Name: _____ Date: _____

Polynomial Division Homework

Write the zero that corresponds with each factor.

1. $x - 9$ $x=9$
2. $x + 3$ $x=-3$
3. $3x - 4$ $x=\frac{4}{3}$
4. $4x - 7$ $x=\frac{7}{4}$

Write the factor that corresponds to each zero.

5. $x = 5$ $(x-5)$
6. $x = -2$ $(x+2)$
7. $x = 0$ x
8. $x = -\frac{1}{4}$ $(4x+1)$

Divide the polynomial using long division.

9. $(x^3 + 3x^2 - x + 2) \div (x - 1)$ $x^2+4x+3 \frac{5}{x-1}$
10. $(2x^3 - 3x^2 - 18x - 8) \div (x - 4)$ $2x^2+5x+2$
11. $(x^2 + 3) \div (x - 1)$ $x+1 \frac{4}{x-1}$
12. $(x^4 + 3x^2 + x + 4) \div (x + 3)$ $x^3-3x^2+12x-35 \frac{104}{x+3}$

Divide the polynomial using synthetic division.

13. $(x^3 + 3x^2 - x - 3) \div (x - 1)$ x^2+4x+3
14. $(x^4 - 6x^2 - 27) \div (x + 2)$ $x^3-2x^2-2x+4 \frac{-35}{x+2}$

Using either long or synthetic division, determine whether the given binomial is a factor of the given polynomial. ***(Your answer should be either yes or no.)***

15. $(x^3 + x^2 - 16x - 16); (x + 1)$ yes
16. $(x^3 - 7x^2 - 7x + 20); (x + 4)$ No

Use synthetic division to evaluate $P(a)$.

17. $P(-2)$ for $(x^3 + 4x^2 - 8x - 6)$ 18
18. $P(3)$ for $(6x^3 - x^2 + 4x + 3)$ 168

Using either long or synthetic division and the given factor, factor the polynomial completely.

19. $(x^3 + 3x^2 - 18x - 40); (x - 4)$

$(x+5)(x+2)(x-4)$

20. A decorative box has a volume in cubic inches of $V(x) = x^3 + x^2 - 6x$. Its width is given by the factor $(x - 2)$. Find the linear expressions for the other two dimensions.

height width length

$x(x-2)(x+3)$