

## Polynomial Long Division Guided Lesson Explanation

1.  $\frac{4x^2+2x-12}{(x+2)}$

Step 1:

Divide the leading coefficient of the numerator ( $4x^2$ ) by the divisor ( $x+2$ ) =  $4x$

Step 1a: Multiply ( $x+2$ ) by  $4x = 4x^2 + 8x$

Step 1b: Subtract  $4x^2 + 8x$  from  $4x^2 + 2x - 12 = -6x - 12$

Step 2: Rewrite problem:  $\frac{4x^2+2x-12}{(x+2)} = 4x + \frac{-6x-12}{(x+2)}$

Step 3:

Divide the leading coefficient of the numerator ( $-6x-12$ ) by the divisor ( $x+2$ ) =  $-6$

Step 3a: Multiply ( $x+2$ ) by  $-6 = -6x-12$

Step 3b: Subtract  $-6x-12$  from  $-6x-12$  remainder = 0

Therefore:  $\frac{-6x-12}{(x+2)} = -6$

Step 4: Write final answer:  $\frac{4x^2+2x-12}{(x+2)} = 4x - 6$

2.  $(4a^3 + 10a^2 + 4a) \div (2a + 4)$

Step 1:

Divide the leading coefficient of the numerator ( $4x^3+10a^2+4a$ ) by the divisor ( $2a+4$ )

$$\frac{4a^3}{2a} = 2a^2$$

Step 1a: Multiply ( $2a+4$ ) by  $2a^2 = 4a^3 + 8a^2$

Step 1b: Subtract  $4a^3 + 8a^2$  from  $4a^3 + 10a^2 + 4a = 2a^2 + 4a$

Step 2: Rewrite problem:  $2a^2 + \frac{4a + 2a^2}{2a+4}$



Step 3:

Divide the leading coefficient of the numerator ( $2a^2 + 4a$ ) by the divisor ( $2a + 4$ ) =

$$\frac{2a^2}{2a} = a$$

Step 3a: Multiply ( $2a + 4$ ) by  $a = 2a^2 + 4a$

Step 3b: Subtract  $2a^2 + 4a$  from  $2a^2 + 4a$  remainder = 0

Therefore:  $\frac{4a + 2a^2}{2a+4} = a$

Step 4 - Write final answer:  $(4a^3 + 10a^2 + 4a) \div (2a + 4) = 2a^2 + a$

