Warm-up!

Simplify $(A+B)^0$

Simplify $(A+B)^1$

Expand $(A+B)^2$

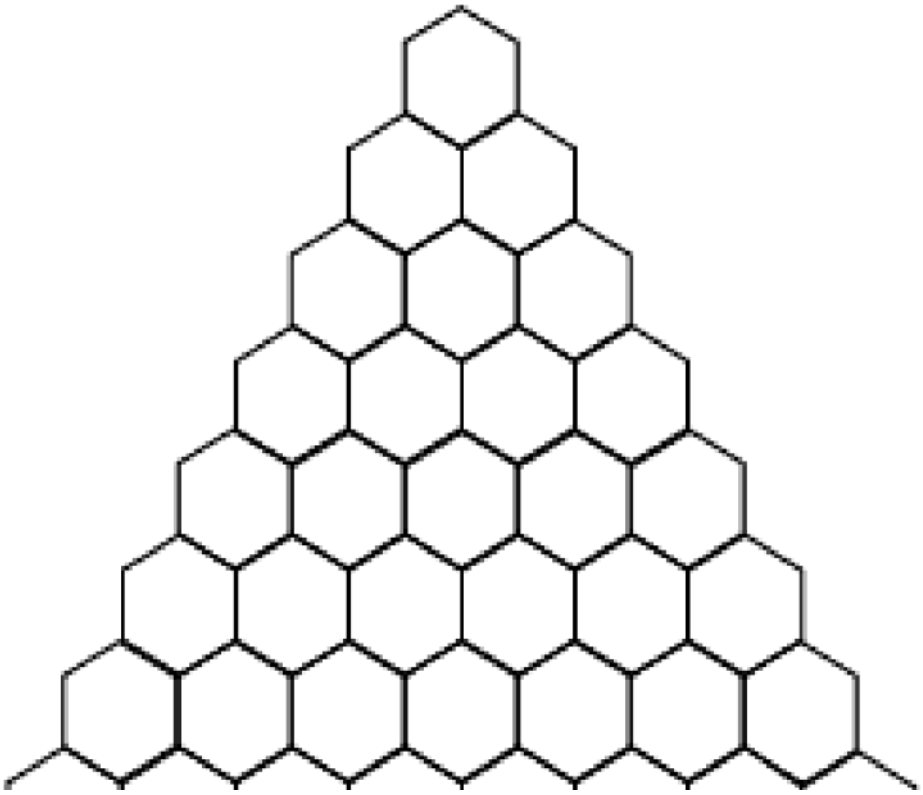
Expand $(A+B)^3$

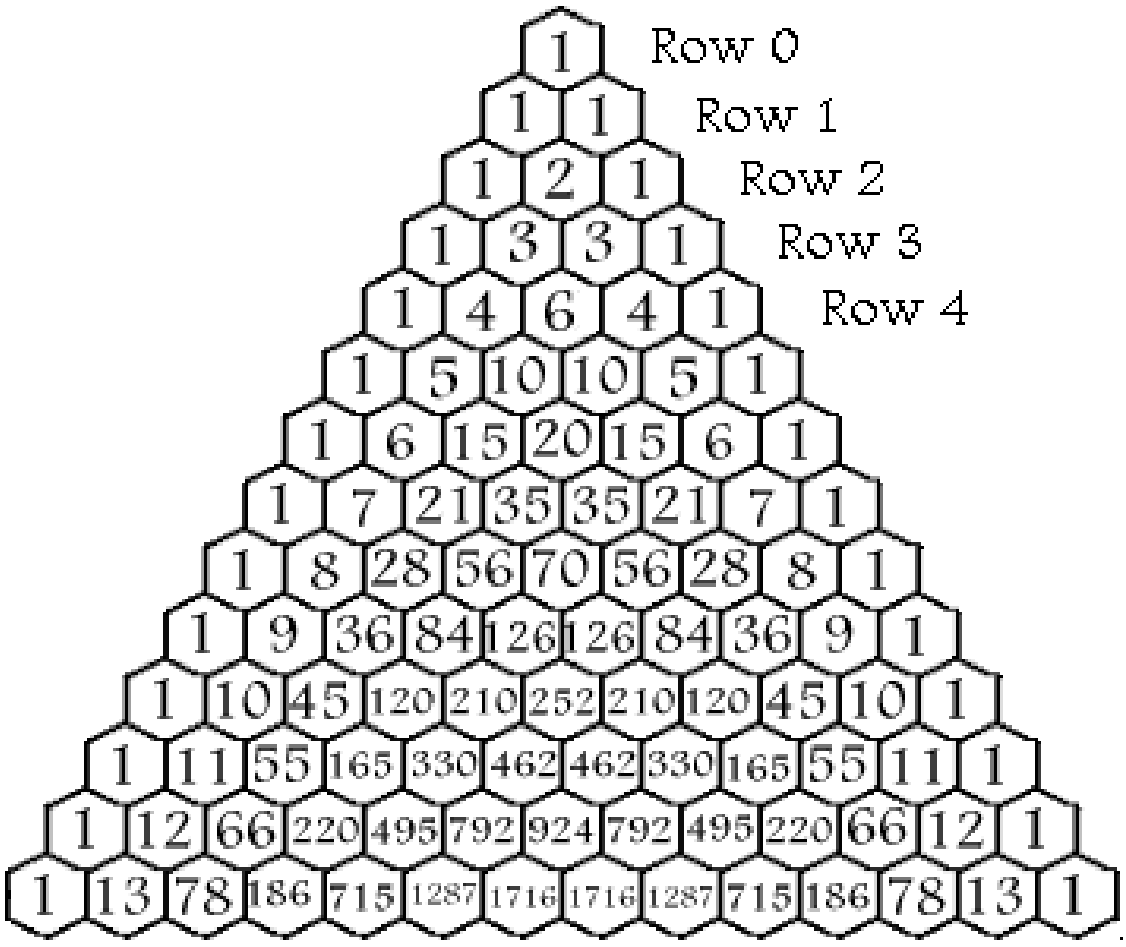
Advanced Trig Day 8:

- Binomial Expansion Theorem
- Polar Average Rate of Change

HW: Binomial Expansion and Polar AROC

Pascal's Triangle




1 Row 0
1 1 Row 1
1 2 1 Row 2
1 3 3 1 Row 3
1 4 6 4 1 Row 4
1 5 10 10 5 1
1 6 15 20 15 6 1
1 7 21 35 35 21 7 1
1 8 28 56 70 56 28 8 1
1 9 36 84 126 126 84 36 9 1
1 10 45 120 210 252 210 120 45 10 1
1 11 55 165 330 462 462 330 165 55 11 1
1 12 66 220 495 792 924 792 495 220 66 12 1
1 13 78 186 715 1287 1716 1716 1287 715 186 78 13 1

