed{x=24}$$

$$81. (3\sqrt{a-2})^2 = (\sqrt{8a+1})^2$$

$$9(a-2) = 8a+1$$

$$9a-18 = 8a+1$$

$$\boxed{a=19}$$

$$82. \sqrt{y+7} = -6$$

impossible for

$\sqrt{\quad}$ to = negative!

$\boxed{\text{NO SOLUTIONS}}$