

HONORS

Polynomial Unit Test Review Guide

① $x^3 - 7x^2 + 15x - 9$
 Cubic Polynomial
 End Behavior: $\uparrow \rightarrow \infty$, $\downarrow \rightarrow -\infty$
 L: x^3 , R: $-7x^2$
 Y: $15x$, Y: -9

② $x^3 - 4x^2 + 4x - 4$ *synthetic*
 Cubic Polynomial
 End Behavior: $\uparrow \rightarrow \infty$, $\downarrow \rightarrow -\infty$
 L: x^3 , R: $-4x^2$
 Y: $4x$, Y: -4

③ $2x^3 - 7x^2 + 9x + 5$ *synthetic*
 Cubic Polynomial
 End Behavior: $\uparrow \rightarrow \infty$, $\downarrow \rightarrow -\infty$
 L: $2x^3$, R: $-7x^2$
 Y: $9x$, Y: 5

④ $x^3 - 12x^2$ *synthetic*
 Cubic Polynomial
 End Behavior: $\uparrow \rightarrow \infty$, $\downarrow \rightarrow -\infty$
 L: x^3 , R: $-12x^2$
 Y: 0 , Y: 0

⑤ $x^6 + 18x^5 + 135x^4 + 540x^3 + 1215x^2 + 1455x + 729$

⑥ $y^5 - 10y^4 + 40y^3 - 80y^2 + 80y - 32$

⑦ $a^6 + 7a^5b + 21a^4b^2 + 35a^3b^3 + 35a^2b^4 + 21ab^5 + 7b^6$

HONORS

Polynomial Unit Test Review Guide

① $x^3 - 7x^2 + 15x - 9$
Cubic Polynomial Positive odd
End Behavior: $\downarrow \uparrow$
L: $x \rightarrow -\infty$ $y \rightarrow -\infty$
R: $x \rightarrow +\infty$ $y \rightarrow +\infty$

② $-x^4 - 4x^3 - 4x^2$ negative even
Quartic Trinomial $\downarrow \downarrow$
End Behavior:
L: $x \rightarrow -\infty$ $y \rightarrow -\infty$
R: $x \rightarrow +\infty$ $y \rightarrow -\infty$

③ $-2x^5 - 7x^3 - x^2 + 15x - 5$ negative odd
Quintic Polynomial $\uparrow \downarrow$
End Behavior:
L: $x \rightarrow -\infty$ $y \rightarrow +\infty$
R: $x \rightarrow +\infty$ $y \rightarrow -\infty$

④ $x^6 - 16x^2$ positive even
6th Degree Binomial $\uparrow \uparrow$
End Behavior:
L: $x \rightarrow -\infty$ $y \rightarrow +\infty$
R: $x \rightarrow +\infty$ $y \rightarrow +\infty$

⑤ $x^6 + 18x^5 + 135x^4 + 540x^3 + 1215x^2 + 1458x + 729$

⑥ $y^5 - 10y^4 + 40y^3 - 80y^2 + 80y - 32$

⑦ $a^7 + 7a^6b + 21a^5b^2 + 35a^4b^3 + 35a^3b^4 + 21a^2b^5 + 7ab^6 + b^7$

⑧

$x(10x^2 - 3)$

⑨

$3xy(x - 3y^3)$

⑩

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

⑪

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

⑫

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

⑬

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

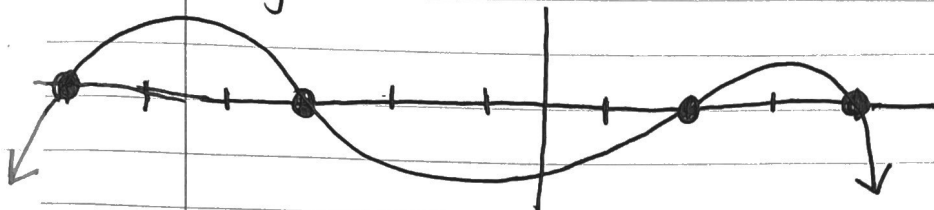
←

⑭

zeros:

$x = -3 \quad x = 2 \quad x = -6 \quad x = 4$

no multiples

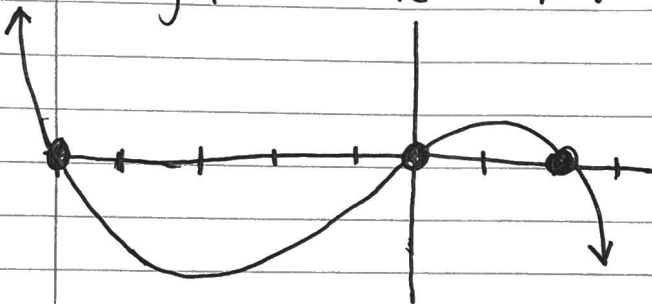
negative even $\downarrow \downarrow$ 

⑮

zeros:

