# Polynomial Unit Test Review Guide

① $x^3 - 7x^2 + 15x - 9$

Cubic Polynomial Positive odd

End Behavior: ↓ ↑

L: $x \to -\infty$ R: $x \to +\infty$

$y \to -\infty$ $y \to +\infty$

② $-x^4 - 4x^3 - 4x^2$ negative even ↓ ↓

Quartic Trinomial

End Behavior:

L: $x \to -\infty$ R: $x \to +\infty$

$y \to -\infty$ $y \to -\infty$

③ $-2x^5 - 7x^3 - x^2 + 15x - 5$ negative odd ↑ ↓

Quintic Polynomial

End Behavior:

L: $x \to -\infty$ R: $x \to +\infty$

$y \to +\infty$ $y \to -\infty$

④ $x^6 - 16x^2$ positive even ↑ ↑

6th Degree Binomial

End Behavior:

L: $x \to -\infty$ R: $x \to +\infty$

$y \to +\infty$ $y \to +\infty$

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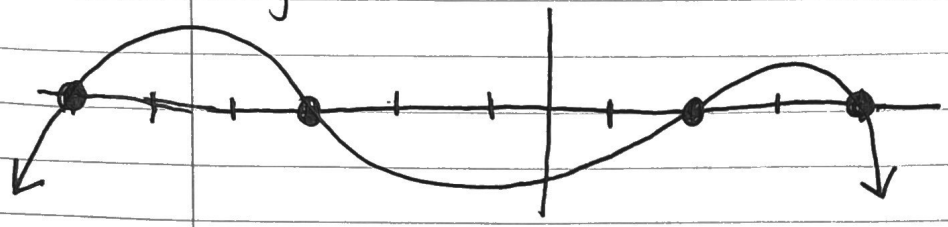
⑤ $x(10x^2 - 3)$ ⑥ $3xy(x - 3y^3)$ ⑦ $2x^2y(1 + 2x^2 + 3x^4)$

⑧ $3x^2(x-4)(x-2)$ ⑨ $x(x+3)(x-3)$ ⑩ $4(3w^3 - 16w^2 + 20)$

(11) zeros: $x = -3$ $x = 2$ $x = -6$ $x = 4$

no multiples

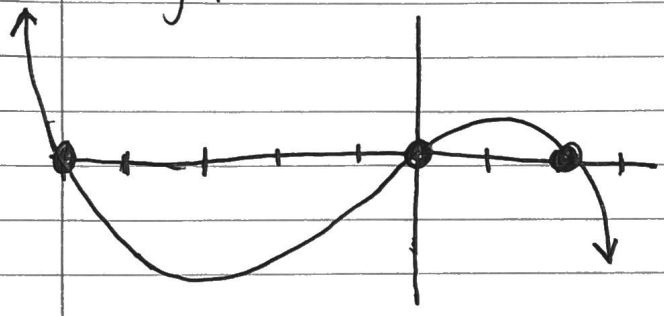
negative even ↓ ↓



(12) zeros: $x = 0$ $x = 2$ $x = -5$

no multiples

negative odd ↑ ↓

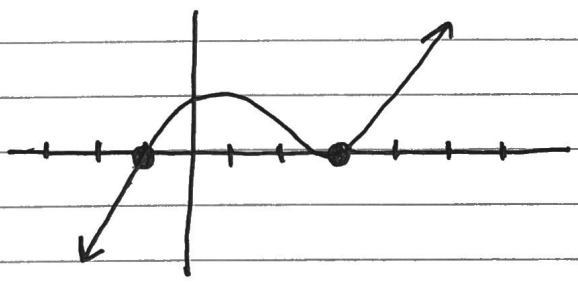


(13) Zeros: $x = 3$ $x = 3$ $x = -1$ $x = -1$ $x = -1$

3 has a multiplicity of 2

-1 has a multiplicity of 3

positive odd ↓ ↑

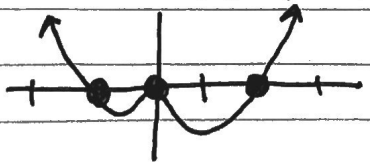


*no number 14*

(15) Zeros: $x = 0$ $x = 0$ $x = -1$ $x = 2$ $x = 2$ $x = 2$

0 has a multiplicity of 2, 2 has a multiplicity of 3

positive even ↑ ↑



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

Factor completely!

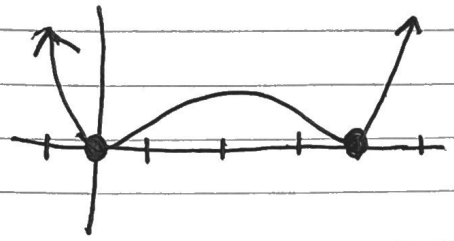
$y = x^2(x-4)(x-4)$

Zeros: $x=0$ $x=0$ $x=4$ $x=4$

0 has multiplicity of 2

4 has multiplicity of 2

positive even ↑ ↑



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

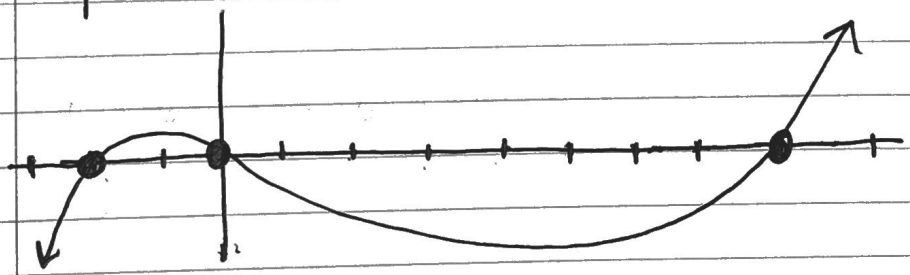
Factor Completely!

