Name _____   Date _____
Mr. Schlansky   Algebra II

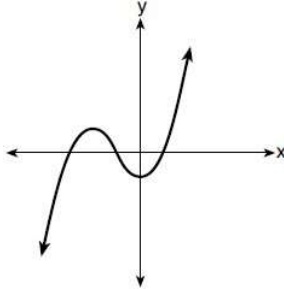# *Polynomial Graphs/Remainder Theorem Review Sheet*

1. Consider the end behavior description below.

- as $x \rightarrow -\infty$, $f(x) \rightarrow \infty$
- as $x \rightarrow \infty$, $f(x) \rightarrow -\infty$

Which function satisfies the given conditions?
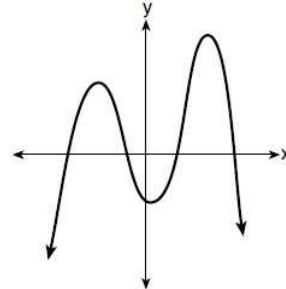
1) $f(x) = x^4 + 2x^2 + 1$ 3) $f(x) = -x^3 + 2x - 6$
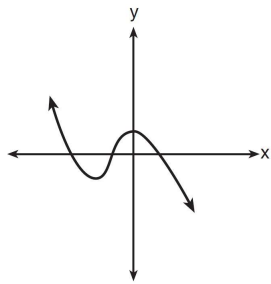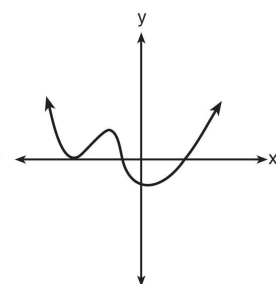
2)   4)

2. Which graph has the following characteristics?
- three real zeros
- as $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$
- as $x \rightarrow \infty$, $f(x) \rightarrow \infty$
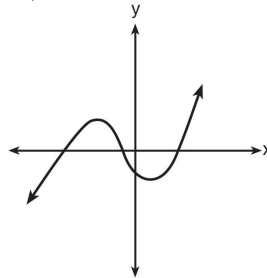
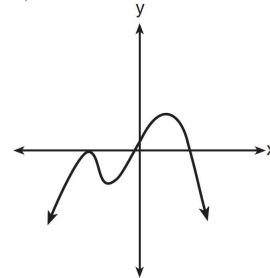1)   2)   3)   4)
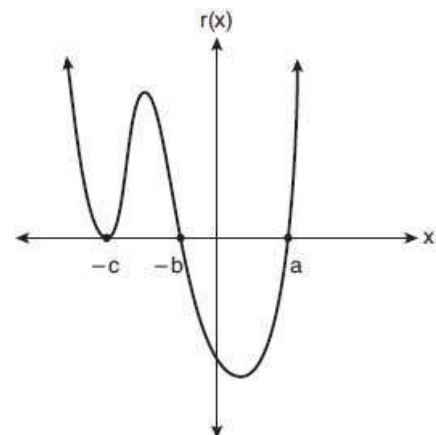

3. A sketch of $r(x)$ is shown below.

An equation for $r(x)$ could be
1) $r(x) = (x-a)(x+b)(x+c)$ 3) $r(x) = (x+a)(x-b)(x-c)$
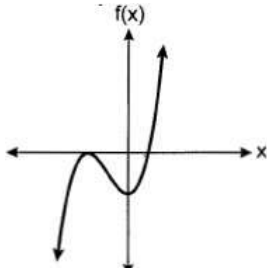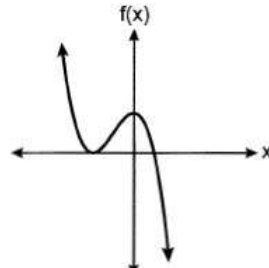2) $r(x) = (x+a)(x-b)(x-c)^2$ 4) $r(x) = (x-a)(x+b)(x+c)^2$

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4. Which graph best represents the graph of $f(x) = (x + a)^2(x - b)$, where a and b are positive real numbers?
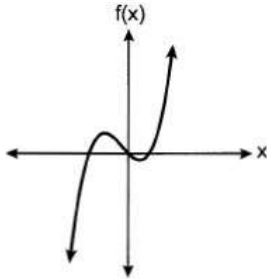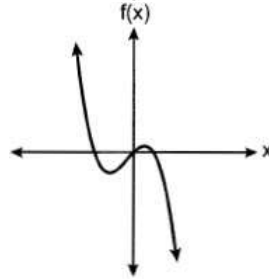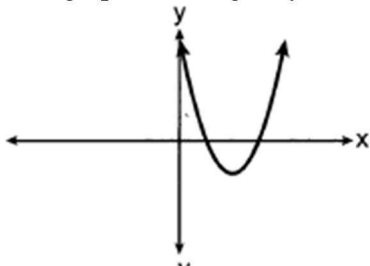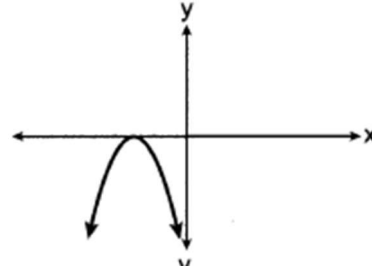
1)

f(x)

