

1. $(3a^3 + 5a^2 - 4) \div (3a)$

$$\frac{3a^3 + 5a^2 - 4}{3a}$$

$$\frac{3a^3}{3a} + \frac{5a^2}{3a} - \frac{4}{3a}$$

$$a^2 + \frac{5}{3}a - \frac{4}{3a}$$

2. $(\frac{2}{3}a^2b^2 - \frac{1}{4}a^2b^4 + \frac{5}{6}ab^4 - \frac{2}{5}b^5) \div (-\frac{1}{2}ab^2)$

$$\frac{\frac{2}{3}a^2b^2 - \frac{1}{4}a^2b^4 + \frac{5}{6}ab^4 - \frac{2}{5}b^5}{-\frac{1}{2}ab^2}$$

$$-\frac{1}{2}ab^2 \quad -\frac{1}{2}ab^2 \quad \frac{1}{2}ab^2 \quad \frac{1}{2}ab^2$$

$$-\frac{4}{3}ab^0 + \frac{2}{4}ab^2 - \frac{10}{6}ab^2 + \frac{4}{5}ab^3$$

$$-\frac{4}{3}a + \frac{2}{4}ab^2 - \frac{10}{6}b^2 + \frac{4}{5}ab^3$$

3. $(x^4 - 2x^3 - 11x^2 + 30x - 20) \div (x^2 + 3 - 2)$

$$x^2 + 3 - 2 \overline{) x^4 - 2x^3 - 11x^2 + 30x - 20}$$

$$-x^2 - 3x^3 + 2x^2$$

$$-5x^3 - 9x^2 + 30x$$

$$+5x^3 + 15x^2 - 10x$$

$$+6x^2 + 20x - 20$$

$$-6x^2 - 18x + 12$$

$$2x - 8$$

$$x^2 - 5x + 6 \left(\frac{2x-8}{x^2+3-2} \right)$$

4. $(x^6 + 5x^4 + 3x^2 - 2x) \div (x^2 - x + 3)$

$$x^4 + x^2 + 3x^2 - 3$$

$$x^2 - x + 3 \overline{) x^6 + 5x^4 + 3x^2 - 2x}$$

$$-x^6 + x^5 - 3x^4$$

$$x^5 + 2x^4$$

$$-x^5 + x^4 - 3x^3$$

$$3x^3 + 3x^2$$

$$-3x^3 - 2x^2$$

$$x^4 + x^3 + 3x^2 - 3 + \left(\frac{2x-8}{x^2-x+3} \right)$$

$$5. (x^4 - 2x^3 - 11x^2 + 30x - 20) \div (x^2 + 3x - 2)$$

$$\begin{array}{r}
 x^2 + 3x - 2 \overline{) x^4 - 2x^3 - 11x^2 + 30x - 20} \\
 \underline{-x^4 - 3x^3 + 2x^2} \\
 -5x^3 - 9x^2 + 30x \\
 \underline{-5x^3 + 15x^2 - 10x} \\
 6x^2 + 20x - 20 \\
 \underline{-6x^2 - 18x + 12} \\
 2x - 8
 \end{array}$$

$$x^2 - 5x + 6 \left(\frac{2x - 8}{x^2 + 3x - 2} \right)$$

$$6. (x^4 + 5x^3 + 3x^2 - 2x) \div (x^2 - x + 3)$$

$$\begin{array}{r}
 x^2 - x + 3 \overline{) x^4 + 5x^3 + 3x^2 - 2x} \\
 \underline{-x^4 + x^3 - 3x^2} \\
 6x^3 + 6x^2 - 2x \\
 \underline{-6x^3 + 6x^2 - 18x} \\
 20x^2 + 20x \\
 \underline{-20x^2 + 20x} \\
 20x + 20 \\
 \underline{-20x^2 + 20x} \\
 20
 \end{array}$$

$$x^4 + 5x^3 + 3x^2 + 6x - 20 \left(\frac{-20x^2 + 20}{x^2 - x + 3} \right)$$

$$7. (2x^4 - 2x^3 + 3x^2 + 5x + 10) \div (x + 2)$$

$$\begin{array}{r}
 x + 2 \overline{) 2x^4 - 2x^3 + 3x^2 + 5x + 10} \\
 \underline{2x^4 + 4x^3} \\
 -6x^3 + 3x^2 + 5x + 10 \\
 \underline{6x^3 + 12x^2} \\
 -9x^2 + 5x + 10 \\
 \underline{9x^2 + 18x} \\
 23x + 10 \\
 \underline{23x + 46} \\
 -36
 \end{array}$$

