

Polynomial, Radical, and Rational Functions

LESSON ONE - *Polynomial Functions*

Lesson Notes

Example 4

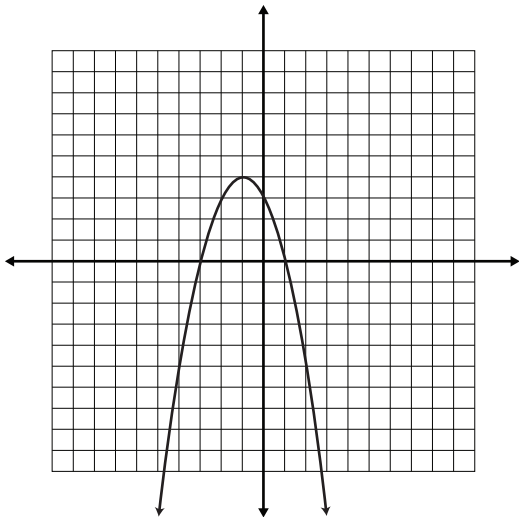
Multiplicity of Zeros in a Polynomial Function.

Multiplicity

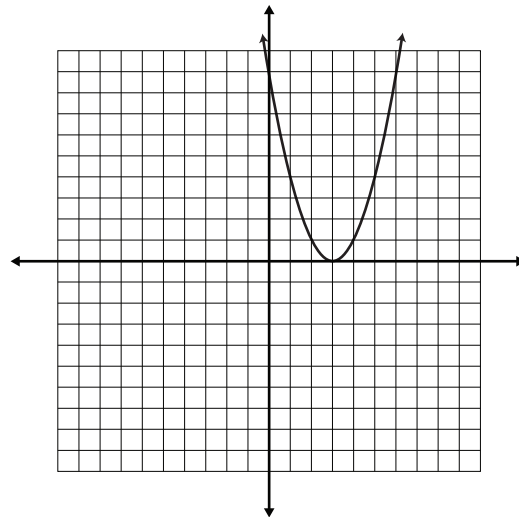
a) Define “multiplicity of a zero”.

For the graphs in parts (b - e), determine the zeros and state each zero’s multiplicity.

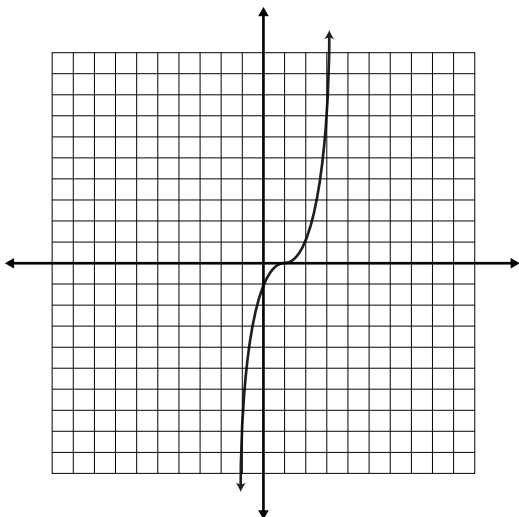
b) $P(x) = -(x + 3)(x - 1)$



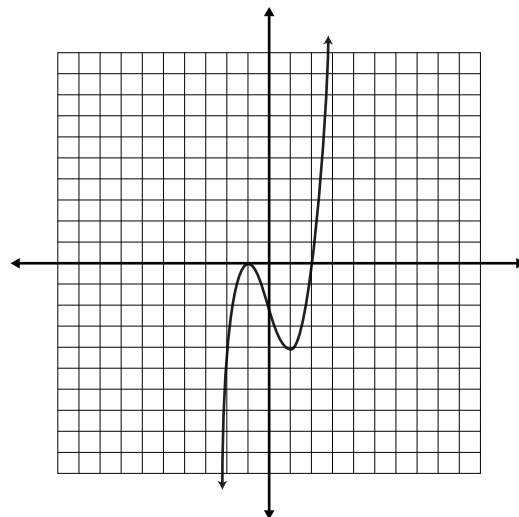
c) $P(x) = (x - 3)^2$



d) $P(x) = (x - 1)^3$



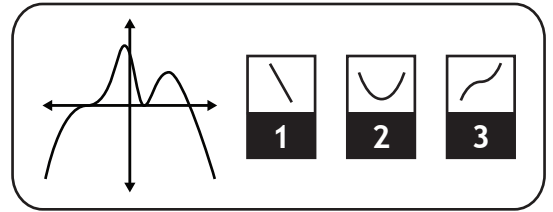
e) $P(x) = (x + 1)^2(x - 2)$



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Example 5

Find the requested data for each polynomial function, then use this information to sketch the graph.