Take a moment to try to write Pascal's triangle on a fresh sheet of paper without looking back at what you already wrote in your notes. Try to write up to row 5 of Pascal's triangle.

Binomial Expansion Theorem

Use the Binomial Expansion Theorem to expand

$(2x - 3)^4$

Use the Binomial Expansion Theorem to expand

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

Finding a single term

Use the binomial expansion theorem to find the x^3 term in the expansion of $(2x-1)^6$

Use the binomial expansion theorem to find the x^4 term in the expansion of $(2x+3)^5$

Harder than I think the AP exam will be, but let's be prepared for anything

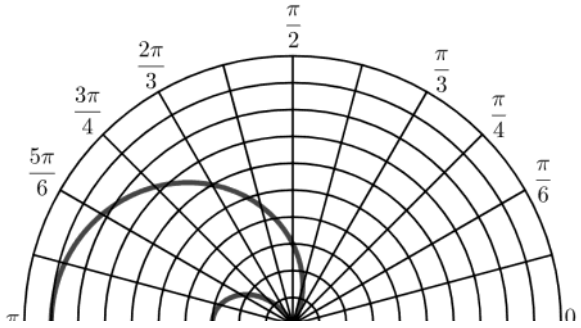
Using binomial expansion theorem, find the x^6 term in the expansion of $\left(x^2 - 3\right)^5$

