

Sec 2.3 –Operations with Polynomials
Dividing Polynomials

Name: _____

1. Divide each of the following polynomials by the suggested monomial.

a. $\frac{32a^5 + 24a^3}{8a^3}$

b. $\frac{36x^5 + 72x^3 + 48x^2}{6x^2}$

c. $\frac{12m^5 + 20m^4 + 32m^2}{4m^3}$

2. (REVIEW) Complete the following long division problem: $385274 \div 12$

$$12 \overline{) 385274}$$

3. Use long division to divide the following polynomials. $(x^4 + 5x^3 + 3x^2 - 8x + 3) \div (x + 3)$

$$x + 3 \overline{) x^4 + 5x^3 + 3x^2 - 8x + 3}$$

4. Use long division to divide $(2x^4 - 7x^3 + 10x^2 - 6x - 3)$ by $(x - 2)$

5. Use long division to divide: $\frac{2x^4 - 3x^3 - x^2 + 8x - 6}{2x + 3}$

6. Use long division to divide $(4x^4 + 3x^2 + 2x - 2)$
by $(2x - 1)$

7. Use long division to divide:
$$\frac{x^5 + 5x^4 - x^3 - 22x^2 + x + 6}{x^2 + 3x - 2}$$

8. Use long division to find the quotient of $3x^3 - 12$
and $x^2 + 2x + 3$

9. Use long division to determine.
 $(6x^4 + 8x^3 - 11x^2 - 7x + 6) \div (2x^2 + 2x - 3)$

10. Rewrite $2x^3 + 3x^2 + 4x - 5$ as a nested polynomial.

11. Use the nested polynomial to easily evaluate $2x^3 + 3x^2 + 4x - 5$ when $x = 2$.

12. Use the following format to quickly evaluate $2x^3 + 3x^2 + 4x - 5$ when $x = 2$.

$$\begin{array}{r} \underline{2} \mid \quad 2 \quad 3 \quad 4 \quad -5 \\ \quad \downarrow \\ \hline \quad \quad 2 \end{array}$$

13. Use long division to find the following quotient: $(2x^3 + 3x^2 + 4x - 5) \div (x - 2)$

(Compare the answer from problem #12 with problem #11.)

14. Use synthetic division to divide

$$(x^4 + 7x^3 + 17x^2 + 13x - 6) \div (x + 3)$$

15. Use synthetic division to divide

$$(x^4 + 3x^3 + 2x^2 + x - 6) \div (x + 2)$$

16. Use synthetic division to divide

$$\frac{(2x^4 - 5x^3 - 7x - 6)}{(x - 3)}$$

17. Use synthetic division to evaluate

$$2x^3 + 3x^2 - 4x - 2 \text{ at } x = 3$$

18. Use synthetic division find the remainder of

$$(3x^4 + 10x^3 - 6x^2 + 5x - 7) \div (x + 4)$$

19. Which of the following is a factor of

$$2x^5 - 3x^3 + 6x^2 - 5x + 6$$

- | | |
|------------|------------|
| a. $(x+1)$ | b. $(x-2)$ |
| c. $(x+2)$ | d. $(x-1)$ |