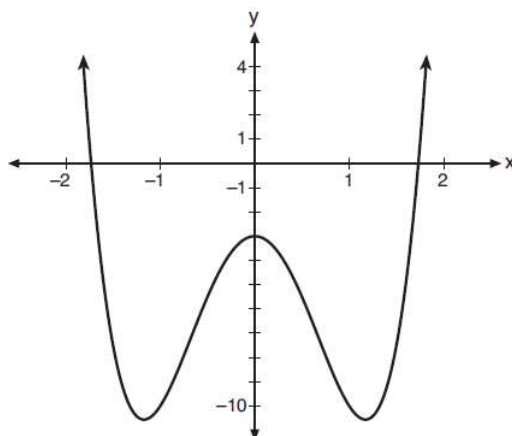


Name _____
Mr. Schlansky

Date _____
Algebra II

Sketching Polynomial Graphs Regents Practice

1. Consider the function $p(x) = 3x^3 + x^2 - 5x$ and the graph of $y = m(x)$ below.



Which statement is true?

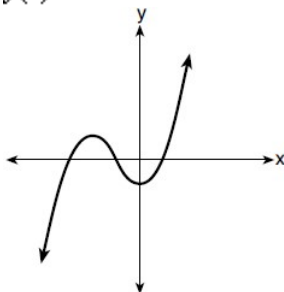
- | | |
|---------------------------------------------------------------|----------------------------------------------------------------|
| 1) $p(x)$ has three real roots and $m(x)$ has two real roots. | 3) $p(x)$ has two real roots and $m(x)$ has three real roots. |
| 2) $p(x)$ has one real root and $m(x)$ has two real roots. | 4) $p(x)$ has three real roots and $m(x)$ has four real roots. |

2. Consider the end behavior description below.

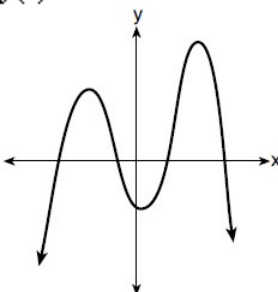
- as $x \rightarrow -\infty, f(x) \rightarrow \infty$
- as $x \rightarrow \infty, f(x) \rightarrow -\infty$

Which function satisfies the given conditions?

- 1) $f(x) = x^4 + 2x^2 + 1$
2)

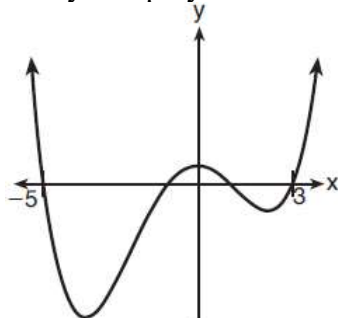


- 3) $f(x) = -x^3 + 2x - 6$
4)

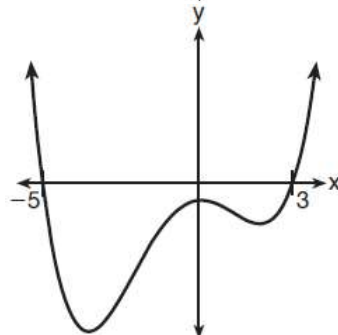


3. A 4th degree polynomial has zeros -5 , 3 , i , and $-i$. Which graph could represent the function defined by this polynomial?

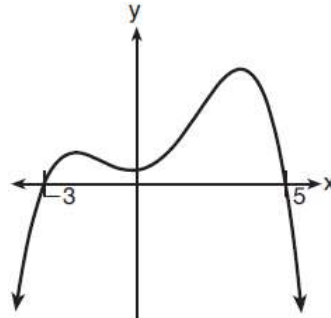
1)



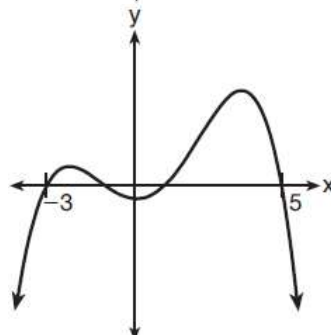
2)



3)



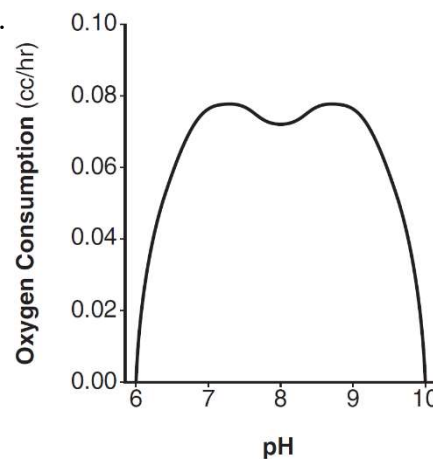
4)



4. There was a study done on oxygen consumption of snails as a function of pH, and the result was a degree 4 polynomial function whose graph is shown below.

