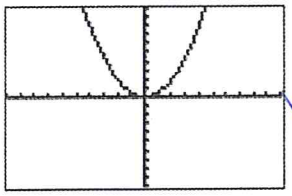
Name Schlansky
Mr. Schlansky

Date _____
Algebra II

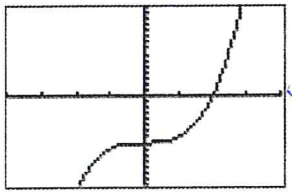
# *Polynomial Graphs Regents Practice*

1. Without using a graphing utility, match each graph below in column 1 with the function in column 2 that it represents.

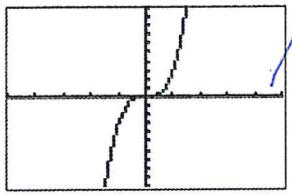
a.



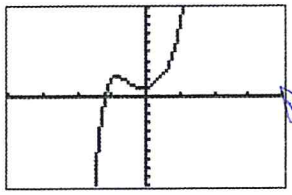
b.



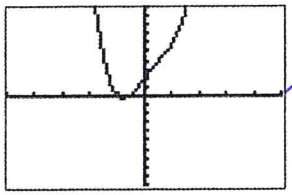
c.



d.

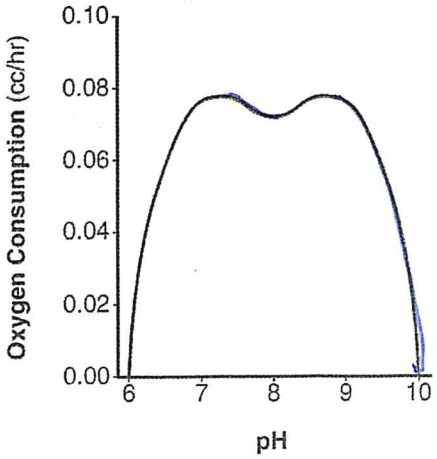


e.



1. $y = 3x^3$ y int=0
2. $y = \frac{1}{2}x^2$ y int=0
3. $y = x^3 - 8$ y int=-8
4. $y = x^4 - x^3 + 4x + 2$ y int=2
5. $y = 3x^5 - x^3 + 4x + 2$ y int=2

2. 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.



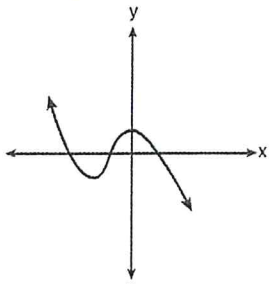

Which statement about this function is *incorrect*?

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.

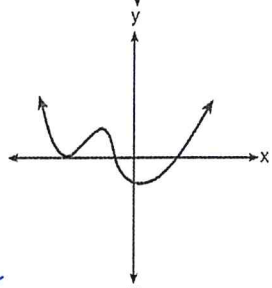
3. Which graph has the following characteristics?

- three real zeros
- as $x \to -\infty$, $f(x) \to -\infty$ (left, down)
- as $x \to \infty$, $f(x) \to \infty$ (right, up)

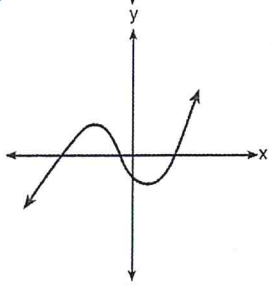
1)



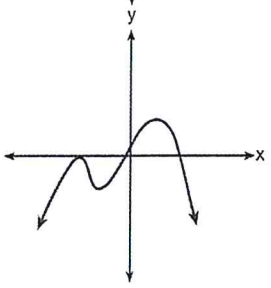

2)



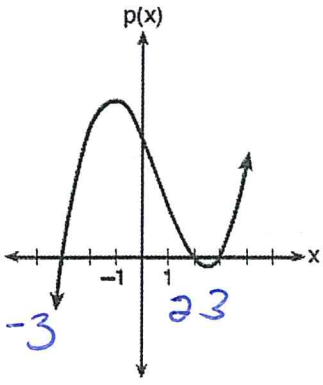

3)




4)




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




Which equation could represent $p(x)$?

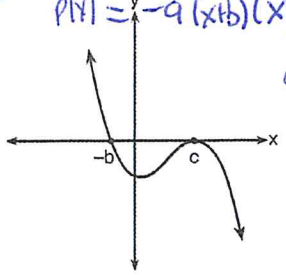
1) $p(x) = (x^2 - 9)(x - 2)$
2) $p(x) = x^3 - 2x^2 + 9x + 18$
3) $p(x) = (x^2 + 9)(x - 2)$
4) $p(x) = x^3 + 2x^2 - 9x - 18$

$(x+3)(x-3)(x-2) = 0$

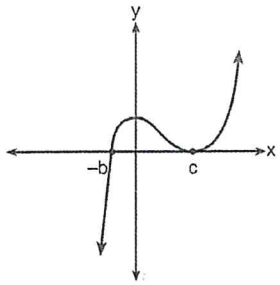
$x = -3 \quad x = 3 \quad x = 2$

5. If $a$, $b$, and $c$ are all positive real numbers, which graph could represent the sketch of the graph of $p(x) = -a(x+b)\left(x^2 - 2cx + c^2\right)$? degree 3 ↳

1) $p(x) = -a(x+b)(x-c)^2$ double root



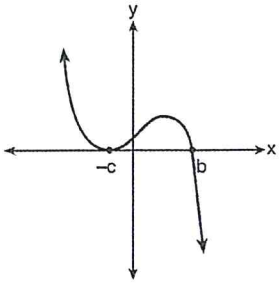

3)



