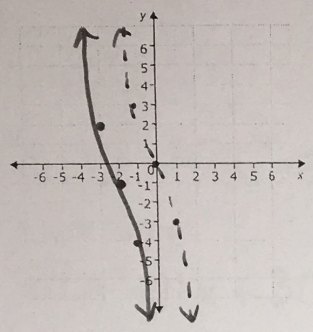
Review – Polynomials

Percent:_____

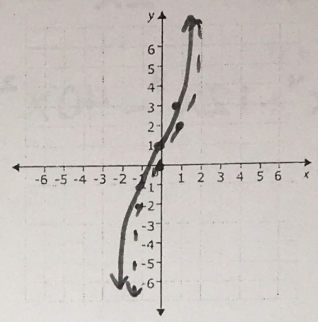
Name: Key
Date:
Period:

Graph the following cubic functions.

1. $f(x) = -3(x+2)^3 - 1$



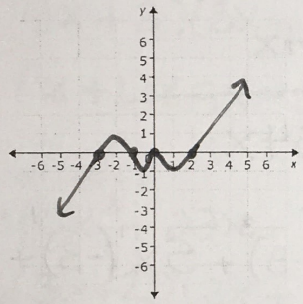
2. $f(x) = 2x^3 + 1$



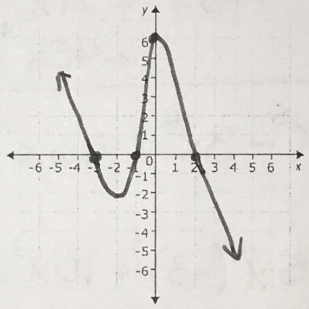
Sketch the graph of each of the following polynomial functions.

3. $f(x) = x^2(x+3)(x+1)(x-2)$

zeros:
0: bounce
-3: cross
-1: cross
2: cross
Deg: 5
LC: +
y-int: 0



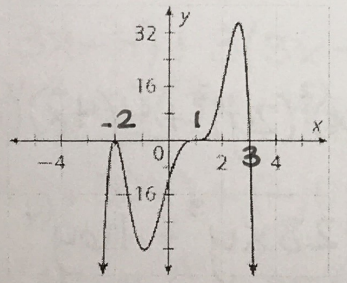
4. $g(x) = -(x+3)(x-2)(x+1)$



zeros:
-3: cross
2: cross
-1: cross
Deg: 3
LC: −
y-int: $-(3)(-2)(1)$
$= 6$

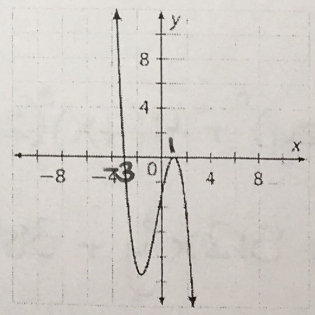
Write a polynomial function in factored form with a lead coefficient of 1 or -1 for each of the following.

5.



$f(x) =$ $-(x+2)^2(x-1)^3(x-3)$

6.



$f(x) =$ $-(x+3)(x-1)^2$

Perform the indicated operations.

7. $(18x^3 + 13x^5 - 11x) + (9 - 20x^5 + 8x) - (2x^2 + 6x - 17x^3)$

$18x^3 + 13x^5 - 11x + 9 - 20x^5 + 8x - 2x^2 - 6x + 17x^3$

$= -7x^5 + 35x^3 - 2x^2 - 9x + 9$

8. $(4x^3 - 5)(8x^2 - 9x + 3)$

$32x^5 - 36x^4 + 12x^3 - 40x^2 + 45x - 15$

9. $(2x^4 - 3x^2 + 9x)(5x^2 - 7x + 6)$

$$\begin{array}{l} 10x^6 - 14x^5 + 12x^4 \\ \qquad\qquad - 15x^4 + 21x^3 - 18x^2 \\ \qquad\qquad\qquad\quad + 45x^3 - 63x^2 + 54x \\ \hline 10x^6 - 14x^5 - 3x^4 + 66x^3 - 81x^2 + 54x \end{array}$$

10. $(x - 3)^5$

$1x^5(-3)^0 + 5x^4(-3)^1 + 10x^3(-3)^2 + 10x^2(-3)^3 + 5x^1(-3)^4 + 1x^0(-3)^5$

$= x^5 - 15x^4 + 90x^3 - 270x^2 + 405x - 243$

11. $(4x + 2y)^4$

$1(4x)^4(2y)^0 + 4(4x)^3(2y)^1 + 6(4x)^2(2y)^2 + 4(4x)^1(2y)^3 + 1(4x)^0(2y)^4$

$= 256x^4 + 512x^3y + 384x^2y^2 + 128xy^3 + 16y^4$

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1

Factor each of the following COMPLETELY:

12. $x^4 - 16$

$(x^2+4)(x^2-4)$

$(x^2+4)(x+2)(x-2)$

13. $5x^3 + 135$

$5(x^3+27)$

$5(x+3)(x^2-3x+9)$

14. $2x^2 + 22x + 60$

$2(x^2+11x+30)$

$2(x+5)(x+6)$

15. $3x^2 - 2x - 5$ 15

$(3x+3)(3x-5)$

$(x+1)(3x-5)$

16. $9x^2 + 66x + 21$

$3(3x^2+22x+7)$ 21

$3(3x+21)(3x+1)$

$3(x+7)(3x+1)$

17. $3x^3 - 4x^2 + 9x - 12$

$(3x^3-4x^2)+(9x-12)$

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

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

18. $40xy + 30x - 100y - 75$

$(40xy+30x)+(-100y-75)$

$10x(4y+3)-25(4y+3)$

$(10x-25)(4y+3)$