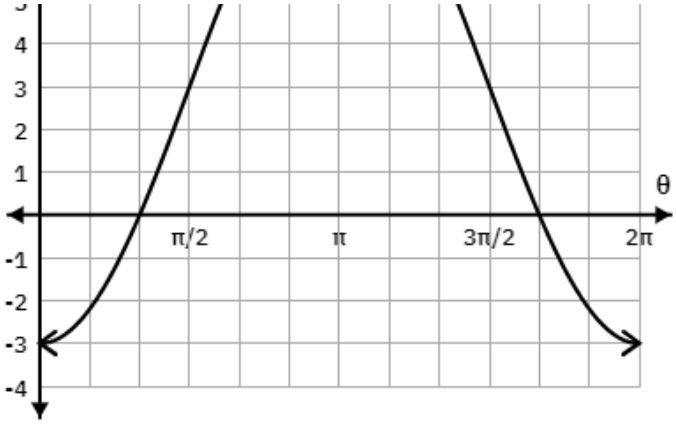
Last Polar Topic, I promise (it just didn't fit into the past few classes)

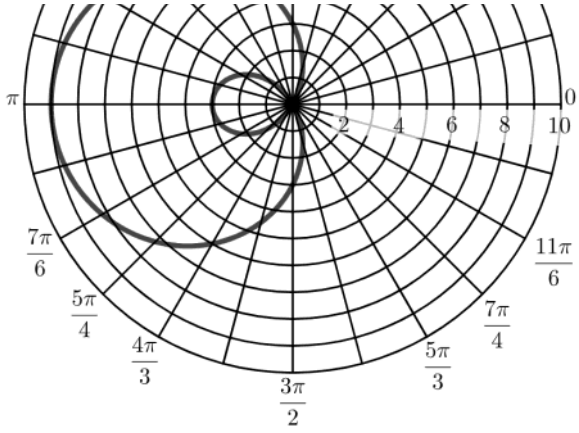
Sometimes we may be asked to find the average rate of a function $f(\theta)$ over an interval $a \leq \theta \leq b$.

The formula for average rate of change is, as it always has been:

Example: Below is the rectangular graph of $f(\theta) = 3 - 6\cos(\theta)$ and the polar graph of $r = f(\theta)$. Find the average rate of change of $f(\theta)$ over the interval $\pi \leq \theta \leq \frac{3\pi}{2}$.




4
3
2
1
θ
π/2
π
3π/2
2π
-1
-2
-3
-4


π
0
2
4
6
8
10
7π/6
11π/6
5π/4
7π/4
4π/3
5π/3
3π/2

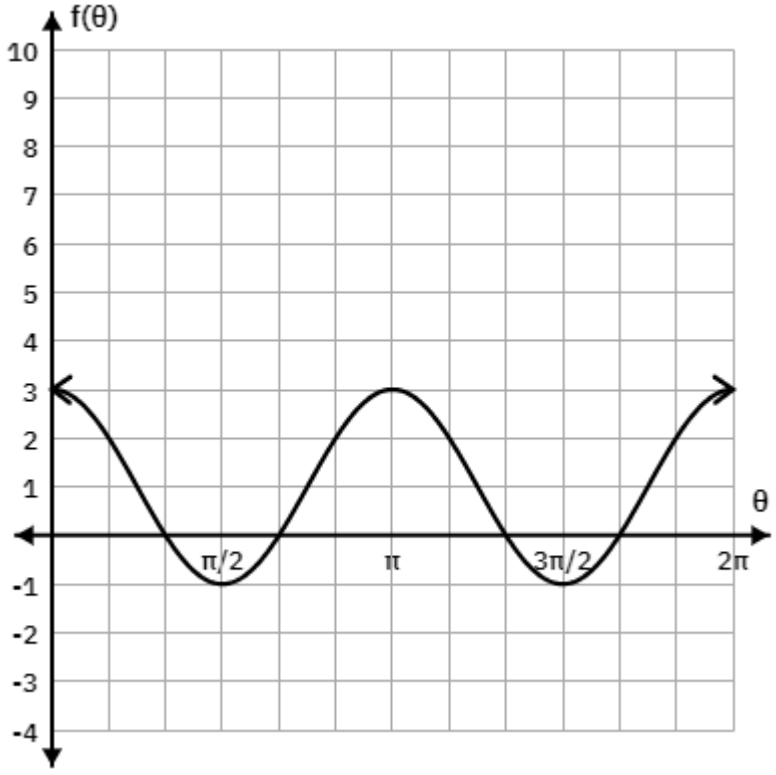
The table below gives values of the polar function $r = f(\theta)$ at selected values of θ.