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

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

no multiples

positive odd ↓ ↑



(18) $(x-8)$ (19) $3x-5$ (20) $x^2+4x+3+\frac{5}{x-1}$

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

(22) $x+3$ is a factor because there is no remainder.

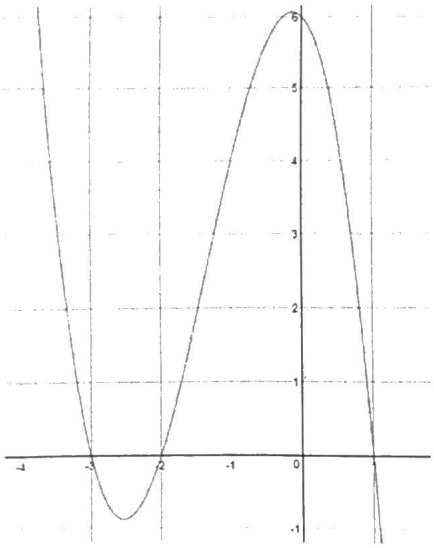
(23) $x-1$ is a factor because there is no remainder.

(24) $x+2$ is not a factor because there is a remainder.

(25) $x-4$ is not a factor because there is a remainder.

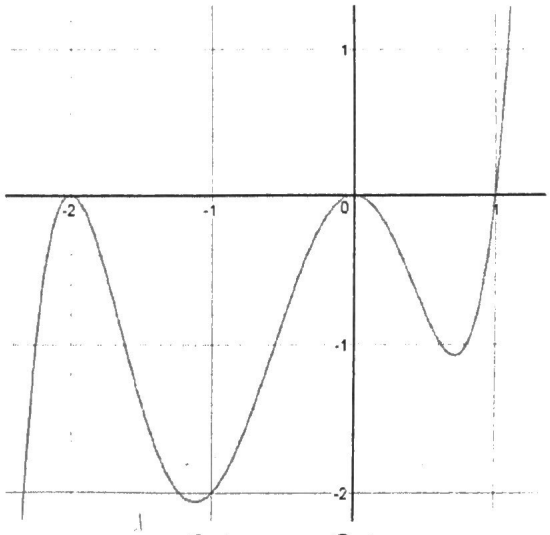
**Write the equation in factored form of the given graph. Pay attention to multiplicities.**

26)



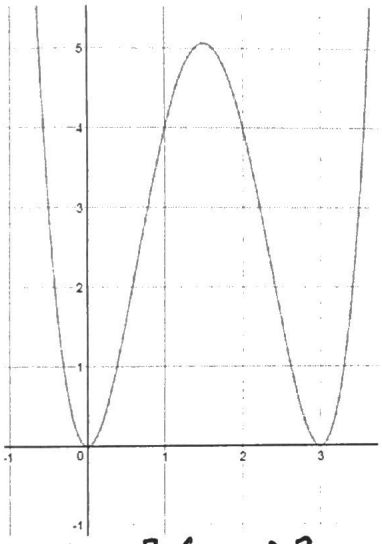
$y = -(x+3)(x+2)(x-1)$

27)



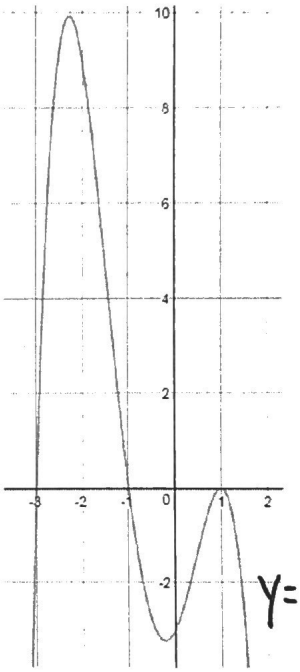
$y = x^2(x+2)^2(x-1)$

28)



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

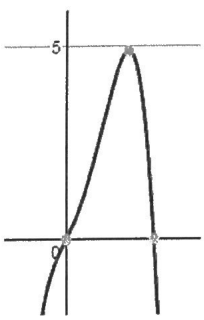
29)



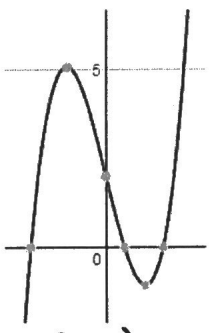
$y = (x+3)(x+1)(x-1)^2$

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

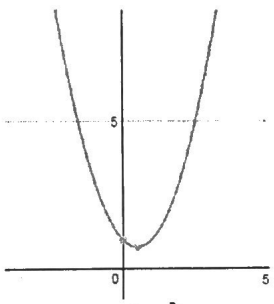
$f(x) = x^3 + -4x + 2$
$g(x) = -x^4 + 2x^3 + 2x$
$?(x) = -x^3 + 2x - 1$
$j(x) = x^2 - x + 1$



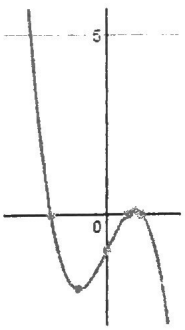
$g(x)$



$f(x)$



$j(x)$



$h(x)$

LOOK AT The End Behaviors to decide!