Name: Key Hour: ____ Date: ____

Polynomials Study Guide

Test Date: Wednesday, March 6, 2019

Find the product of the following polynomials. Write the product in standard form, classify the polynomial by degree/number of terms and describe the end behavior.

1) $(x-3)^2(x-1)$

$(x-1)(x^2-6x+9)$

$x^3-6x^2+9x-x^2+6x-9$

$x^3-7x^2+15x-9$

Name: Cubic Polynomial

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

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

$-x^4-4x^3-4x^2$

Name: Quartic Trinomial

3) $(x^2+5)(-2x^3+3x-1)$

$-2x^5+3x^3-x^2-10x^3+15x-5$

$2x^5-7x^3-x^2+15x-5$

Name: Quintic Polynomial

4) $x^2(x^4-16)$

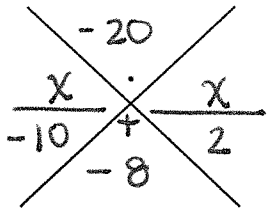
x^6-16x^2

Name: Sixth Degree Binomial

Factor the following polynomials completely.

5) $-x^4+8x^3+20x^2$

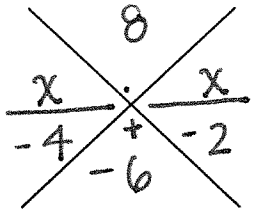
$-x^2(x^2-8x-20)$



$-x^2(x-10)(x+2)$

6) $3x^4-18x^3+24x^2$

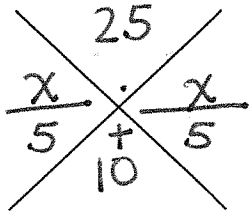
$3x^2(x^2-6x+8)$



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

7) $5x^4+50x^3+125x^2$

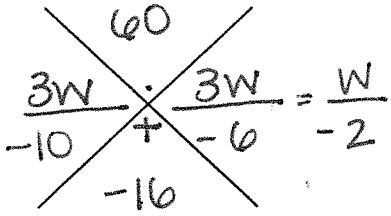
$5x^2(x^2+10x+25)$



$5x^2(x+5)^2$

8) $12w^3-64w^2+80w$

$4w(3w^2-16w+20)$

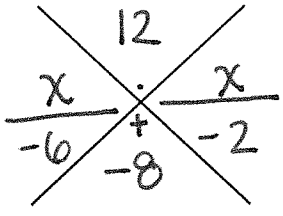


$= \frac{w}{-2}$

$4w(3w-10)(w-2)$

9) $-4x^4+32x^2-48x^2$

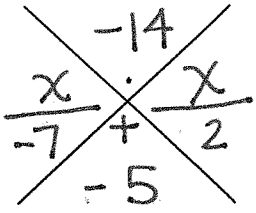
$-4x^2(x^2-8x+12)$



$-4x^2(x-6)(x-2)$

10) $-2x^3+10x^2+28x$

$-2x(x^2-5x-14)$



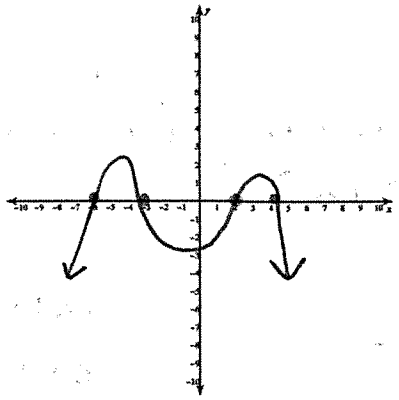
$-2x(x+7)(x+2)$

Determine the zeros of each polynomial. If there are any multiples list them. Sketch a graph of the function.

