

Given a polynomial divisor and dividend, use ***long division*** to find the quotient and remainder.

1. $(x^2 + 14x + 38) \div (x + 8)$

2. $(x^2 - 74) \div (x - 8)$

3. $(x^3 + 7x^2 + 14x + 3) \div (x + 2)$

4. $(x^3 - 13x^2 + 40x + 18) \div (x - 7)$

5. $(3x^3 + 34x^2 + 89x + 75) \div (x + 8)$

6. $(8x^3 - 55x^2 + 44x - 12) \div (x - 6)$

Given a polynomial $p(x)$, use ***synthetic division*** to divide by $x - a$ and obtain the quotient and the (nonzero) remainder. Write the result in the form $p(x) = (x - a)(\text{quotient}) + \text{remainder}$.

7. $(7x^3 - 4x^2 - 400x - 100) \div (x - 8)$

8. $(8x^4 - 28.5x^2 - 9x + 10) \div (x + 0.25)$

9. $(2.5x^3 + 6x^2 - 5.5x - 10) \div (x + 1)$

10. $(3x^3 - 11x^2 - 56x - 50) \div (3x + 4)$

11. $(x^3 - 13x^2 + 40x + 18) \div (x - 7)$

12. $(x^3 + 6x^2 + 9x - 5) \div (x + 1)$

13. Explain the error: Two students used synthetic division to divide $3x^3 - 2x - 8$ by $x - 2$. Determine which solution is correct. Find the error in the other solution.

A.	B.
$\begin{array}{r} \underline{2} \mid \quad 3 \quad 0 \quad -2 \quad -8 \\ \qquad \quad 6 \quad 12 \quad 20 \\ \hline \qquad \quad 3 \quad 6 \quad 10 \quad 12 \end{array}$	$\begin{array}{r} \underline{2} \mid \quad 3 \quad 0 \quad -2 \quad -8 \\ \qquad \quad -6 \quad 12 \quad -20 \\ \hline \qquad \quad 3 \quad -6 \quad 10 \quad -28 \end{array}$