



3.1 Characteristics of Polynomial and Sinusoidal Graphs

Definitions

Scatter Plot: a set of points on a grid, used to visualize a relationship or trend in data.

Polynomial Function: sum of one or more monomials with real coefficients and non-negative integer exponents

ex.) $y = 3$, $y = x - 2$, $y = 2x^2 - x + 5$
 $y = mx + b$
 $y = -3x^3 + 5x^2 - x + 1$

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Sinusoidal Function: also known as a sine wave, which is a curve that describes a periodic graph

Characteristics

End Behaviour: where does the graph start and end



Turning Points: any point where a graph changes from increasing to decreasing or vice versa.

→ called max. or min. points



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Domain: all possible x-values

Range: all possible y-values

X-int/Y-int: the other value is zero

$(x, 0)$

$(0, y)$

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Definitions for Sine Graphs Only

Midline Equation: middle of the wave

$$y = \frac{\max + \min}{2} = \frac{1 + (-1)}{2} = 0 \quad y = 0$$

Amplitude: distance from the midline to the max. or min.

$$A = \frac{\max - \min}{2} = \frac{1 - (-1)}{2} = 1$$

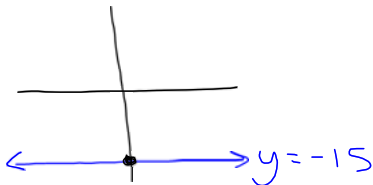
Period: time to make one ²complete cycle/wave on the graph

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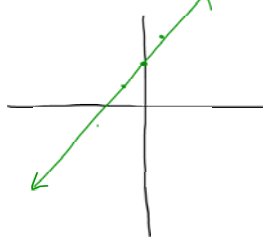


Ex.) Find all the characteristics and sketch the graph:

a) $y = -15$ constant function



b) $y = 3x + 4$ linear function



$0 = 3x + 4$

End Behaviour: QIII to IV

Turning Points: none

X-int: none

Y-int: $(0, -15)^*$

Domain: $\{x \in \mathbb{R}\}$

Range: $\{y = -15\}$

End Behaviour: QIII to I

Turning Points: none

X-int: $(-4/3, 0)$

Y-int: $(0, 4)$

Domain: $x \in \mathbb{R}$

Range: $y \in \mathbb{R}$

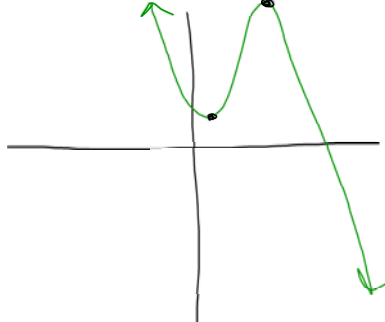
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c) $y = 2x^2 - 7x - 4$ Quadratic



d) $y = -x^3 + 6x^2 - 6x + 3$



End Behaviour: QII to QI

Turning Points: one

X-int: $(-1/2, 0)$ & $(4, 0)$

Y-int: $(0, -4)$

Domain: $x \in \mathbb{R}$

Range: $y \geq -10.1$

End Behaviour: QII to IV

Turning Points: two

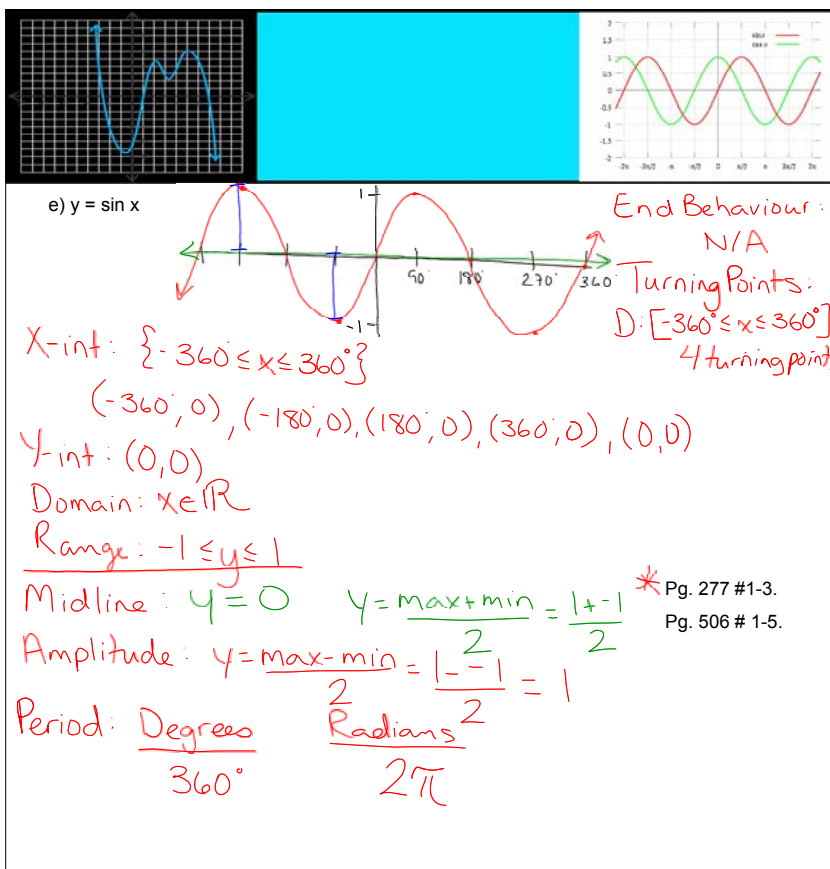
X-int: $(4.9, 0)$

Y-int: $(0, 3)$

Domain: $x \in \mathbb{R}$

Range: $y \in \mathbb{R}$

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