

Algebra 2 - Dividing Polynomials and the Remainder Theorem - Worksheet

Common Core A-APR.B.2, A-APR.D.6 · maths-pdf.fr/en/

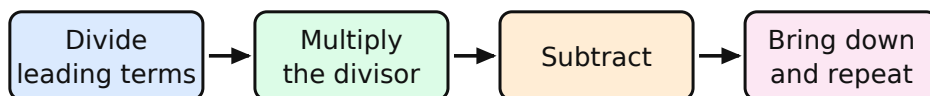
Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice polynomial division and the Remainder Theorem (Common Core A-APR.B.2 and A-APR.D.6). The first problems check long division by a binomial, the middle problems add synthetic division, the Remainder Theorem, and the Factor Theorem, and the last six are word problems and multi-step tasks that need dimension problems and writing quotients with a remainder term.

Work in order and show every step. Write each answer in simplest form, and open the answer key only after you have tried the problem yourself.

Algebra 2 · Common Core State Standards: **A-APR.B.2, A-APR.D.6**

Exercise 1 - Divide, no remainder



Long division cycle.

Divide using long division: $(x^2+7x+12) \div (x+3)$.

Exercise 2 - Divide, remainder

Divide: $(x^2-5x+7) \div (x-2)$. Write the answer as a quotient plus a remainder over the divisor.

Exercise 3 - Leading coefficient 2

Divide: $(10x^2-x-24) \div (2x+3)$.

Exercise 4 - Cubic long division

Divide: $(x^3+2x^2-5x-6) \div (x+1)$.

Exercise 5 - Synthetic division

2	2	-3	1	-5
		?	?	?
	?	?	?	?

Fill in the blank cells.

Use synthetic division to divide $(2x^3 - 3x^2 + x - 5) \div (x - 2)$.

Exercise 6 - Missing term

Divide $x^3 - 7x + 6$ by $x - 2$ using synthetic division. Remember the missing power.

Exercise 7 - Divisor $x + 3$

Divide $x^4 + 3x^3 - x + 4$ by $x + 3$. Use $k = -3$.

Exercise 8 - Remainder Theorem, zero

Find the remainder when $x^3 - 4x^2 + x + 6$ is divided by $x - 3$, without dividing.

Exercise 9 - Remainder Theorem

Find the remainder when $2x^3 + x^2 - 5x + 4$ is divided by $x + 2$.

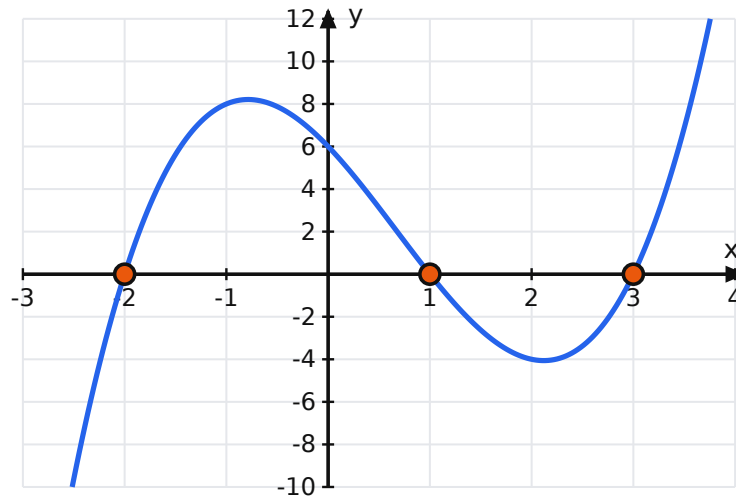
Exercise 10 - Factor check

Decide whether $x - 4$ is a factor of $x^3 - 5x^2 + 2x + 8$.

Exercise 11 - Find k

Find k so that $x + 1$ is a factor of $x^3 + kx^2 - 5x + 3$.

Exercise 12 - Read the graph



Graph of $p(x)$.

The graph of the cubic $p(x) = x^3 - 2x^2 - 5x + 6$ crosses the x -axis at -2 , 1 , and 3 . Write $p(x)$ in factored form.

Exercise 13 - Factor completely

Given that $x-1$ is a factor of $x^3 - 6x^2 + 11x - 6$, factor the polynomial completely.

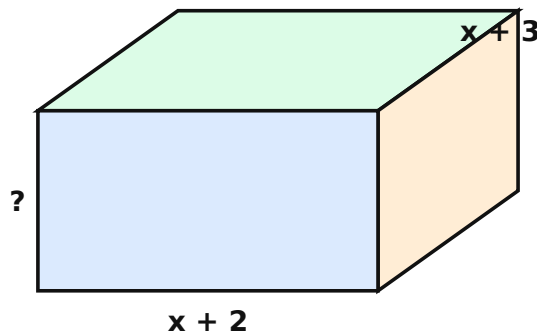
Exercise 14 - Rewrite a rational expression

Rewrite $\frac{x^2 + 3x + 5}{x + 2}$ in the form $q(x) + \frac{r}{x + 2}$.

Exercise 15 - Rewrite with a cubic

Rewrite $\frac{3x^3 - 2x^2 + 4}{x - 1}$ as a quotient plus a remainder term.

Exercise 16 - Box dimensions



Box with unknown height.

A shipping box has volume $V = x^3 + 9x^2 + 26x + 24$ cubic inches. Its length is $x + 2$ and its width

is $x+3$. Find the height.

Exercise 17 - Rectangle length

A rectangle has area $x^3+3x^2-4x-12$ ft² and width $x+3$ feet. Find its length.

Exercise 18 - Evaluate with synthetic division

4	1	-6	11	2
		4	-8	12
	1	-2	3	14

Synthetic division with $k = 4$ gives $P(4)$.

A population model is $P(t)=t^3-6t^2+11t+2$ (in hundreds). Use synthetic division to find $P(4)$.

Exercise 19 - Difference of cubes

Show that $x-5$ is a factor of x^3-125 , then factor completely.

Exercise 20 - No division needed

Without dividing, find the remainder when $x^{10}-1$ is divided by $x-1$ and by $x+1$.