3)
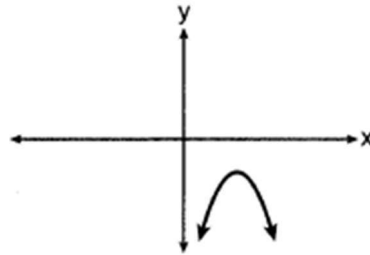
f(x)

2)

f(x)

4)

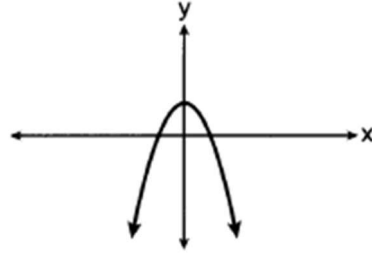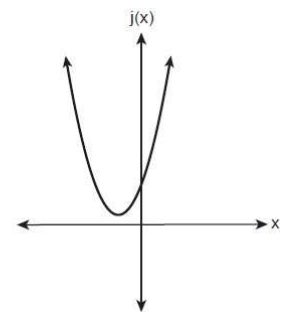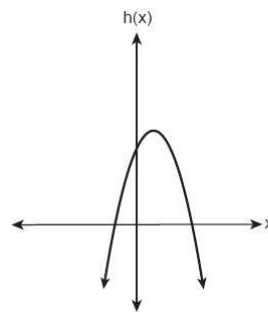f(x)

5. Which graph has imaginary roots?

1)

y

3)

y

2)

y

4)

y

6. Which quadratic functions have imaginary roots?
1) $h(x)$ only
2) $j(x)$ only
3) Both $j(x)$ and $h(x)$
4) Neither $j(x)$ or $h(x)$

h(x)

j(x)

7. Is $x-6$ a factor of $x^3 - 6x^2 + 4x - 1$? Explain your answer.

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

9. Which binomial is *not* a factor of the expression $x^3 - 6x^2 - 49x - 66$?
1) $x-11$ 3) $x+6$
2) $x+2$ 4) $x+3$

10. Which binomial is a factor of the expression $x^3 - 7x - 6$?
1) $x+3$ 3) $x-2$
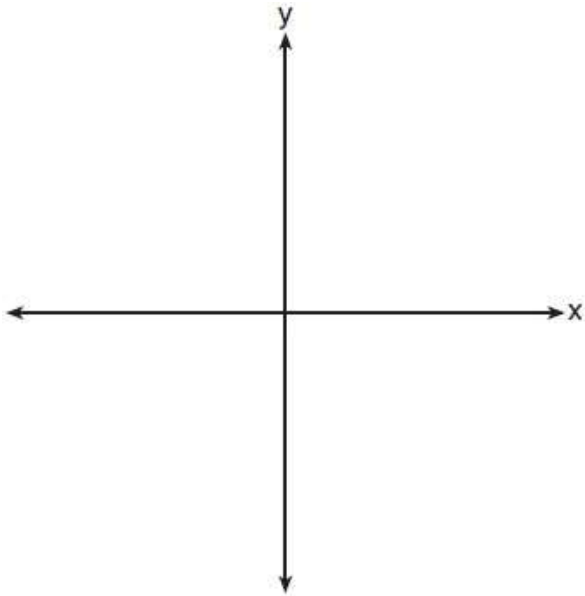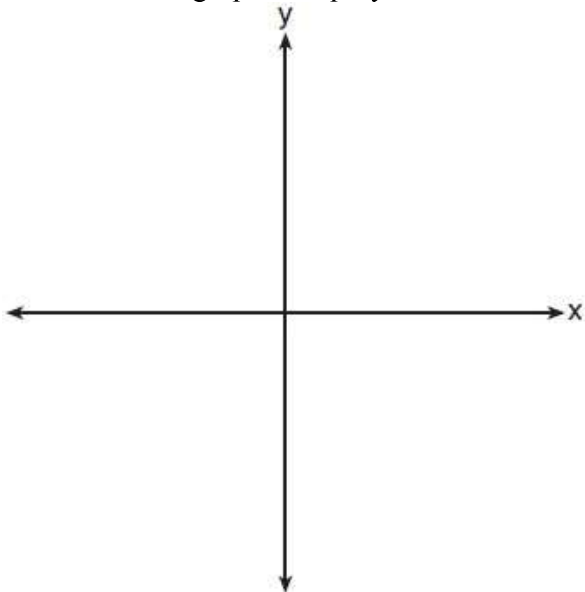2) $x-1$ 4) $x+2$

11. Given $p(x) = 6x^3 + 31x^2 + kx - 12$, and $x+4$ is a factor, find the value of k.

12. Consider the polynomial $p(x) = x^3 + kx - 30$. Find a value of k so that $x+3$ is a factor of P.

13. Sketch the graph of a polynomial function whose factors are $(x+1)$, $(x-4)^2$, and $(x+2)$.

14. Sketch the graph of a polynomial functions whose zeros are -5, -2, -2, and 6.

15. Solve for x:
$3x^2 - 4x - 4 = 0$

16. Solve for x:
$6x^2 - 11x - 2 = 0$

17. Solve for x:
$x^3 + 6x^2 = 4x + 24$

18. Solve for x:
$x^3 - 2x^2 = 9x - 18$