Which statement about this function is *incorrect*?

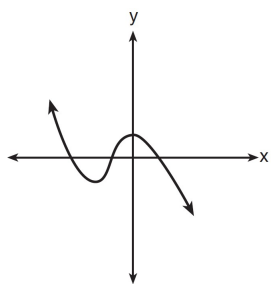
- 1) The degree of the polynomial is even.
- 2) There is a positive leading coefficient.
- 3) At two pH values, there is a relative maximum value.
- 4) There are two intervals where the function is decreasing.



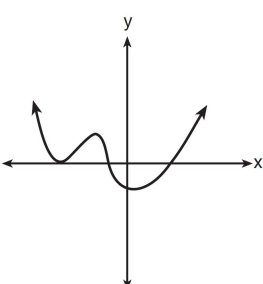
5. Which graph has the following characteristics?

- three real zeros
- as $x \rightarrow -\infty$, $f(x) \rightarrow -\infty$
- as $x \rightarrow \infty$, $f(x) \rightarrow \infty$

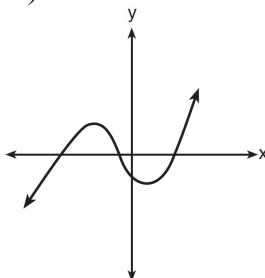
1)



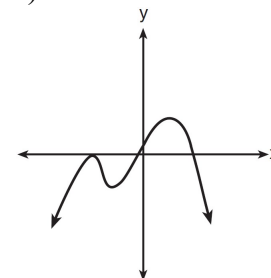
2)



3)



4)



6. The graph of the function $p(x)$ is sketched below.

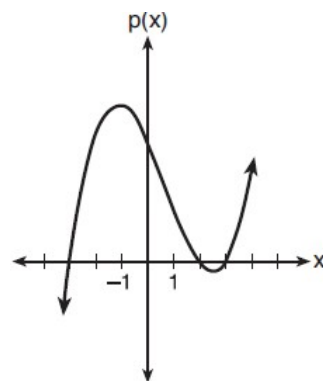
Which equation could represent $p(x)$?

1) $p(x) = (x^2 - 9)(x - 2)$

2) $p(x) = x^3 - 2x^2 + 9x + 18$

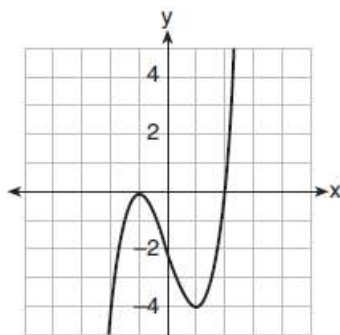
3) $p(x) = (x^2 + 9)(x - 2)$

4) $p(x) = x^3 + 2x^2 - 9x - 18$

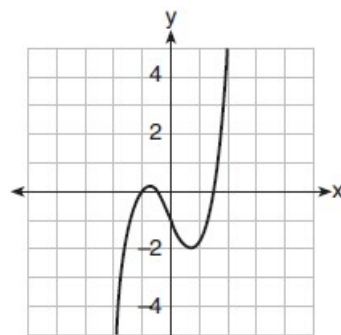


7. Which graph represents a polynomial function that contains $x^2 + 2x + 1$ as a factor?

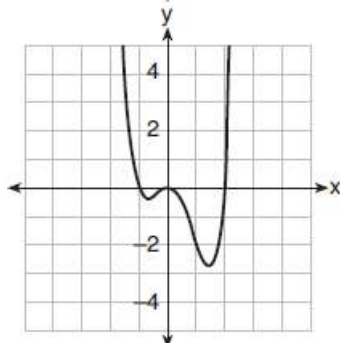
1)



