

## 12.1 IB Math - Unit 9: Probability

Bronx Early College Academy

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7.1 Venn diagrams, Monday 18 March

7.2 Deltamath probability review. Tuesday 19 March

7.3 Expected value, Wednesday 20 March

7.4 Conditional probability, trees with & without replacement,  
Thursday 21 March

7.5 Binomial distribution, Friday 22 March

7.6 Binomial distribution, Monday 25 March

7.7 Deltamath binomial expansion review. Tuesday 26 March

7.8 Binomial expansion review. Thursday 28 March

7.9 Binomial expansion review. Friday 29 March

7.10 Binomial expansion review. Monday 1 April

7.11 Binomial distribution expected value. Thursday 4 April

7.12 Normal distribution. Friday 5 April

7.13 Deltamath binomial expansion review. Tuesday 9 April

7.14 Normal distribution. Wednesday 10 April

7.15 Inverse normal function. Thursday 11 April

7.16 Inverse normal function. Friday 12 April

## GQ: How do we notate sample spaces with Venn diagrams?

CCSS: HSS.CP.A.3 Understand conditional probability

7.1 Monday 18 March

Do Now: Draw a Venn diagram of these 110 students:

- ▶ 25 students took physics
- ▶ 45 students took biology
- ▶ 48 students took mathematics
- ▶ 10 students took physics and mathematics
- ▶ 8 students took biology and mathematics
- ▶ 6 students took biology and physics
- ▶ 5 students took all three subjects

How many took biology, but neither physics nor mathematics?

How many students did not take any of the three subjects?

Lesson: Sets, complements, union, intersection, empty set

Homework: Problem set

## GQ: How do we notate sample spaces with Venn diagrams?

CCSS: HSS.CP.A.3 Understand conditional probability

7.2 Tuesday 19 March

Do Now Quiz: Trig, calculus practice, with calculator

1. *Medium* Middling exam problems
2. *Spicy* Middling and extended exam problems

Lesson: Deltamath probability (trigonometry & calculus) review

Homework: Complete Deltamath problem set, review quiz answers

## GQ: How do we calculate expected value?

CCSS: HSS.MD.A.3 Develop a probability distribution for a random variable

7.3

Wednesday 20 March

Do Now: Algebra practice, with calculator

Lesson: Expected value

Homework: Problem set

## GQ: How do we add the probabilities of multiple events?

CCSS: HSS.CP.A.3 Understand conditional probability

7.4 Thursday 21 March

Do Now Quiz: Trig, calculus practice, with calculator

1. *Medium* Middling exam problems
2. *Spicy* Middling and extended exam problems

Lesson: Conditional probability, trees with & without replacement

Homework: Problem set

## GQ: How do we model a series of events?

CCSS: HSS.MD.A.3 Develop a probability distribution for a random variable 7.5 Friday 22 March

Do Now: Make a tree representing three coin flips

1. What is the probability of each outcome?
2. If order doesn't matter, how can the results be consolidated into a probability distribution of the total number of heads?

Lesson: Binomial expansion p. 186-8

Homework: Problem set

## GQ: How do we model a series of events?

CCSS: HSS.MD.A.3 Develop a probability distribution for a random variable 7.6 Monday  
25 March

Do Now: Sequences review, Exercise 6L #1-4 p. 182-3

1. Use the sequences formulas on the formula sheet
2. The equation for compound interest (try to remember it first)  
is  $P_n = P_0(1 + \frac{i}{c})^{cn}$

Lesson: Binomial expansion p. 186-8

Assessment: Exercise 6N p. 187

Homework: Exercise 6O p. 188



## GQ: How do we model a series of events?

CCSS: HSS.MD.A.3 Develop a probability distribution for a random variable 7.7 Tuesday  
26 March

Do Now Quiz: Trig Paper 1, without calculator

1. *Medium* Middling exam problems: Periodic functions

Lesson: Deltamath probability (trigonometry & calculus) review

Homework: Complete Deltamath problem set, review quiz answers

## GQ: How do we model a series of events?

CCSS: HSS.MD.A.3 Develop a probability distribution for a random variable 7.8 Thursday  
28 March

### Do Now: Trig skills check, *without calculator*

1. What is the amplitude, midline, and period of  $f(x) = 2 \sin \pi x + 2$ ?
2. Sketch  $g(x) = 3 \cos 2(x - \frac{\pi}{2})$  over  $0 \leq x \leq 2\pi$ . Label its extrema as ordered pairs and the x-intercepts with their values.
3. Write down  $\sin \frac{\pi}{6}$ ,  $\cos \frac{2\pi}{3}$
4. Write down the solution set of  $\sin x = \frac{1}{2}$  over  $0 \leq x \leq 2\pi$ .

