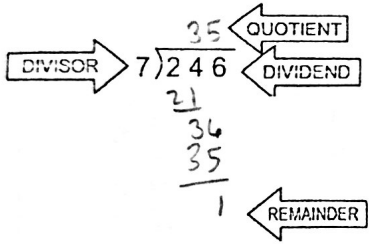
Notes

Long Division with Polynomials

We've ...ve divide polynomials using a method similar to long division, so let's review that first.



Use long division to divide the polynomials.

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

$$x-3 \overline{)\, x^3-2x^2+6x-6}$$
$$x^2+x+9+\frac{21}{x-3}$$
$$-(x^3-3x^2)$$
$$x^2+6x$$
$$-(x^2-3x)$$
$$9x-6$$
$$-(9x-27)$$
$$21$$

2. $(2x^4 + 5x^3 + 5x^2 + 10x + 8) \div (x + 2)$

$$x+2 \overline{)\, 2x^4+5x^3+5x^2+10x+8}$$
$$2x^3+x^2+3x+4$$
$$-(2x^4+4x^3)$$
$$x^3+5x^2$$
$$-(x^3+2x^2)$$
$$3x^2+10x$$
$$-(3x^2+6x)$$
$$4x+8$$
$$-(4x+8)$$
$$0$$

3. $\dfrac{27x^3 + 9x^2 - 3x - 10}{3x - 2}$

$$3x-2 \overline{)\, 27x^3+9x^2-3x-10}$$
$$9x^2+9x+5$$
$$-(27x^3-18x^2)$$
$$27x^2-3x$$
$$-(27x^2-18x)$$
$$15x-10$$
$$15x-10$$
$$0$$

4. $\dfrac{x^3 - 2x^2 - 4}{x - 2}$

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

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

$$h^2-2h+2 \overline{)\, 3h^3-4h^2+2h+4}$$
$$3h+2$$
$$-(3h^3-6h^2+6h)$$
$$2h^2-4h+4$$
$$-(2h^2-4h+4)$$
$$0$$

6. $(-2x^2 + x^3 - 75) \div (x - 5)$

$$x-5 \overline{)\, x^3-2x^2+0x-75}$$
$$x^2+3x+15$$
$$-(x^3-5x^2)$$
$$3x^2+0x$$
$$-(3x^2-15x)$$
$$15x-75$$
$$-(15x-75)$$
$$0$$

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

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

8. $(f^3 - 8) \div (f - 2)$

$$f-2 \overline{)\, f^3-0f^2-0f-8}$$
$$f^2+2f+4$$
$$-(f^3-2f^2)$$
$$2f^2-0f$$
$$-(2f^2-4f)$$
$$4f-8$$
$$-(4f-8)$$
$$0$$

YOU TRY:

A. $(6n^2 + 4n + 3) \div (3n - 1)$

$$3n-1 \overline{)\, 6n^2+4n+3}$$
$$2n+2+\frac{5}{3n-1}$$
$$-(6n^2-2n)$$
$$6n+3$$
$$-(6n-2)$$
$$5$$

B. $(t^3 + 1) \div (t + 1)$

$$t+1 \overline{)\, t^3+0t^2+0t+1}$$
$$t^2-t+1$$
$$-(t^3+1t^2)$$
$$-1t^2+0t$$
$$-(-t^2-1t)$$
$$1t+1$$
$$-(1t+1)$$
$$0$$