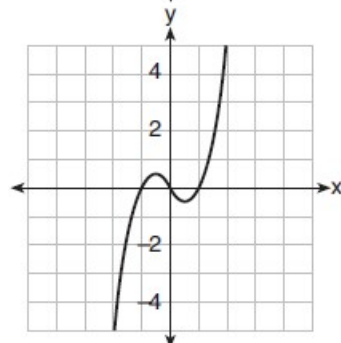
3)



2)

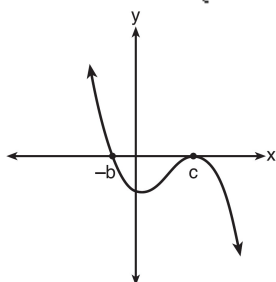


4)

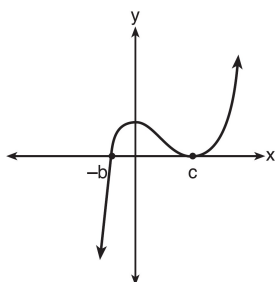


8. If a , b , and c are all positive real numbers, which graph could represent the sketch of the graph of $p(x) = -a(x + b)(x^2 - 2cx + c^2)$?

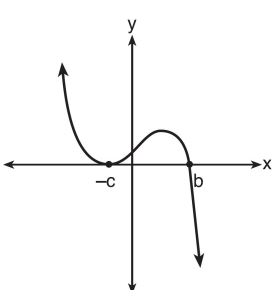
1)



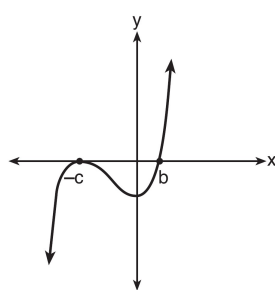
3)



2)



4)



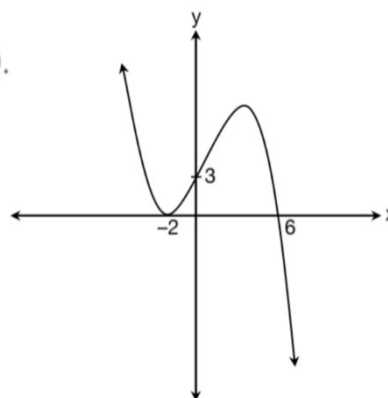
9. Which description could represent the graph of $f(x) = 4x^2(x + a) - x - a$, if a is an integer?

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) As $x \rightarrow -\infty, f(x) \rightarrow \infty$, as
$x \rightarrow \infty, f(x) \rightarrow \infty$, and the graph has 3
x -intercepts. | 3) As $x \rightarrow -\infty, f(x) \rightarrow \infty$, as
$x \rightarrow \infty, f(x) \rightarrow -\infty$, and the graph has 4
x -intercepts. |
| 2) As $x \rightarrow -\infty, f(x) \rightarrow -\infty$, as
$x \rightarrow \infty, f(x) \rightarrow \infty$, and the graph has 3
x -intercepts. | 4) As $x \rightarrow -\infty, f(x) \rightarrow -\infty$, as
$x \rightarrow \infty, f(x) \rightarrow \infty$, and the graph has 4
x -intercepts. |

10. The graph below shows the polynomial $y = p(x)$.

The factors of $p(x)$ are

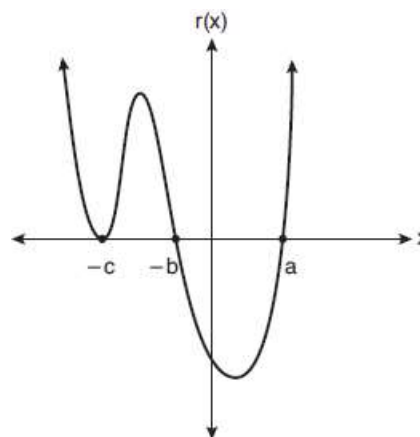
- (1) $(x + 2)$, $(x - 3)$, and $(x + 6)$
- (2) $(x - 2)$, $(x + 3)$, and $(x + 6)$
- (3) $(x - 2)$, $(x - 2)$, and $(x + 6)$
- (4) $(x + 2)$, $(x + 2)$, and $(x - 6)$