$$(2x^3 + 6x^2 - 9x + 23) \left(\frac{-36}{x + 2} \right)$$

$$10. (R^4 S^3 T^2 U)^5$$

$$\underline{R^{20} S^{15} T^{10} U^5}$$

$$(R^4 S^3 T^2 U)(R^4 S^3 T^2 U)$$

$$R^8 S^6 T^4 U^2 (R^4 S^3 T^2 U)$$

$$R^{12} S^9 T^6 U^3 (R^4 S^3 T^2 U)$$

$$R^{16} S^{12} T^8 U^4 (R^4 S^3 T^2 U)$$

$$11. (-a^3 b^4 c^2 d^5)^6 (-a^3 b^4 c^2 d^5)$$

$$a^6 b^8 c^4 d^{10} (-a^3 b^4 c^2 d^5)$$

$$a^9 b^{12} c^6 d^{15} (-a^3 b^4 c^2 d^5)$$

$$a^{12} b^{16} c^8 d^{20} (-a^3 b^4 c^2 d^5)$$

$$a^{15} b^{20} c^{10} d^{25} (-a^3 b^4 c^2 d^5)$$

$$\underline{a^{18} b^{24} c^{12} d^{30}}$$

$$12. (-3x^6 y^3 z^2) (-3x^6 y^3 z^2)$$

$$9x^{12} y^6 z^4$$

$$13. \left(\frac{2}{5} a^2 b - \frac{4}{3} ab - 4\right) \left(\frac{3}{2} ab^2\right)$$

$$\frac{3}{10} a^3 b^3 - \frac{12}{9} a^2 b^3 - \frac{12}{4} ab^4$$

$$14. (3x^3 + 2y^2)(3x^3 + 2y^3)^2$$

$$9x^6 + 6x^3 y^2$$

$$6x^3 y^2 + 4y^4$$

$$9x^6 + 12x^3 y^4 + 4x^4 (3x^2 + 2y^3)$$

$$27x^8 + 36x^5 y^2 + 12x^2 y^4$$

$$18x^6 y^2 + 24x^3 y^2 + 8y^6$$

$$27x^8 + 36x^5 y^2 + 12x^2 y^4 + 18x^6 y^2 + 24x^3 y^2 + 8y^6$$

$$15. \left(\frac{2}{6} a^3 + \frac{1}{3} b^2\right) \left(\frac{2}{6} a^3 + \frac{1}{3} b^2\right)$$

$$\frac{4}{36} a^6 + \frac{2}{18} a^3 b^2$$

$$\frac{2}{18} + \frac{2}{18} = \frac{6+6}{6} = \frac{6}{6} = 1$$

$$+\frac{2}{18} a^3 b^2 + \frac{1}{9} b^4$$

$$\frac{4}{36} a^6 + 1 a^3 b^2 + \frac{1}{9} b^4$$

$$8. \quad \begin{array}{r} X^9 \\ X+2 \overline{) X^{10} - 1024} \\ -X^{10} \end{array}$$

$$\begin{array}{r} X^9 - 2X^8 + 4X^7 + 8X^6 - 16X^5 - 32X^4 + 64X^3 - 128X^2 + 256X + 512 \\ X+2 \overline{) X^{10} + 0X^9 + X^8 + X^7 + X^6 + X^5 + X^4 + X^3 + X^2 + X - 1024} \\ -X^{10} + 2X^9 \\ \hline -2X^9 + 0X^8 \\ -2X^8 + 4X^7 \\ \hline 4X^7 + 0X^6 \\ 4X^7 + 8X^6 \\ \hline 8X^6 - 0X^5 \\ 8X^6 + 16X^5 \\ \hline 16X^5 - 0X^4 \\ 16X^5 - 32X^4 \\ \hline 32X^4 - 0X^3 \\ 32X^4 + 64X^3 \\ \hline 64X^3 - 128X^2 \\ 64X^3 - 256X^2 \\ \hline +256X^2 + 512X - 1024 \\ -256X^2 + 512X - 1024 \\ \hline 0 \end{array}$$

$$9. \quad (x^3 - 5x - 1) \div (x - 3)$$

$$\begin{array}{r} x^2 + 3x + 4 \\ X-3 \overline{) X^3 - 5x - 1} \\ -X^3 + 3x^2 \\ \hline 3x^2 - 5x \\ -3x^2 + 9x \\ \hline 4x - 1 \\ -4x + 12 \\ \hline +11 \end{array}$$

$$x^2 + 3x + 4 \left(\frac{11}{x-3} \right)$$