

Honors Math 3 - Dividing Polynomials

$$\textcircled{1} (2x^2 + 3x - 35) \div (x + 5) \quad \begin{array}{r} -5 \overline{) 2 \quad 3 \quad -35} \\ + \quad \downarrow \quad -10 \quad 35 \\ \hline 2 \quad -7 \quad 0 \end{array} \quad \boxed{2x - 7}$$

$$\textcircled{2} (3x^2 - 4x - 4) \div (x + \frac{2}{3}) \quad \begin{array}{r} -\frac{2}{3} \overline{) 3 \quad -4 \quad -4} \\ + \quad \downarrow \quad -2 \quad 4 \\ \hline 3 \quad -6 \quad 0 \end{array} \quad \boxed{3x - 6}$$

$$\textcircled{3} (x^3 - x^2 - 17x + 12) \div (4 + x) \quad \begin{array}{r} -4 \overline{) 1 \quad -1 \quad -17 \quad 12} \\ + \quad \downarrow \quad -4 \quad 20 \quad -12 \\ \hline 1 \quad -5 \quad 3 \quad 0 \end{array} \quad \boxed{x^2 - 5x + 3}$$

$$\textcircled{4} (3x^3 - 2x^2 + 1) \div (x - 2) \quad \begin{array}{r} 2 \overline{) 3 \quad -2 \quad 0 \quad 1} \\ + \quad \downarrow \quad 6 \quad 8 \quad 16 \\ \hline 3 \quad 4 \quad 8 \quad 17 \end{array} \quad \boxed{3x^2 + 4x + 8 + \frac{17}{x-2}}$$

$$\textcircled{5} (x^3 - 5x^2 + 4x + 7) \div (x - 1) \quad \begin{array}{r} 1 \overline{) 1 \quad -5 \quad 4 \quad 7} \\ + \quad \downarrow \quad 1 \quad -4 \quad 0 \\ \hline 1 \quad -4 \quad 0 \quad 7 \end{array} \quad \boxed{x^2 - 4x + \frac{7}{x-1}}$$

$$-53x + 6 \div (x - 5)$$

$$\begin{array}{r|rrrrr} 5 & 2 & 0 & -53 & 6 \\ + & \downarrow & 10 & 50 & -15 \\ \hline & 2 & 10 & -3 & -9 \end{array}$$

$$2x^2 + 10x - 3 - \frac{9}{x-5}$$

$$\textcircled{7} (x^3 + 2x^2 + 32) \div (x + 4)$$

$$\begin{array}{r|rrrr} -4 & 1 & 2 & 0 & 32 \\ + & \downarrow & -4 & 8 & -32 \\ \hline & 1 & -2 & 8 & 0 \end{array}$$

$$x^2 - 2x + 8$$

$$\textcircled{8} (3x^4 - 8x^3 - 5x^2 + 7x - 1) \div (x - 3)$$

$$\begin{array}{r|rrrrrr} 3 & 3 & -8 & -5 & 7 & -1 \\ + & \downarrow & 9 & 3 & -6 & 3 \\ \hline & 3 & 1 & -2 & 1 & 2 \end{array}$$

$$3x^3 + x^2 - 2x + 1 + \frac{2}{x-3}$$

$$\textcircled{9} (4y^4 - 5y^2 - 8y + 3) \div (2y - 3) \text{ * must } \div \text{ everything by 2}$$

$$(2y^4 - \frac{5}{2}y^2 - 4y + \frac{3}{2}) \div (y - \frac{3}{2}) \quad \begin{matrix} y^{-3/2} = 0 \\ y = 3/2 \end{matrix}$$

$$\begin{array}{r|rrrrr} \frac{3}{2} & 2 & 0 & -\frac{5}{2} & -4 & \frac{3}{2} \\ + & \downarrow & 3 & \frac{9}{2} & 3 & -\frac{3}{2} \\ \hline & 2 & 3 & 2 & -1 & 0 \end{array}$$

$$2y^3 + 3y^2 + 2y - 1$$

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$$x^3 - 3x^2 - x + 2 \div (2x + 1) \text{ must } \div \text{ everything by } 2$$

$$x^3 - \frac{3}{2}x^2 - \frac{1}{2}x + 1 \div (x + \frac{1}{2})$$

$$\begin{array}{r} -\frac{1}{2} \overline{) 1 \quad -\frac{3}{2} \quad 0 \quad -\frac{1}{2} \quad 1} \\ + \downarrow \quad -\frac{1}{2} \quad 1 \quad -\frac{1}{2} \quad \frac{1}{2} \\ \hline 1 \quad -2 \quad 1 \quad -1 \quad \frac{3}{2} \end{array}$$

$$x^3 - 2x^2 + x - 1 + \frac{\frac{3}{2}}{x + \frac{1}{2}} \leftarrow \text{cannot leave ans as a double fraction! mult. everything by } 2$$

$$x^3 - 2x^2 + x - 1 + \frac{3}{2x + 1}$$

⑪ $x^2 - 1; x - 2$

$$\begin{array}{r} 2 \overline{) 1 \quad 0 \quad -1} \\ + \downarrow \quad 2 \quad 4 \\ \hline 1 \quad 2 \quad 3 \end{array}$$

3

⑫ $x^2 - x + 4; x - 2$

$$\begin{array}{r} 2 \overline{) 1 \quad -1 \quad 4} \\ + \downarrow \quad 2 \quad 2 \\ \hline 1 \quad 1 \quad 6 \end{array}$$