$x = 0 \quad x = 2 \quad x = -5$

no multiples

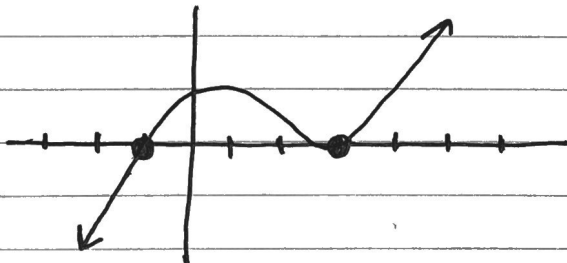
negative odd $\uparrow \downarrow$ 

⑯

Zeros: $x = 3 \quad x = 3 \quad x = -1 \quad x = -1 \quad x = -1$

3 has a multiplicity of 2

-1 has a multiplicity of 3

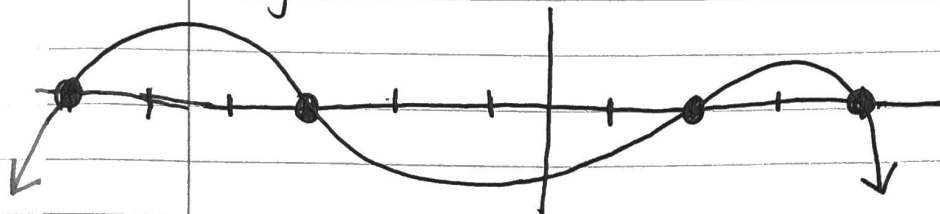
positive odd $\downarrow \uparrow$ 

⑧ $x(10x^2 - 3)$ ⑨ $3xy(x - 3y^3)$ ⑩ $2x^2y(1 + 2x^2 + 3x^4)$

⑪ $3x^2(x-4)(x-2)$ ⑫ $x(x+3)(x-3)$ ⑬ $4(3w^3 - 16w^2 + 20)$

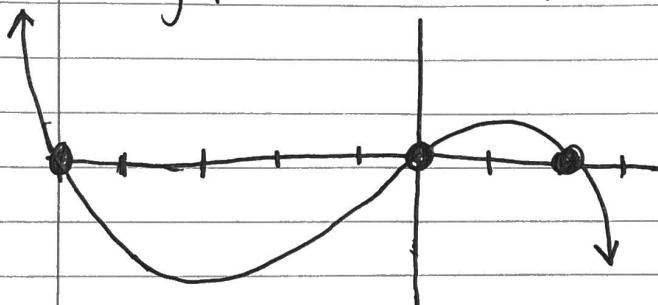
⑭ Zeros: $x = -3$ $x = 2$ $x = -6$ $x = 4$

no multiples
negative even ↓ ↓



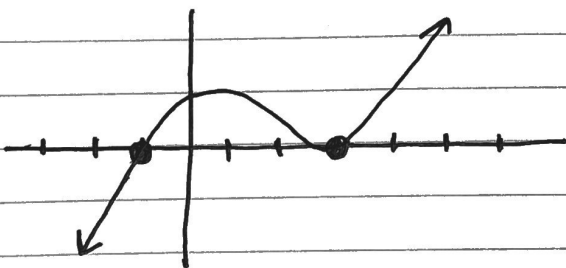
⑮ Zeros: $x = 0$ $x = 2$ $x = -5$

no multiples
negative odd ↑ ↓



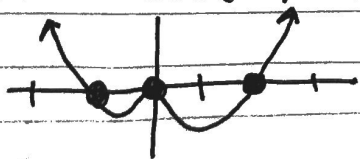
⑯ Zeros: $x = 3$ $x = 3$ $x = -1$ $x = -1$ $x = -1$

3 has a multiplicity of 2
-1 has a multiplicity of 3
positive odd ↓ ↑



⑰ 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 ↑ ↑



18

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

Factor completely!