11) $y = -(2x + 6)(x - 2)(x + 6)(x - 4)$

Zeros: $x = -3, 2, -6, 4$

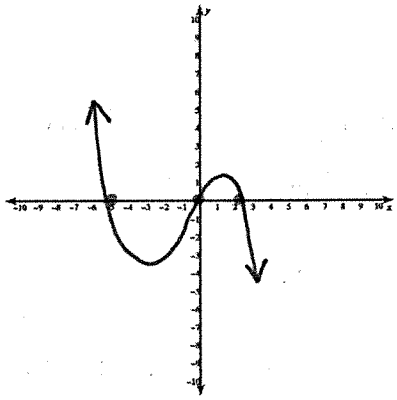
E.B.: $-E, \downarrow\downarrow$



12) $y = -x(x - 2)(x + 5)$

Zeros: $x = 0$ $x = 2$ $x = -5$

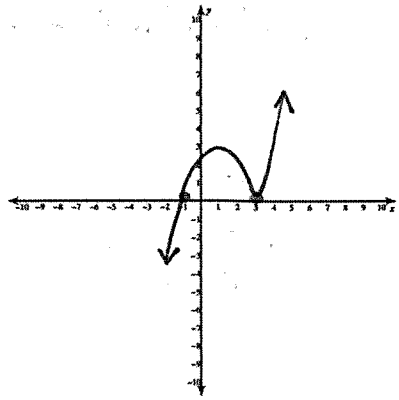
E.B.: $-0, \uparrow\downarrow$



13) $y = (x - 3)^2(x + 1)^3$

Zeros: $x = 3$ (mult 2) $x = -1$ (mult 3)

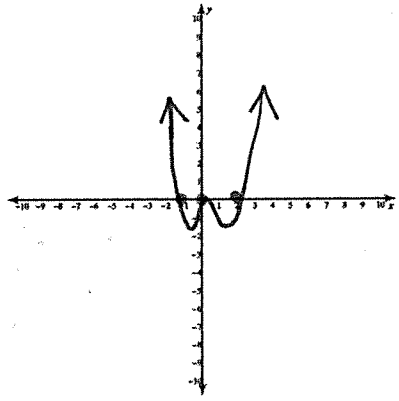
E.B.: $+0, \downarrow\uparrow$



15) $y = x^2(x + 1)(x - 2)^3$

Zeros: $x = 0$ (mult 2) $x = -1$ $x = 2$ (mult 3)

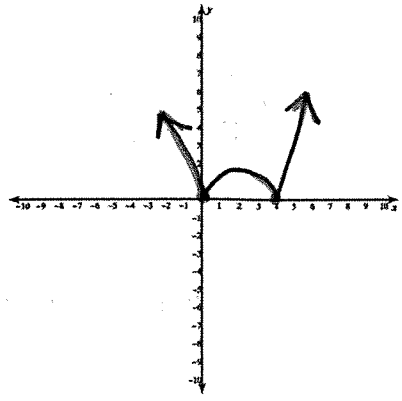
E.B.: $+E, \uparrow\uparrow$



16) $y = x^4 - 8x^3 + 16x^2$

Zeros: $x = 0$ (mult 2) $x = 4$ (mult 2)