6

⑬ $x^2 - x + 6; x + 3$

$$\begin{array}{r} -3 \overline{) 1 \quad -1 \quad 6} \\ + \downarrow \quad -3 \quad 12 \\ \hline 1 \quad -4 \quad 18 \end{array}$$

18

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$$+10x+24; x+6$$

$$\begin{array}{r}
 -6 \overline{) 1 \quad 10 \quad 24} \\
 + \downarrow -6 \quad -24 \\
 \hline
 1 \quad 4 \quad 0
 \end{array}$$

0

$$(16) 3x^2+2x-9; x-1$$

$$\begin{array}{r}
 1 \overline{) 3 \quad 2 \quad -9} \\
 + \downarrow 3 \quad 5 \\
 \hline
 3 \quad 5 \quad -4
 \end{array}$$

-4

$$(16) 5x^2-6x+2; x-2$$

$$\begin{array}{r}
 2 \overline{) 5 \quad -6 \quad 2} \\
 + \downarrow 10 \quad 8 \\
 \hline
 5 \quad 4 \quad 10
 \end{array}$$

10

$$(17) -5x^2-11x+3; 1-x \rightarrow -x+1$$

$$5x^2+11x-3; x-1$$

* must ÷ everything by -1

$$\begin{array}{r}
 1 \overline{) 5 \quad 11 \quad -3} \\
 + \downarrow 5 \quad 16 \\
 \hline
 5 \quad 16 \quad 13
 \end{array}$$

13

$$x^2 - x + 1; x - \frac{1}{2}$$

$$\begin{array}{r|rrr} \frac{1}{2} & 2 & -1 & 1 \\ + & \downarrow & 1 & 0 \\ \hline & 2 & 0 & 1 \end{array}$$

1

$$(19) 3x^2 - 8x + 4; x - \frac{2}{3}$$

$$\begin{array}{r|rrr} \frac{2}{3} & 3 & -8 & 4 \\ + & \downarrow & 2 & -4 \\ \hline & 3 & -6 & 0 \end{array}$$

0

$$(20) x^3 + 9x^2 - 5; x + 1$$

$$\begin{array}{r|rrrr} -1 & 1 & 9 & 0 & -5 \\ + & \downarrow & -1 & -8 & 8 \\ \hline & 1 & 8 & -8 & 3 \end{array}$$

3

$$(21) x^3 + 2x^2 - 5x - 6; x + 2$$

$$\begin{array}{r|rrrr} -2 & 1 & 2 & -5 & -6 \\ + & \downarrow & -2 & 0 & 10 \\ \hline & 1 & 0 & -5 & 4 \end{array}$$

4

$$(22) -4x^3 + 11x^2 - 9x + 8; 1 - x \rightarrow -x + 1$$

$$4x^3 - 11x^2 + 9x - 8 \div x - 1$$

$$\begin{array}{r|rrrr} 1 & 4 & -11 & 9 & -8 \\ + & \downarrow & 4 & -7 & 2 \\ \hline & 4 & -7 & 2 & -6 \end{array}$$

-6

* must \div everything by -1

$$3x^3 - x^2 + x; x - \frac{1}{2}$$

$$\begin{array}{r|rrrr} \frac{1}{2} & 3 & -1 & 1 & 0 \\ + \downarrow & & \frac{3}{2} & \frac{1}{4} & \frac{5}{8} \\ \hline & 3 & \frac{1}{2} & \frac{5}{4} & \frac{5}{8} \end{array}$$

$$\boxed{\frac{5}{8}}$$

$$(24) x^4 - x^3 + x; x + 2$$

$$\begin{array}{r|rrrrr} -2 & 1 & -1 & 0 & 1 & 0 \\ + \downarrow & & -2 & 6 & -12 & 22 \\ \hline & 1 & -3 & 6 & -11 & 22 \end{array}$$

$$\boxed{22}$$

$$(25) x^4 - 5x^3 + 2x^2 - 7x + 2; x - 2$$

$$\begin{array}{r|rrrrr} 2 & 1 & -5 & 2 & -7 & 2 \\ + \downarrow & & 2 & -6 & -8 & -30 \\ \hline & 1 & -3 & -4 & -15 & -28 \end{array}$$

$$\boxed{-28}$$

$$(26) 4x^4 + 7x^3 - 2x^2 + x - 9; x + 3$$

$$\begin{array}{r|rrrrr} -3 & 4 & 7 & -2 & 1 & -9 \\ + \downarrow & & -12 & 15 & -39 & 114 \\ \hline & 4 & -5 & 13 & -38 & 105 \end{array}$$

$$\boxed{105}$$

Please have

$$x^4 - x^3 + 3; x - \frac{1}{2}$$

$$\begin{array}{r} \frac{1}{2} \overline{) 1 - 1 \ 0 \ 0 \ 3} \\ + \downarrow \frac{1}{2} \quad -\frac{1}{4} \quad -\frac{1}{8} \quad -\frac{1}{16} \\ \hline 1 \quad -\frac{1}{2} \quad -\frac{1}{4} \quad -\frac{1}{8} \quad \frac{47}{16} \end{array}$$

$$\frac{47}{16}$$

$$\textcircled{28} \quad 3x^4 + 6x^3 - 5x + 1; x + \frac{2}{3}$$

$$\begin{array}{r} \frac{-2}{3} \overline{) 3 \ 6 \ 0 \ -5 \ 1} \\ + \downarrow -2 \quad -\frac{8}{3} \quad \frac{16}{9} \quad \frac{58}{27} \\ \hline 3 \quad 4 \quad -\frac{8}{3} \quad -\frac{29}{9} \quad \frac{85}{27} \end{array}$$

$$\frac{85}{27}$$