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Date _____
Algebra II

Determining Whether a Binomial is a Factor

Determine whether the following are factors

1. Is $x-6$ a factor of $p(x)=x^3-6x^2+4x-1$? Explain your answer.

$P(6)=(6)^3-6(6)^2+4(6)-1$
$P(6)=23$
No, the remainder is not 0

2. Is $x+2$ a factor of $p(x)=x^3-3x^2-8x+4$? Explain your answer.

$P(-2)=(-2)^3-3(-2)^2-8(-2)+4$
$P(-2)=0$
Yes, the remainder is 0

$2x+1=0$
$-1\ \ -1$
$\frac{2x}{2}=\frac{-1}{2}$
$x=-\frac{1}{2}$

3. Is $2x+1$ a factor of $p(x)=2x^2+5x+2$? Explain your answer.

$P(-\frac{1}{2})=2(-\frac{1}{2})^2+5(-\frac{1}{2})+2$
$P(-\frac{1}{2})=0$
Yes, the remainder is 0

4. Determine if $x-5$ is a factor of $2x^3-4x^2-7x-10$. Explain your answer.

$P(5)=2(5)^3-4(5)^2-7(5)-10$
$P(5)=105$
No, the remainder is not 0

5. Determine if $x+4$ is a factor of $p(x)=x^4-6x^3-4x^2+54x-45$. Explain your answer.

$P(-4)=(-4)^4-6(-4)^3-4(-4)^2+54(-4)-45$
$P(-4)=315$
No, the remainder is not 0.

6. Determine if $x+3$ is a factor of $p(x)=x^4+7x^3+9x^2-21x-36$. Explain your answer.

$P(-3)=(-3)^4+7(-3)^3+9(-3)^2-21(-3)-36$
$P(-3)=0$
Yes, the remainder is 0

7. Use an appropriate procedure to show that $x-4$ is a factor of the function $f(x)=2x^3-5x^2-11x-4$. Explain your answer.

$f(4)=2(4)^3-5(4)^2-11(4)-4$
$f(4)=0$
$x-4$ is a factor because when divided into the polynomial, the remainder is 0.

8. Which binomial is a factor of $x^4 - 4x^2 - 4x + 8$?

1) $x-2$ $p(2)=0$
2) $x+2$ $p(-2)=16$
3) $x-4$ $p(4)=184$
4) $x+4$ $p(-4)=216$

9. Which binomial is *not* a factor of the expression $x^3 - 11x^2 + 16x + 84$?

1) $x+2$ $p(-2)=0$
2) $x+4$ $p(-4)=-220$
3) $x-6$ $p(6)=0$
4) $x-7$ $p(7)=0$

10. Which binomial is *not* a factor of the expression $x^3 - 6x^2 - 49x - 66$?

1) $x-11$ $p(11)=0$
2) $x+2$ $p(-2)=0$
3) $x+6$ $p(-6)=-204$
4) $x+3$ $p(-3)=0$

11. Which binomial is a factor of the expression $x^3 - 7x - 6$?

1) $x+3$ $p(-3)=-12$
2) $x-1$ $p(1)=-12$
3) $x-2$ $p(2)=-12$
4) $x+2$ $p(-2)=0$

12. Which binomial is *not* a factor of the expression $x^3 - 4x^2 - 25x + 28$?

1) $x+6$ $p(-6)=-182$
2) $x-7$ $p(7)=0$
3) $x-1$ $p(1)=0$
4) $x+4$ $p(-4)=0$

13. Which binomial is a factor of the expression $x^4 + 4x^2 - 32$?

1) $x+8$ $p(-8)=4320$
2) $x-8$ $p(8)=4320$
3) $x-1$ $p(1)=-27$
4) $x+2$ $p(-2)=0$

14. Which binomial is not a factor of $p(x) = 2x^3 + 7x^2 - 5x - 4$?

1) $x+4$ $p(-4)=0$
2) $x+1$ $p(-1)=6$
3) $x-1$ $p(1)=0$
4) $2x+1$ $p(-\frac{1}{2})=0$

15. Given $r(x) = x^3 - 4x^2 + 4x - 6$, find the value of $r(2)$. What does your answer tell you about $x-2$ as a factor of $r(x)$? Explain.

$r(2) = (2)^3 - 4(2)^2 + 4(2) - 6$
$r(2) = -6$

$x-2$ is not a factor because the remainder is not 0

16. When $g(x)$ is divided by $x+4$, the remainder is 0. Given $g(x) = x^4 + 3x^3 - 6x^2 - 6x + 8$, which conclusion about $g(x)$ is true?

$x+4$ is a factor
-4 is a zero

1) $g(4) = 0$
2) $g(-4) = 0$
3) $x-4$ is a factor of $g(x)$.
4) No conclusion can be made regarding $g(x)$.