What you will learn about:
Divisioin of Polynomials

Quotient Property of Exponents

$\frac{a^m}{a^n} = a^{m-n}, m > n$

$\frac{a^m}{a^n} = \frac{1}{a^{n-m}}, n > m$

Simplify:

$\frac{x^9}{x^7} = x^2$ $\quad \frac{3^{10}}{3^2} = 3^8$ $\quad \frac{z^7}{z^4} = z^3$

$\frac{b^8}{b^{12}} = \frac{1}{b^4}$ $\quad \frac{4^{15}}{4^{20}} = \frac{1}{4^5}$ $\quad \frac{x^9}{x^{18}} = \frac{1}{x^9}$

Zero Exponent = anything raised to zero power is 1

$\frac{x^3}{x^3} = \frac{\cancel{x}\cdot\cancel{x}\cdot\cancel{x}}{\cancel{x}\cdot\cancel{x}\cdot\cancel{x}} = 1$

Quotient to a Power Property

$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$

Simplify

$\left(\frac{5}{8}\right)^2 = \frac{5^2}{8^2} = \frac{25}{64}$ $\quad \left(\frac{p}{10}\right)^4 = \frac{p^4}{10^4} = \frac{p^4}{10{,}000}$ $\quad \left(\frac{m}{n}\right)^7 = \frac{m^7}{n^7}$

Simplify:

$\frac{(y^4)^2}{y^6} = \frac{y^8}{y^6} = y^2$

$\frac{b^{12}}{(b^2)^6} = \frac{b^{12}}{b^{12}} = b^0 = 1$

$\left(\frac{y^9}{y^4}\right)^2 = \frac{y^{18}}{y^8} = y^{10}$

$\left(\frac{2m^2}{5n}\right)^4$ $\frac{2^4 m^8}{5^4 n^4}$ $\frac{16m^8}{625n^4}$

$\frac{(x^3)^4(x^2)^5}{(x^6)^5}$ $\frac{x^{12}\cdot x^{10}}{x^{30}}$ $\frac{x^{22}}{x^{30}} = \frac{1}{x^8}$

$\frac{(2x^4)^5}{(4x^3)^2(x^3)^5} = \frac{2^5 x^{20}}{(16x^6)(x^{15})}$ $\frac{32x^{20}}{16x^{21}} = \frac{2}{x}$

Find the Quotient:

$56x^7 \div 8x^3$ $\frac{56x^7}{8x^3} = 7x^4$

$42y^6 \div 6y^3$ $\frac{42y^6}{6y^3} = 7y^3$

$\frac{45a^2b^3}{-5ab^5}$ $-\frac{9a}{b^2}$

$\frac{-72a^7b^3}{8a^{12}b^4}$ $-\frac{9}{a^5b}$

$\frac{16a^7b^6}{24ab^8} = \frac{2a^6}{3b^2}$

$\frac{27p^4q^7}{-45p^{12}q^7} = -\frac{3}{5p^8}$

$\frac{(6x^2y^3)(5x^3y^2)}{(3x^4y^5)}$ $\frac{30x^5y^5}{3x^4y^5}$ $10x$

$\frac{(-12x^6y^9)(-4x^5y^8)}{-12x^{10}y^{12}}$ $\frac{48x^{11}y^{17}}{-12x^{10}y^{12}}$ $-4xy^5$

Find the quotient

$\frac{7y^2+21}{7}$ $= \frac{7(y^2+3)}{7}$

$= y^2+3$

$\frac{8z^2+24}{4}$ $= \frac{8(z^2+3)}{4}$

$= 2(z^2+3)$

$2z^2+6$

$(18x^3 - 36x^2) \div (6x)$

$\frac{18x^3-36x^2}{6x}$

$3x^2-6x$

$(27b^3 - 33b^2) \div 3b$

$\frac{27b^3-33b^2}{3b} = 9b^2-11b$

$\frac{18x^2(x-2)}{6x}$

$3x(x-2)$

$\frac{12d^2}{-4} - \frac{16d}{-4}$

$\frac{12d^2-16d}{-4}$

$-3d^2+4d$

$\frac{42b^2-18b}{-6}$

$-7b^2+3b$

$\frac{105y^5+75y^3}{5y^2}$

$(15x^3y - 35xy^2) \div (-5xy)$

$(-48a^8b^4 - 36a^6b^5) \div (-6a^3b^3)$

$\frac{10x^2+5x-20}{5x}$

$\frac{36x^3y^2+27x^2y^2-9x^2y^3}{9x^2y}$

Divide 876 by 25

$$25\overline{)876}\quad 35$$
$$-75$$
$$126$$
$$-125$$
$$1$$

$35\frac{1}{25}$

Find the quotient:

$(x^2 + 9x + 20) \div (x + 5)$

$$x+5\overline{)x^2+9x+20}\quad x+4$$
$$-(x^2+5x)$$
$$4x+20$$
$$-(4x+20)$$
$$0$$

$\frac{x^2+9x+20}{x+5} = x+4$

$(2x^2 - 5x - 3) \div (x - 3)$

$$x-3\overline{)2x^2-5x-3}\quad 2x+1$$
$$-(2x^2-6x)$$
$$x-3$$
$$-(x-3)$$
$$0$$

$(2x^2 - 3x - 20) \div (x - 4)$

$$x-4\overline{)2x^2-3x-20}\quad 2x+5$$
$$-(2x^2-8x)$$
$$5x-20$$
$$-(5x-20)$$
$$0$$

-1-1

$(x^3 - x^2 + x + 4) \div (x + 1)$

$$x+1 \overline{)\, x^3 - x^2 + x + 4}$$

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

$(-)\ x^3 + x^2$

$-2x^2 + x$

$(-)\ -2x^2 - 2x$

$3x + 4$

$(-)\ 3x + 3$

1

$(x^3 + 5x^2 + 8x + 6) \div (x + 2)$

$$x+2 \overline{)\, x^3 + 5x^2 + 8x + 6}$$

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

$(-)\ x^3 + 2x^2$

$3x^2 + 8x$

$(-)\ 3x^2 + 6x$

$2x + 6$

$(-)\ 2x + 4$

2

$(2x^3 + 8x^2 + x - 8) \div (x + 1)$

$$x+1 \overline{)\, 2x^3 + 8x^2 + x - 8}$$

$2x^2 + 6x - 5$

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

$6x^2 + x$

$(-)\ 6x^2 + 6x$

$-5x - 8$

$(-)\ -5x - 5$

-3

$2x^2 + 6x - 5 - \frac{3}{x+1}$

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

$$x+2 \overline{)\, x^4 + 0x^3 - x^2 + 5x - 2}$$

$x^3 - 2x^2 + 3x - 1$

$(-)\ x^4 + 2x^3$

$-2x^3 - x^2$

$(-)\ -2x^3 - 4x^2$

$3x^2 + 5x$

$(-)\ 3x^2 + 6x$

$-x - 2$

$(-)\ -x - 2$

0