Name _____ Date _____

Mr. Schlansky Algebra II

The Remainder Theorem

1. What is the remainder when $p(x) = x^3 - 9x^2 + 21x - 5$ is divided by $x - 5$? Is $x - 5$ a factor of $p(x)$? Explain your answer.

2. What is the remainder when $p(x) = x^4 - 8x^2 + 3x$ is divided by $x + 4$? Is $x + 4$ a factor of $p(x)$? Explain your answer.

3. What is the remainder when $p(x) = x^3 - 2x^2 + 6x - 2$ is divided by $x - 3$? Is $x - 3$ a factor of $p(x)$? Explain your answer.

4. What is the remainder when $p(x) = x^3 - 5x^2 - 5x + 25$ is divided by $x + 2$? Is $x + 2$ a factor of $p(x)$? Explain your answer.

5. What is the remainder when $p(x) = x^3 - 6x^2 + 4x - 1$ is divided by $x - 6$? Is $x - 6$ a factor of $p(x)$? Explain your answer.

6. What is the remainder when $p(x) = x^3 - 3x^2 - 8x + 4$ is divided by $x + 2$? Is $x + 2$ a factor of $p(x)$? Explain your answer.

7. What is the remainder when $p(x) = 2x^3 + 5x + 2$ is divided by $2x + 1$. Is $2x + 1$ a factor of $p(x)$? Explain your answer.

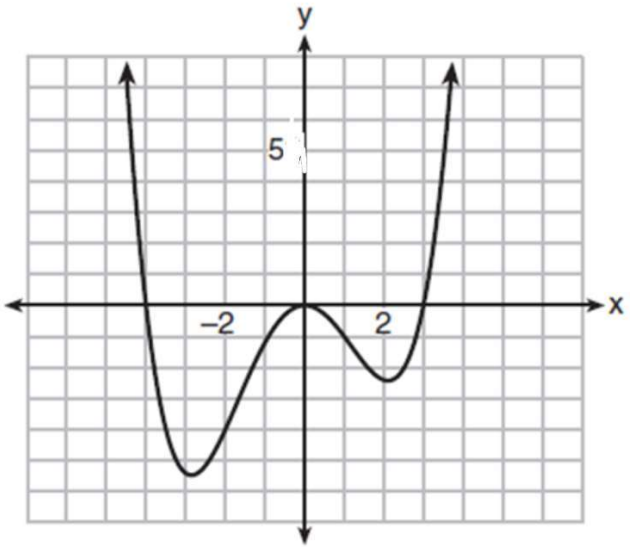
8. What is the remainder when $p(x) = 3x^3 - 2x^2 - 27x + 18$ is divided by $3x - 2$. Is $3x - 2$ a factor of $p(x)$? Explain your answer.

9. What is the remainder when $p(x) = 2x^3 - 2x^2 + 3$ is divided by $4x + 1$. Is $4x + 1$ a factor of $p(x)$? Explain your answer.

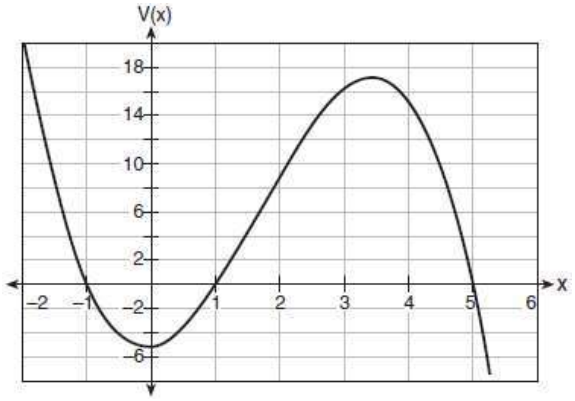
Use the graph below to the right to answer the following two questions.

10. What is the remainder when the following polynomial is divided by $x - 1$? Is $x - 1$ a factor? Explain your answer.

11. What is the remainder when the following polynomial is divided by $x + 3$? Is $x + 3$ a factor? Explain your answer.



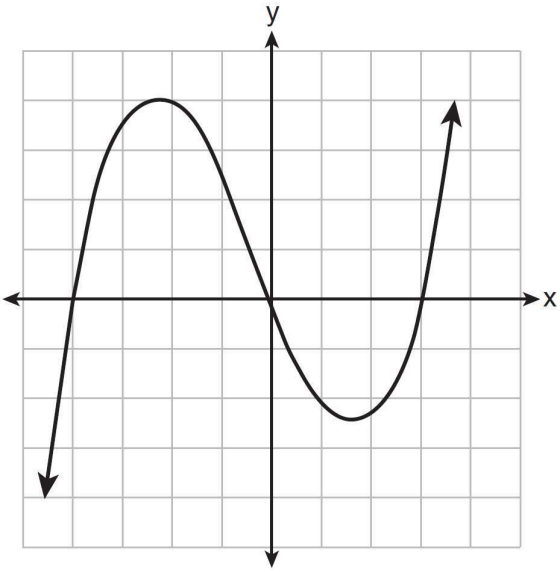
Use the graph below to the right to answer the following two questions.



12. What is the remainder when the following polynomial is divided by $x-1$? Is $x-1$ a factor? Explain your answer.

13. What is the remainder when the following polynomial is divided by $x+2$? Is $x+2$ a factor? Explain your answer.

Use the graph below to the right to answer the following two questions.



14. What is the remainder when the following polynomial is divided by $x-1$? Is $x-1$ a factor? Explain your answer.

15. What is the remainder when the following polynomial is divided by $x-3$? Is $x-3$ a factor? Explain your answer.

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

1) $x-2$
2) $x+2$
3) $x-4$
4) $x+4$

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

1) $x+2$
2) $x+4$
3) $x-6$
4) $x-7$

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

1) $x-11$
2) $x+2$
3) $x+6$
4) $x+3$

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

1) $x + 3$
2) $x - 1$
3) $x - 2$
4) $x + 2$

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

1) $x + 6$
2) $x - 7$
3) $x - 1$
4) $x + 4$

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

1) $x + 4$
2) $x + 1$
3) $x - 1$
4) $2x + 1$

22. Which binomial is not a factor of $p(x) = 2x^3 - 5x^2 + 6x - 2$?

1) $x - 1$
2) $x - 2$
3) $2x - 1$
4) $2x + 1$

23. Given $P(x) = x^3 - 3x^2 - 2x + 4$, which statement is true?

1) $(x - 1)$ is a factor because $P(-1) = 2$.
2) $(x + 1)$ is a factor because $P(-1) = 2$.
3) $(x + 1)$ is a factor because $P(1) = 0$.
4) $(x - 1)$ is a factor because $P(1) = 0$.

24. If $f(x) = 2x^4 - x^3 - 16x + 8$, then $f\left(\frac{1}{2}\right)$

1) equals 0 and $2x + 1$ is a factor of $f(x)$
2) equals 0 and $2x - 1$ is a factor of $f(x)$
3) does not equal 0 and $2x + 1$ is not a factor of $f(x)$
4) does not equal 0 and $2x - 1$ is a factor of $f(x)$

25. Consider the function $f(x) = 2x^3 + x^2 - 18x - 9$. Which statement is true?

1) $2x - 1$ is a factor of $f(x)$.
2) $x - 3$ is a factor of $f(x)$.
3) $f(3) \neq f\left(-\frac{1}{2}\right)$
4) $f\left(\frac{1}{2}\right) = 0$