E.B.: $+E, \uparrow\uparrow$



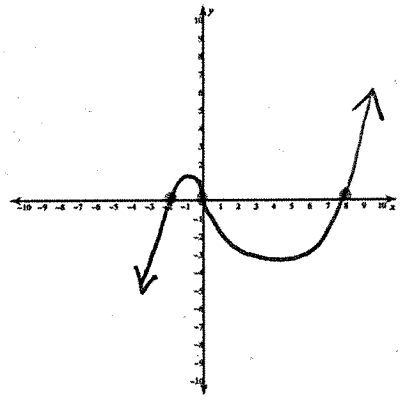
$x^2(x^2 - 8x + 16)$

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

17) $y = x^3 - 6x^2 - 16x$

Zeros: $x = 0$ $x = 8$ $x = -2$

E.B.: $+0; \downarrow\uparrow$

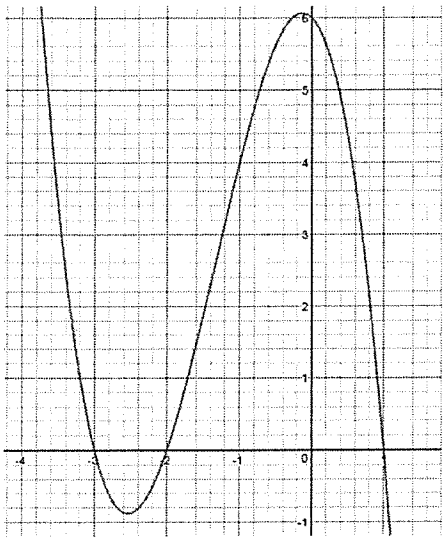


$x(x^2 - 6x - 16)$

$x(x - 8)(x + 2)$

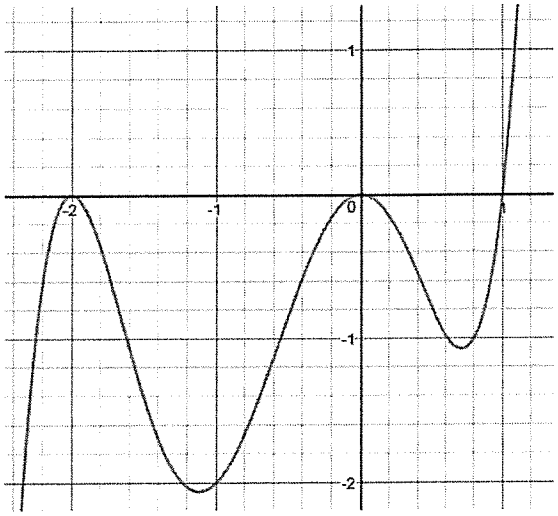
Write the equation in factored form of the given graph. Pay attention to multiplicities.

26) $y = -(x+3)(x+2)(x-1)$



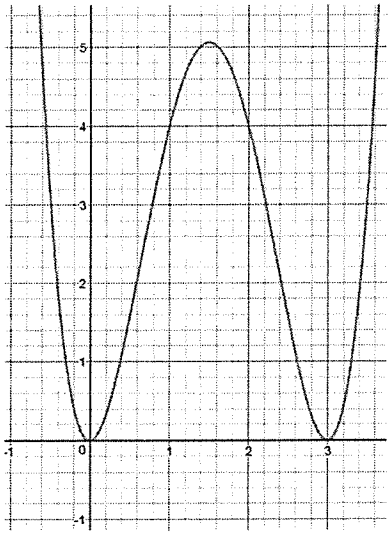
0; ↑↓
= -3
= -2
= 1

27) $y = x^2(x+2)^2(x-1)$



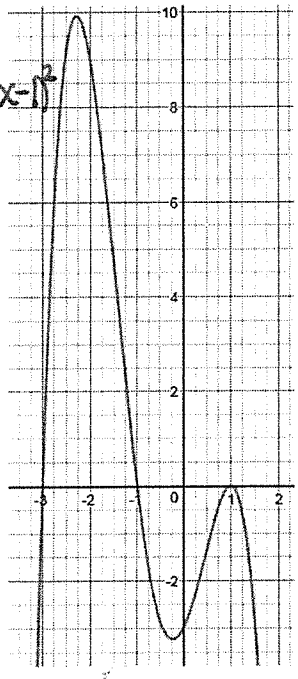
+0 ↓↑
x = -2
(mult 2)
x = 0
(mult 2)
x = 1

28) $y = x^2(x-3)^2$



E; ↑↑
= 0
mult 2)
= 3
mult 2)

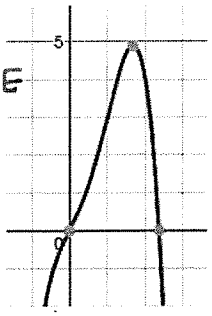
29) $y = -(x+3)(x+1)(x-1)^2$



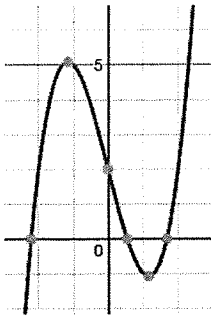
-E; ↓↓
x = -3
x = -1
x = 1
(mult 2)

30) *Based on the end behavior*, match each function with it's graph. Be able to explain how you made each decision.

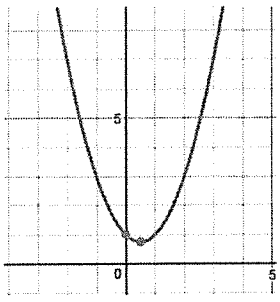
$f(x) = x^3 + -4x + 2$ +O
$g(x) = -x^4 + 2x^3 + 2x$ -E
$h(x) = -x^3 + 2x - 1$ -O
$j(x) = x^2 - x + 1$ +E



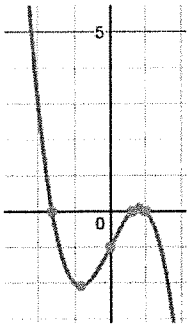
-E; g(x)



+O; f(x)



+E; j(x)



-O; h(x)