θ	$\frac{\pi}{2}$	$\frac{2\pi}{3}$	$\frac{5\pi}{6}$
$f(\theta)$	-1	0	2

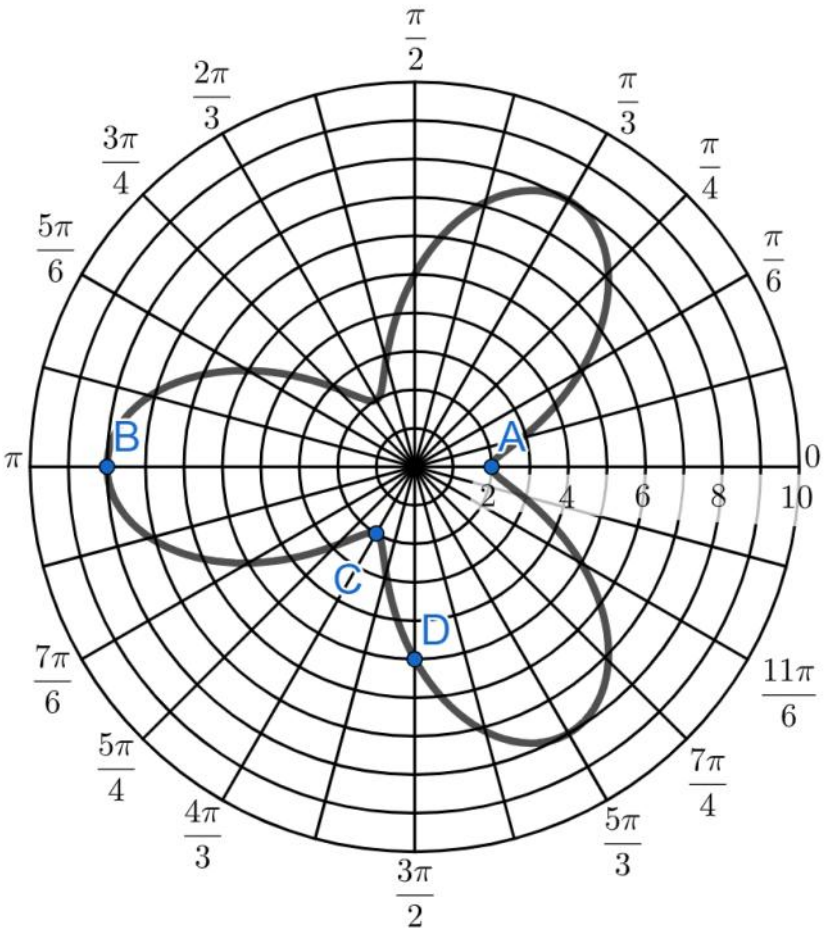
Determine the average rate of change of $f(\theta)$ on the interval $\frac{2\pi}{3}$ to $\frac{5\pi}{6}$.

Use this average rate of change to approximate $f(\pi)$

BTW, the previous question was based off $f(\theta) = 2\cos(2\theta) + 1$



In the polar coordinate system, the graph of a polar function $r = f(\theta)$ is shown with a domain of all real values of θ for $0 \leq \theta \leq 2\pi$. On this interval of θ, the graph has no holes, the graph passes through each point exactly one time, and $f(\theta)$ is positive. Over which of the following intervals is the average rate of change of $f(\theta)$ zero?



(A) $0 \leq \theta \leq \pi$

(B) $0 \leq \theta \leq \frac{4\pi}{3}$

(C) $\pi \leq \theta \leq \frac{3\pi}{2}$

(D) $\frac{4\pi}{3} \leq \theta \leq \frac{3\pi}{2}$

Expand using binomial expansion theorem

$$\left(2x - \frac{1}{2}\right)^5$$

Let's do a quick check in on our course progress and list all the AP Precalculus topics left for this year: