

5.2-5.4 Review

Divide using long division.

1) $(k^3 - 6k^2 - 36k + 85) \div (k - 9)$

$$\begin{array}{r} k^2 + 3k - 9 \\ k-9 \overline{) k^3 - 6k^2 - 36k + 85} \\ \underline{-(k^3 - 9k^2)} \\ 3k^2 - 36k \\ \underline{-(3k^2 - 27k)} \\ -9k + 85 \\ \underline{-(-9k + 81)} \\ 4 \end{array}$$

$$\boxed{k^2 + 3k - 9 + \frac{4}{k-9}} \quad \begin{array}{r} -9k + 85 \\ -(-9k + 81) \\ 4 \end{array}$$

3) $(10b^3 - 53b^2 + 58b + 77) \div (10b + 7)$

$$\begin{array}{r} b^2 - 6b + 10 \\ 10b+7 \overline{) 10b^3 - 53b^2 + 58b + 77} \\ \underline{-(10b^3 + 7b^2)} \\ -60b^2 + 58b \\ \underline{-(-60b^2 - 42b)} \\ 100b + 77 \\ \underline{-(100b + 70)} \\ 7 \end{array}$$

$$\boxed{b^2 - 6b + 10 + \frac{7}{10b+7}} \quad \begin{array}{r} 100b + 77 \\ -(100b + 70) \\ 7 \end{array}$$

Divide using synthetic division.

5) $(3x^3 - 35x^2 + 40x + 103) \div (x - 10)$

$$\begin{array}{r|rrrr} 10 & 3 & -35 & 40 & 103 \\ & \downarrow & 30 & -50 & -100 \\ \hline & 3 & -5 & -10 & 3 \end{array}$$

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

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Date _____ Hour _____

2) $(6r^3 + 10r^2 - 3r - 5) \div (r + 2)$

$$\begin{array}{r} 6r^2 - 2r + 1 \\ r+2 \overline{) 6r^3 + 10r^2 - 3r - 5} \\ \underline{-(6r^3 + 12r^2)} \\ -2r^2 - 3r \\ \underline{-(-2r^2 - 4r)} \\ r - 5 \\ \underline{-(r + 2)} \\ -7 \end{array}$$

$$\boxed{6r^2 - 2r + 1 - \frac{7}{r+2}}$$

4) $(8n^3 + 77n^2 + 125n + 55) \div (8n + 5)$

$$\begin{array}{r} n^2 + 9n + 10 \\ 8n+5 \overline{) 8n^3 + 77n^2 + 125n + 55} \\ \underline{-(8n^3 + 5n^2)} \\ 72n^2 + 125n \\ \underline{-(72n^2 + 45n)} \\ 80n + 55 \\ \underline{-(80n + 50)} \\ 5 \end{array}$$

$$\boxed{n^2 + 9n + 10 + \frac{5}{8n+5}}$$

6) $(v^3 - 16v^2 + 55v + 64) \div (v - 7)$

$$\begin{array}{r|rrrr} 7 & 1 & -16 & 55 & 64 \\ & \downarrow & 7 & -63 & -56 \\ \hline & 1 & -9 & -8 & 8 \end{array}$$

$$\boxed{v^2 - 9v - 8 + \frac{8}{v-7}}$$

$$7) (9n^3 + 4n^2 - 11n - 2) \div (n+1)$$

$$\begin{array}{r|rrrr} -1 & 9 & 4 & -11 & -2 \\ & \downarrow & & & \\ & 9 & -5 & -6 & 4 \end{array}$$

$$\boxed{9n^2 - 5n - 6 + \frac{4}{n+1}}$$

$$8) (x^3 - 4x^2 + x - 39) \div (x-5)$$

$$\begin{array}{r|rrrr} 5 & 1 & -4 & 1 & -39 \\ & \downarrow & & & \\ & 1 & 1 & 6 & -9 \end{array}$$

$$\boxed{x^2 + x + 6 - \frac{9}{x-5}}$$

$$9) (7n^3 - 69n^2 + 45n + 85) \div (n-9)$$

$$\begin{array}{r|rrrr} 9 & 7 & -69 & 45 & 85 \\ & \downarrow & & & \\ & 7 & -6 & -9 & 4 \end{array}$$

$$\boxed{7n^2 - 6n - 9 + \frac{4}{n-9}}$$

$$10) (3v^3 + 21v^2 - 7) \div (v+7)$$

$$\begin{array}{r|rrrr} -7 & 3 & 21 & 0 & -7 \\ & \downarrow & & & \\ & 3 & 0 & 0 & -7 \end{array}$$

$$\boxed{3v^2 - \frac{7}{v+7}}$$

Describe the end behavior of each function.

$$11) f(x) = -x^5 + 4x^3 - 3x - 4$$

$$f(x) \rightarrow +\infty \text{ as } x \rightarrow -\infty$$

$$f(x) \rightarrow -\infty \text{ as } x \rightarrow +\infty$$

$$13) f(x) = -x^2 + 2x + 5$$

$$f(x) \rightarrow -\infty \text{ as } x \rightarrow -\infty$$

$$f(x) \rightarrow -\infty \text{ as } x \rightarrow +\infty$$

$$15) f(x) = -x^4 - x^3 + 4x^2 - 6$$

$$f(x) \rightarrow -\infty \text{ as } x \rightarrow -\infty$$

$$f(x) \rightarrow -\infty \text{ as } x \rightarrow +\infty$$

$$12) f(x) = x^5 - 3x^3 + 2x - 3$$

$$f(x) \rightarrow -\infty \text{ as } x \rightarrow -\infty$$

$$f(x) \rightarrow +\infty \text{ as } x \rightarrow +\infty$$

$$14) f(x) = -x^3 + 3x^2 - 1$$

$$f(x) \rightarrow +\infty \text{ as } x \rightarrow -\infty$$

$$f(x) \rightarrow -\infty \text{ as } x \rightarrow +\infty$$

$$16) f(x) = -x^4 + x^3 + 4x^2 - 1$$

$$f(x) \rightarrow -\infty \text{ as } x \rightarrow -\infty$$

$$f(x) \rightarrow -\infty \text{ as } x \rightarrow +\infty$$

Name each polynomial by degree and number of terms.

$$17) -8p^2 + 2p - 5 \text{ Quadratic, Trinomial}$$

$$18) 4n^2 - 3n \text{ Quadratic, Binomial}$$

$$19) 7k^3 - 4k - 3 \text{ Cubic, Trinomial}$$

$$20) -5k^3 + 8k^2 - 3k - 5 \text{ Cubic, Polynomial}$$

$$21) -x^4 - 2x^2 \text{ Quartic, Binomial}$$

$$22) 8b^4 - 7b \text{ Quartic, Binomial}$$