Graphing
Polynomials

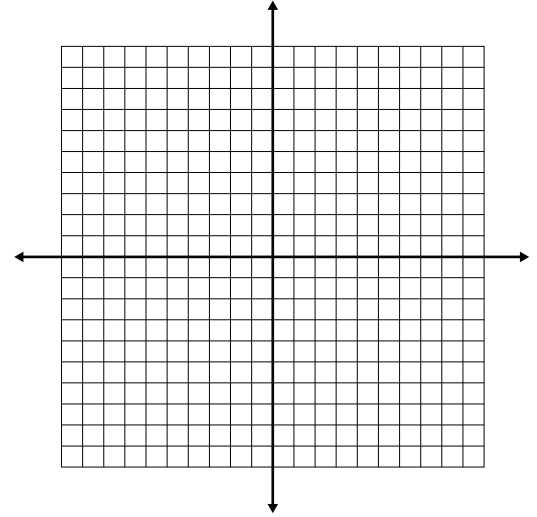
a) $P(x) = \frac{1}{2}(x - 5)(x + 3)$ *Quadratic polynomial with a positive leading coefficient.*

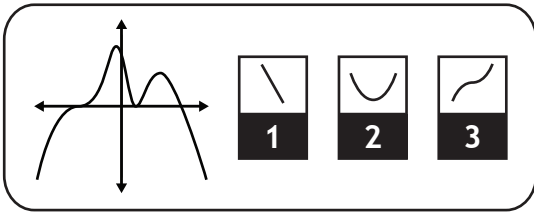
i) Find the zeros and their multiplicities.

ii) Find the y-intercept.

iii) Describe the end behaviour.

iv) What other points are required to draw the graph accurately?





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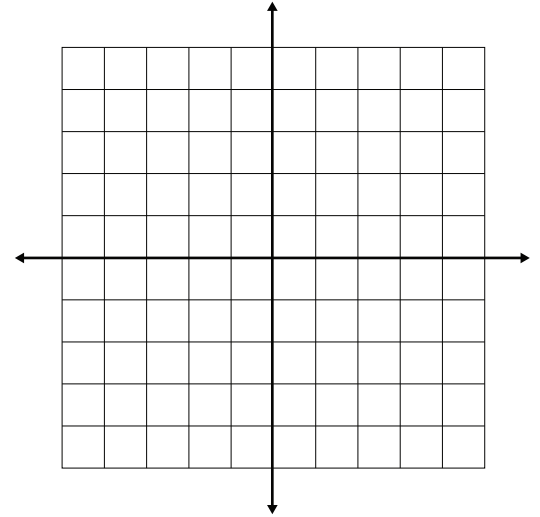
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b) $P(x) = -x^2(x + 1)$ *Cubic polynomial with a negative leading coefficient.*

i) Find the zeros and their multiplicities.

ii) Find the y-intercept.



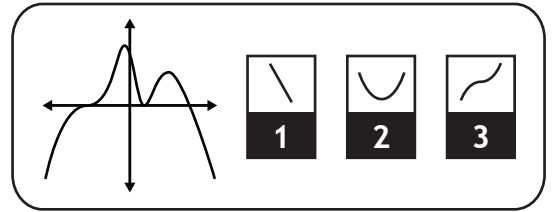
iii) Describe the end behaviour.

iv) What other points are required to draw the graph accurately?

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Example 6

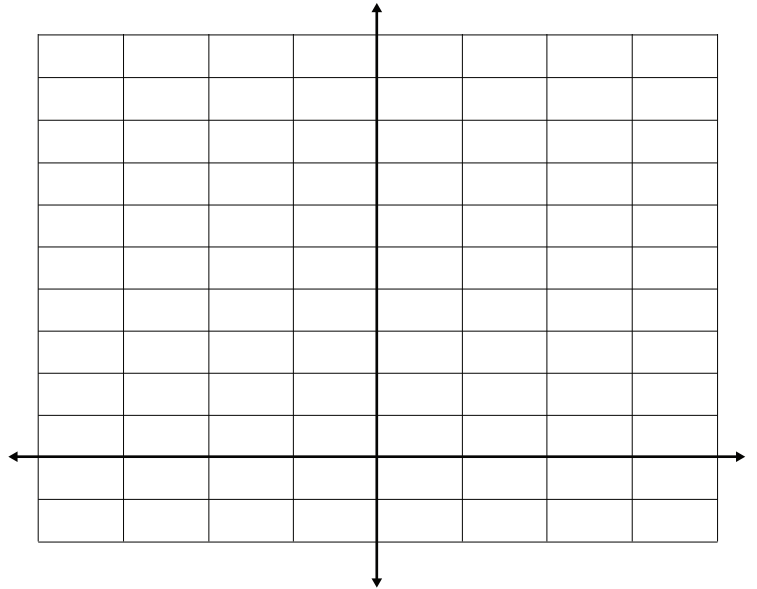
Find the requested data for each polynomial function, then use this information to sketch the graph.

Graphing
Polynomials

a) $P(x) = (x - 1)^2(x + 2)^2$ *Quartic polynomial with a positive leading coefficient.*

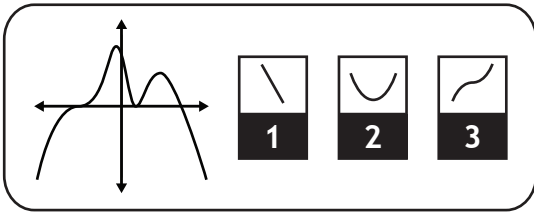
i) Find the zeros and their multiplicities.

ii) Find the y-intercept.



iii) Describe the end behaviour.

iv) What other points are required to draw the graph accurately?