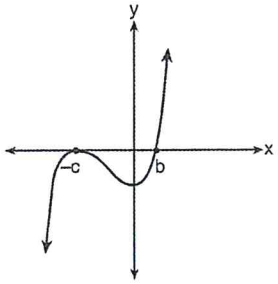

$0 = -a(x+b)(x-c)^2$

$x=-b \quad x=c$

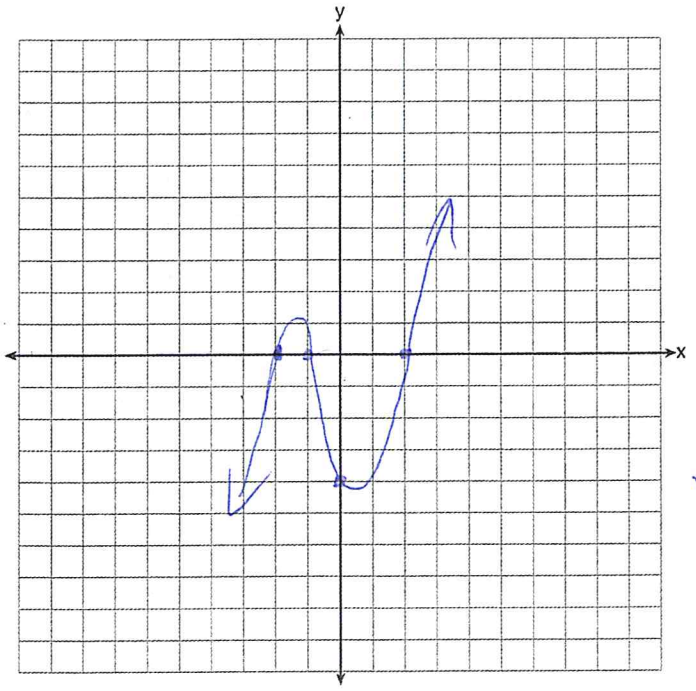
2)




4)




6. Find algebraically the zeros for $p(x) = x^3 + x^2 - 4x - 4$. On the set of axes below, graph $y = p(x)$




degree 3 ↗

y int = -4

$(x^3 + x^2) - (4x - 4) = 0$

$x^2 - 4 = -4$

$x^2(x+1) - 4(x+1) = 0$

$(x^2 - 4)(x+1) = 0$

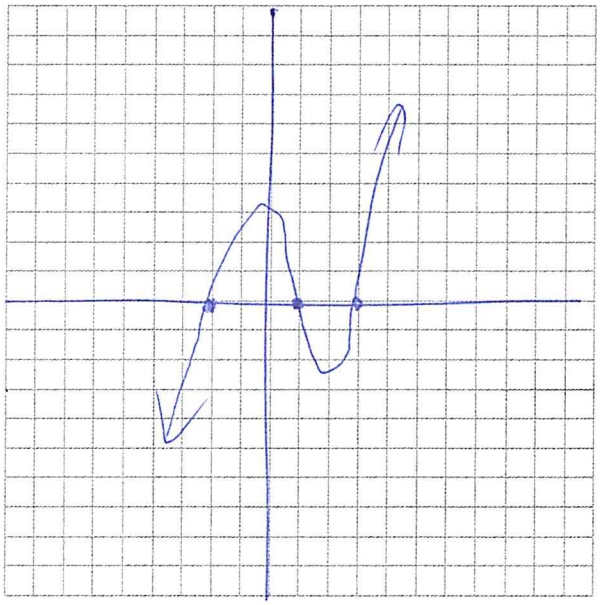
$(x+2)(x-2)(x+1) = 0$

$x+2=0 \quad x-2=0 \quad x+1=0$

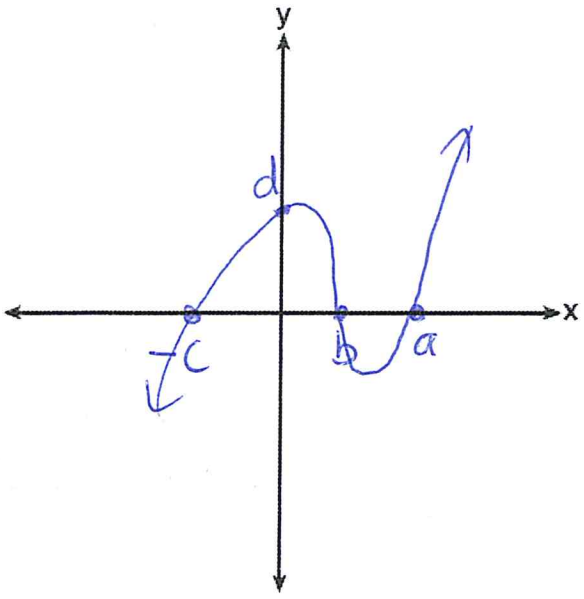
$-2 \quad -2 \quad +1 \quad -1$

$x=-2 \quad x=2 \quad x=-1$

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



8. 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.




$p(x) = (x-a)(x-b)(x+c)$

$0 = (x-a)(x-b)(x+c)$

| $x-a=0$ | $x-b=0$ | $x+c=0$ |
|---|---|---|
| $+a \quad +a$ | $+b \quad +b$ | $-c \quad -c$ |
| $x=a$ | $x=b$ | $x=-c$ |