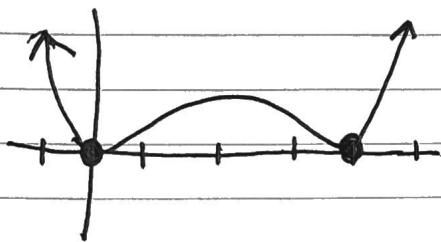
$$y = x^2(x-4)(x-4)$$

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

0 has multiplicity of 2

4 has multiplicity of 2

positive even \uparrow \uparrow



19

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

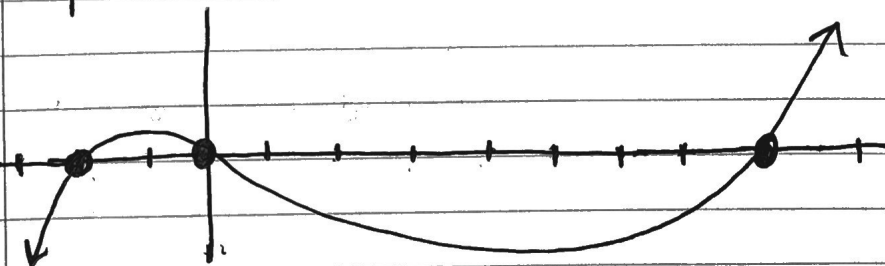
Factor completely!

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

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

no multiples

positive odd \downarrow \uparrow



20

$$(x-8)$$

21

$$3x-5$$

22

$$x^2 + 4x + 3 + \frac{5}{x-1}$$

23

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

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

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

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

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

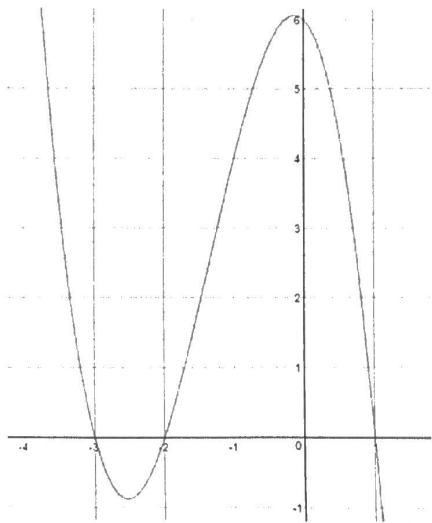
(28) $x^3 - x^2 + 1$

(29) $x^3 - 2x^2 - 2x + 4 - \frac{35}{x+2}$

(30) $x^2 - \frac{8}{x+8}$

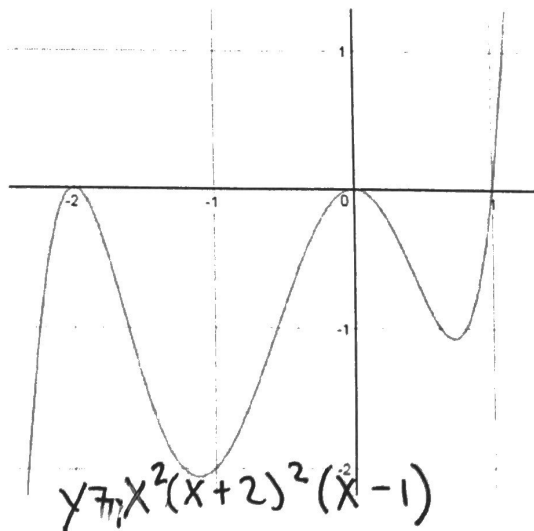
Write the equation in factored form of the given graph. Pay attention to multiplicities.

31)



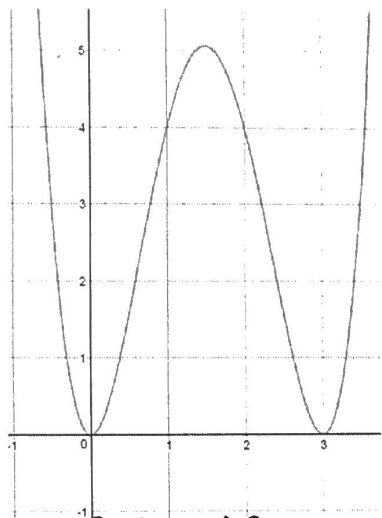
$$y = -(x+3)(x+2)(x-1)$$

32)



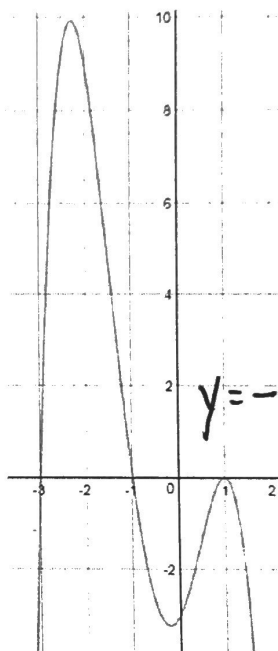
$$y = 7x^2(x+2)^2(x-1)$$

33)



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

34)



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

36) Based on the end behavior, match each function with its graph. Be able to explain how you made each decision.

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

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

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

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