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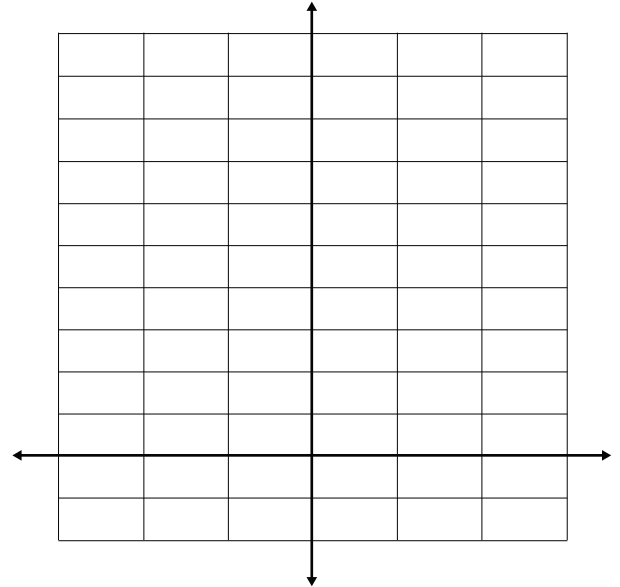
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b) $P(x) = x(x + 1)^3(x - 2)^2$ Sixth-degree polynomial with a positive leading coefficient.

i) Find the zeros and their multiplicities.

ii) Find the y-intercept.



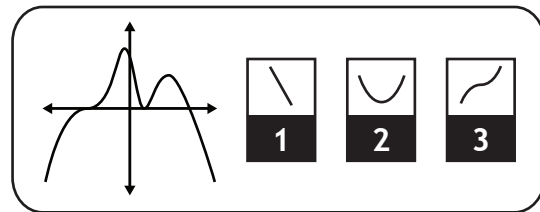
iii) Describe the end behaviour.

iv) What other points are required to draw the graph accurately?

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Example 7

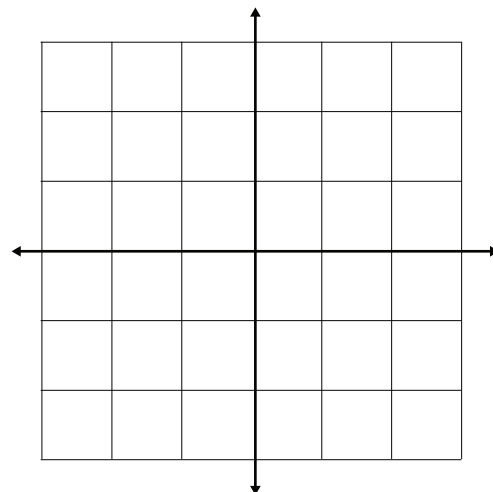
Find the requested data for each polynomial function, then use this information to sketch the graph.

Graphing
Polynomials

a) $P(x) = -(2x - 1)(2x + 1)$ *Quadratic polynomial with a negative leading coefficient.*

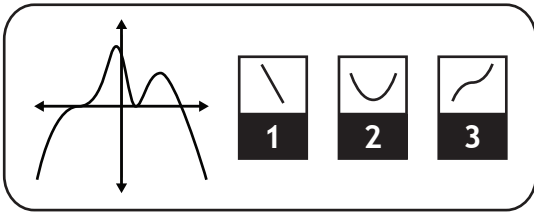
i) Find the zeros and their multiplicities.

ii) Find the y-intercept.



iii) Describe the end behaviour.

iv) What other points are required to draw the graph accurately?



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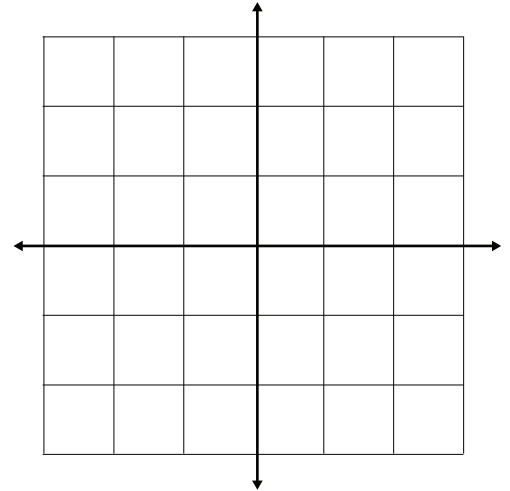
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b) $P(x) = x(4x - 3)(3x + 2)$ *Cubic polynomial with a positive leading coefficient.*

i) Find the zeros and their multiplicities.

ii) Find the y-intercept.



iii) Describe the end behaviour.

iv) What other points are required to draw the graph accurately?