

Advanced Algebra
6.3 Worksheet

Name Answers
Date _____ Period _____

Divide using synthetic division.

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

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

3. $(x^3 - 7x^2 - 7x + 20) \div (x + 4)$

4. $(x^4 + 6x^2 - 8) \div (x + 2)$

$$\begin{array}{r|rrrrr} -2 & 1 & 0 & 6 & 0 & -8 \\ & \downarrow & -2 & 4 & -20 & 40 \\ \hline & 1 & -2 & 10 & -20 & 32 \end{array}$$

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

6. $(x^3 + 27) \div (x + 3)$

$$\begin{array}{l} X^3 - 2X^2 + 10X - 20 \\ R \ 32 \end{array}$$

Determine if each binomial is a factor of $x^3 + x^2 - 16x - 16$. Justify your work.

7. $x + 2$

8. $x - 4$

9. $x + 1$

$$\begin{array}{r|rrrr} 4 & 1 & 1 & -16 & -16 \\ & \downarrow & 4 & 20 & 16 \\ \hline & 1 & 5 & 4 & 0 \end{array}$$

yes its a factor

Use synthetic division and the given factor to completely factor each polynomial function.

10. $f(x) = x^3 + 2x^2 - 5x - 6; (x + 1)$

11. $f(x) = x^3 - 4x^2 - 9x + 36; (x + 3)$

$$\begin{array}{r|rrrr} -3 & 1 & -4 & -9 & 36 \\ & \downarrow & -3 & 21 & -36 \\ \hline & 1 & -7 & 12 & 0 \end{array}$$

$$(x + 3)(x^2 - 7x + 12)$$

$$(x + 3)(x - 4)(x - 3)$$

Use the Remainder Theorem to determine if the given "a" value is a solution.

12. $P(x) = x^3 + 4x^2 - 8x - 6; a = -2$

$$(-2)^3 + 4(-2)^2 - 8(-2) - 6$$

$$\begin{array}{r} 18 \\ \hline -2 \text{ is not a solution} \end{array}$$

Use long division to divide the polynomials.

14. $(50k^3 + 10k^2 - 35k - 7) \div (5k - 4)$

$$\begin{array}{r} 10k^2 + 10k + 1 \text{ R } -3 \\ \hline 5k-4 \overline{) 50k^3 + 10k^2 - 35k - 7} \\ \underline{-(50k^3 - 40k^2)} \\ 50k^2 - 35k \\ \underline{-(50k^2 - 40k)} \\ 5k - 7 \\ \underline{-(5k - 4)} \\ -3 \end{array}$$

13. $P(x) = x^3 + 4x^2 + 4x; a = -2$

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

16. $(2p^2 + 7p - 39) \div (2p - 7)$

17. $(x^3 + 5x^2 - 32x - 7) \div (x - 4)$

18. $(42x^2 - 33) \div (7x + 7)$