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SYNTHETIC DIVISION WORKSHEETS

Use synthetic division for the problems from 1-6 and write the answer of the form $\text{Quotient} + \frac{\text{Remainder}}{\text{Divisor}}$.



1) $(3x^3 - 7x^2 - 11x + 15) \div (x - 3)$

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

3) $(25a^3 + 8a^2 - 4a + 10) \div (a + 1)$

4) $(x^4 + 2x^3 - 8x^2 - 9x + 18) \div (x - 2)$

5) $(r^3 - 3r^2 - 9r + 6) \div (r - 3)$

6) $(s^3 + 3s^2 + 3s + 1) \div (s + 1)$

7) Determine whether $(x - 3)$ is a factor of the polynomial $p(x) = x^4 - 5x^3 + 9x^2 - 15x + 18$ using synthetic division.
Hint: Check whether the remainder of the division is 0.

8) The volume of a storage box is $(8x^3 + 12x^2 - 2x - 3)$ cubic units. Its base area is $(4x^2 - 1)$ square units. Then what is its height?

Hint: Note that $4x^2 - 1 = (2x + 1)(2x - 1)$. Perform synthetic division twice by each of these factors.



- 9) If $(x + 1)$ is a factor of the polynomial $x^4 - 5x^2 - 10x - 6$, factorize the polynomial completely.
- 10) Jonathan travelled $(9a^2 - 39a - 30)$ miles in $(a-5)$ hours by his car. Find his speed.



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"Cuemath is a valuable addition to our family. We love solving puzzle cards. My daughter is now visualizing maths and solving problems effectively!"

- Gary Schwartz

"Cuemath is great because my son has a one-on-one interaction with the teacher. The instructor has developed his confidence and I can see progress in his work. One-on-one interaction is perfect and a great bonus."

- Kirk Riley

"I appreciate the effort that miss Nitya puts in to help my daughter understand the best methods and to explain why she got a problem incorrect. She is extremely patient and generous with Miranda."

- Barbara Cabrera

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**ANSWERS**

1)	$3x^2 + 2x - 5$
2)	$x + 3$
3)	$25a^2 - 17a + 13 - \frac{3}{a+1}$
4)	$x^3 + 4x^2 - 9$
5)	$r^2 - 9 - \frac{21}{r-3}$
6)	$s^2 + 2s + 1$
7)	Yes, as the remainder is 0
8)	$2x + 3$
9)	$(x - 3)(x + 1)(x^2 + 2x + 2)$
10)	$(9a + 6)$ miles/hour

FUN FACT

1. To divide a polynomial $p(x)$ by $x-a$ using synthetic division, we use the number $x = a$.
2. The last digit of the last row of the synthetic division is the remainder of the division.
3. All the elements of the last row except the last element are used to write the quotient of the division.