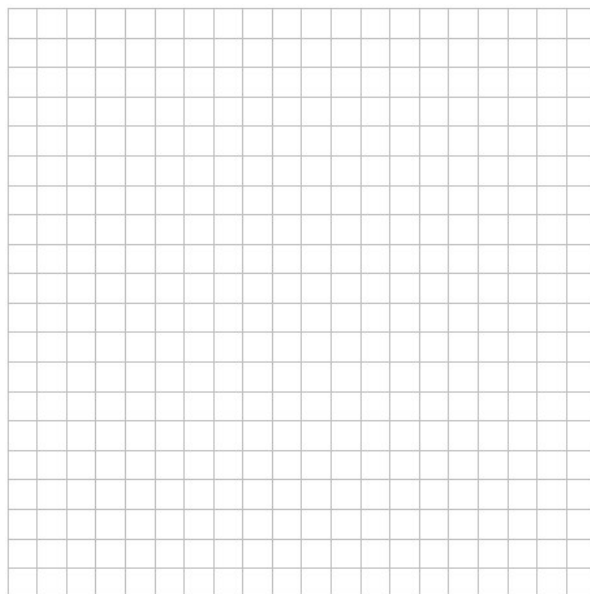
11. A sketch of $r(x)$ is shown below.

An equation for $r(x)$ could be

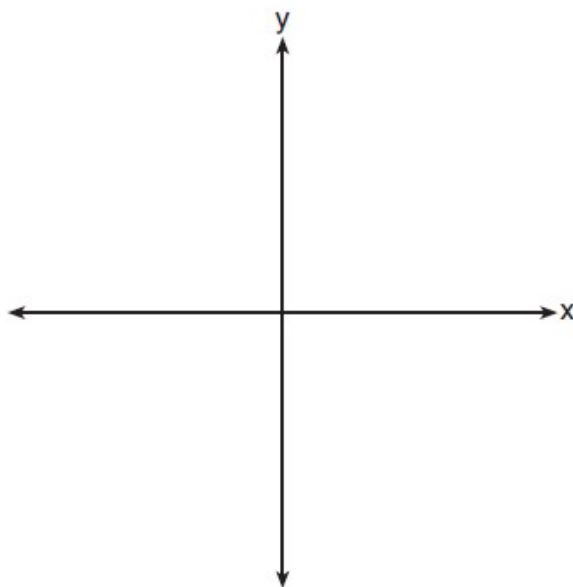
- | | |
|-------------------------------------|-------------------------------------|
| 1) $r(x) = (x - a)(x + b)(x + c)$ | 3) $r(x) = (x + a)(x - b)(x - c)$ |
| 2) $r(x) = (x + a)(x - b)(x - c)^2$ | 4) $r(x) = (x - a)(x + b)(x + c)^2$ |



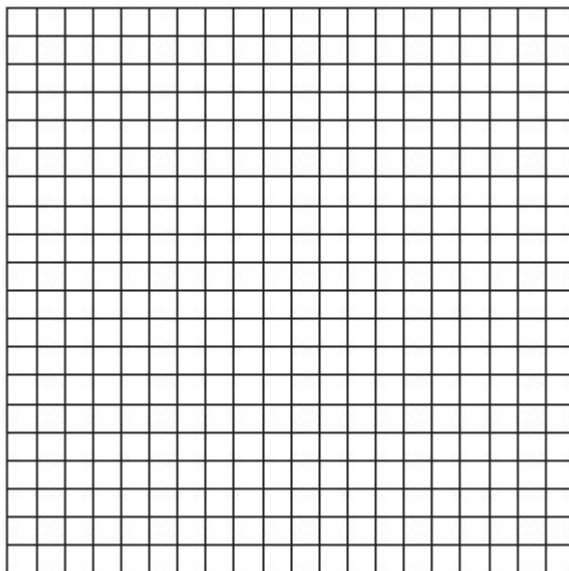
12. On the grid below, sketch a cubic polynomial whose zeros are 1, 3, and -2.



13. The zeros of a quartic polynomial function are 2, -2, 4, and -4. Use the zeros to construct a possible sketch of the function, on the set of axes below.



14. The zeros of a quartic polynomial function h are $-1, \pm 2$, and 3 . Sketch a graph of $y = h(x)$ on the grid below.



15. On the axes below, sketch a possible function $p(x) = (x - a)(x - b)(x + c)$, where a, b , and c are positive, $a > b$, and $p(x)$ has a positive y -intercept of d . Label all intercepts.