Assessment: Enter spiral review scores in personal tracker grids

Homework review

Lesson: Expected values, binomial expansion, modeling problems

Homework: Calculus review problem set

## GQ: How do we model a series of events?

CCSS: HSS.MD.A.3 Develop a probability distribution for a random variable 7.9 Friday 29 March

### Do Now Quiz: Trig skills check, *without calculator*

1. What is the amplitude, midline, and period of  $f(x) = 5 \sin 2x - 3$ ?
2. Sketch  $g(x) = 2 \sin \pi(x - 1)$  over  $0 \leq x \leq 4$ . Label its extrema as ordered pairs and the  $x$ -intercepts with their values.
3. Write down  $\sin \frac{\pi}{3}$ ,  $\cos \frac{2\pi}{3}$
4. Write down the solution set of  $\sin x = \frac{\sqrt{2}}{2}$  over  $0 \leq x \leq 2\pi$ .

Calculus homework review

Lesson: Expected values, binomial expansion, modeling problems

Homework: Problem set

## GQ: How do we model a series of events?

CCSS: HSS.MD.A.3 Develop a probability distribution for a random variable 7.10 Monday  
1 April

Do Now: Binomial expansion skills check, *with calculator*

1. Expand the polynomial function  $f(x) = (x + 1)^4$ .
2. Write down the first five rows of Pascal's triangle (from memory).
3. What is the  $x^3$  term when  $f(x) = (2x + 3)^5$  is expanded?
4. The probability of an event is  $P(x) = 0.2$ . What is the probability of the event occurring exactly three times among five trials?

Calculus homework review/copies; Trig DNQ results, progress grid

Lesson: IB exams, stationary

Homework: "Take-home" mock exams

## GQ: How do we model a series of events?

CCSS: HSS.MD.A.3 Develop a probability distribution for a random variable

7.11

Thursday 4 April

Do Now: Binomial distribution applications p. 533 *with calculator*

1. Exercise 15D #1, dice roll.
2. Exercise 15D #2, use the calculator PDF & CDF functions.

Lesson: Expected value of a binomial distribution p. 535

Homework: Textbook exercises 15D & 15F

## GQ: How do we model a series of events?

CCSS: HSS.MD.A.3 Develop a probability distribution for a random variable 7.12 Friday 5 April

Do Now: Binomial expansion skills check, *with calculator*

1. The probability of an event is  $P(x) = 0.05$ . What is the probability of the event occurring two or fewer times among 20 trials?
2. Exercise 15G #5a,b; p. 537

Lesson: 15.3 Normal distribution p. 538

Homework: Textbook exercises 15H

## GQ: How do we model a series of events?

CCSS: HSS.MD.A.3 Develop a probability distribution for a random variable 7.13 Tuesday  
9 April

Do Now: Deltamath

Lesson: Deltamath probability distributions review

Homework: Complete Deltamath problem set

## GQ: How do we model a large collection of random elements?

CCSS: HSS.MD.A.3 Develop a probability distribution for a random variable 7.14

Wednesday 10 April

Do Now: Normal distribution skills check, *with calculator*

1. Given the distribution  $Z \sim N(0, 1)$  find
  - 1.1  $P(1 < Z)$
  - 1.2  $P(-0.5 < Z < 1)$
2. Given the distribution  $X \sim N(80, 10)$  find  $P(90 < X)$
3. Find  $\int \frac{1}{\cos^2 x} dx$  (use the formula booklet)

Lesson: Applications of the normal distribution p. 542

Homework: Textbook exercises 15J p. 544



## GQ: How do we model a large collection of random elements?

CCSS: HSS.MD.A.3 Develop a probability distribution for a random variable 7.15

Thursday 11 April

Do Now: Normal distribution handout

Lesson: Finding inverse normal function values p. 544

Homework: Textbook exercises 15L p. 548

## GQ: How do we model a large collection of random elements?

CCSS: HSS.MD.A.3 Develop a probability distribution for a random variable 7.16 Friday  
12 April

Do Now: Normal distribution *calculator* skills  
Include a sketch with each exercise

1. Given the distribution  $X \sim N(500, 100)$  find
  - 1.1  $P(400 < X < 500)$
  - 1.2  $P(600 < X)$
2. Given the distribution  $Z \sim N(0, 1)$  find  $P(1.5 < |X|)$
3. Find  $\int \frac{1}{x^2} dx$  (use the formula booklet if needed)

Homework review: Finding inverse normal function values

Lesson: Applications of the normal distribution p. 548

Homework: Review exercises p. 551-2