

Mathematics Class Slides

Bronx Early College Academy

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5-21 September 2018

BECA / Dr. Huson / 11.1 IB Math Unit 1

1.1 First day of IB Mathematics 5 Sept

1.2 Function domain and range

1.3 Precision and significant figures, 9 Sept

1.4 Error bounds, 10 Sept

1.5 Exponents & scientific notation, 11 Sept

1.6 Right triangle trigonometry, 12 Sept

1.7 Sine rule, 13 Sept

1.8 Sine formula for the area of a triangle, 16 Sept

1.9 Deltamath: scientific notation, trig 17 Sept

1.10 Cosine rule, 18 Sept

1.11 Sine & cosine rule practice, 19 Sept

1.12 Circle sectors & arc length, 20 Sept

1.13 3-dimensional figures, volume, 23 Sept

1.14 3-dimensional figures, surface area, nets, 24 Sept

1.15 3-dimensional figures, internal angles, 25 Sept

1.16 3-dimensional figures, internal angles, 26 Sept

1.17 review, bounds, 27 Sept

1.18 review, trig, 2 October

1.19 review, trig, 3 October

1.20 test on trigonometry, 7 October

GQ: How do we define functions?

CCSS: HSF.IF.C.7 Analyze functions

1.1 Thursday 5 Sept

Do Now Handout: Algebra skills check

1. Welcome back to school!
2. Assigned seating: arrange yourself alphabetically by last name, left to right, front to back.
3. Take out notebooks (or blank paper) & calculator
4. Complete handout problem set

Lesson: Linear functions, slope, solving; vertical line test p 4-6

Homework: Problem set: Function identification 1A & 1B p. 6-7

GQ: What are domain and range?

CCSS: HSF.IF.C.7 Analyze functions

1.2 Friday 6 Sept

Do Now: Substitution notation

1. Handout, IB exam problem
2. Challenge: Verify the following Pythagorean identity for all values of x and y :

$$(x^2 + y^2)^2 = (x^2 - y^2)^2 + (2xy)^2$$

Homework review

Lesson: Domain, range, function review

Calculator deposits \$20

Homework: Polynomial simplification, graphing linear functions

Due: notebook, folder, calculator

GQ: What is the appropriate precision for a calculation?

CCSS: MP5 Attend to precision

1.3 Monday 9 Sept

Do Now: Textbook chapter warmup, use looseleaf paper

1. Skills check #1-3 p. 3

Lesson: Rounding, significant figures, error bars pp. 1-5

Exercise 1A, #1-2, p. 5

Homework: Calculation and rounding practice

GQ: How do we measure the bounds of errors?

CCSS: MP5 attend to precision

1.4 Tuesday 10 Sept

Do Now: Calculator practice

1. Chapter review #1 p. 39
2. Pay careful attention to saving calculator values, rather than copying to paper and reentering.
3. Check your answers in back of book, p. 766

Lesson: Bounds and errors pp. 6-8

Practice exercises 1B p. 8-9

Homework: Function substitution, domain and range

GQ: How do we write very large or small numbers?

CCSS: MP5 attend to precision

1.5 Wednesday 11 Sept

Do Now: Precision practice

1. Practice exercises 1B p. 8-9
2. Pay careful attention to saving calculator values, rather than copying to paper and reentering.
3. Check your answers in back of book, p. 765

Lesson: Exponents & scientific notation pp. 9-12

Note exponent rules top of page 11

Homework: Practice exercises 1C p. 12-13

GQ: How do we calculate the side lengths of a right triangle?

CCSS: MP5 attend to precision

1.6 Thursday 11 Sept

Do Now: Precision practice

1. Chapter review #2 p. 39
2. Which will be easier to use, scientific notation or the fully expanded number?
3. Use proper notation to display your answer clearly

Homework review

Lesson: Right triangle trigonometry pp. 13-15

Angle of elevation and depression page 11

Homework: Practice exercises 1D p. 16-17

GQ: How do we calculate the side lengths of a non-right triangle?

CCSS: MP5 attend to precision

1.7 Friday 13 Sept

Do Now: Precision practice

1. Chapter review #3 p. 39
2. Learn how to use the calculator to solve an equation.
(multiple methods)

Lesson: Non-right triangles and the sine rule pp. 17-21

The ambiguous case page 21

Homework: Practice exercises 1E p. 21-22

GQ: How do we calculate the area of a triangle?

CCSS: MP5 attend to precision

1.8 Monday 16 Sept

Do Now: Precision practice

1. Chapter review #4b p. 39
2. Note that both $\frac{15}{\sin 31} = \frac{13.4}{\sin R}$ and $\frac{\sin 31}{15} = \frac{\sin R}{13.4}$.

Which is easier to solve?

Lesson: Practicing applying the sine rule pp. 17-21

The ambiguous case page 21

The sine formula for the area of a triangle page 22

Homework: Practice exercises 1E p. 21-22

GQ: How do we practice the law of sines?

CCSS: MP5 attend to precision

1.9 Tuesday 17 Sept

Deltamath practice: scientific notation, trig

1. Laptops, login with Teacher ID 546068
2. Do Deltamath sections in order
Practice comes first, then new topics
3. Work extra problems on the skills you need to practice

New material: The sine formula for the area of a triangle page 22
Radian / degree conversion; law of cosines

Homework: Complete Deltamath problems, 10:00PM deadline

GQ: How do we calculate the angles of a triangle?

CCSS: MP5 attend to precision

1.10 Wednesday 18 Sept

Do Now: Precision practice

1. Chapter review #6 p. 39

Lesson: The cosine rule pp. 23-24

The sine formula for the area of a triangle page 22

Homework: Practice exercises 1F p. 24-25

GQ: How do we “solve” a triangle?

CCSS: MP5 attend to precision

1.11 Thursday 19 Sept

Do Now: IB exam problems

1. Applications of the sine and cosine rules

Lesson: The cosine rule pp. 23-24

The sine formula for the area of a triangle page 22

Homework: Study Arc length and area of sector

Oxford textbook pp. 25-27

Deltamath, practice circle sectors and arc length

Khan Academy, log in and use videos as resource (DrHuson)

GQ: How do we calculate the angles of a triangle?

CCSS: MP5 attend to precision

1.12 Friday 20 Sept

Continue IB exam trig problems

Lesson: The cosine rule pp. 23-24

The sine formula for the area of a triangle page 22

Homework: Complete Khan videos and Deltamath problems if you haven't already.

Practice exercises 1G p. 26-27

GQ: How do we calculate the volumes of objects?

CCSS: MP5 attend to precision

1.13 Monday 23 Sept

Do Now: Developing inquiry skills, top of page 28

1. Draw a scale model of the surveying of Mt. Everest on IB centimeter graph paper. (use a protractor)
2. Determine the height of the mountain by measuring your model
3. Calculate the height using trig formulas

Continue IB exam trig problems

Lesson: Solid geometry terminology, volume formulas

Homework: Practice exercises 1H p. 30-31

Khan videos and Deltamath problems

GQ: How do we calculate the volumes of objects?

CCSS: MP5 attend to precision

1.14 Tuesday 24 Sept

Do Now: Calculate the volume of each object

1. A sphere with a radius of 15 cm
2. A circular pond 40 meters in diameter with a depth of 20 centimeters
3. A cone with a height of 2 feet and diameter of 20 inches
4. Find the radius of a sphere with volume 215π

Lesson: Solid geometry surface area, nets

Investigation 7, page 32

Homework: Practice exercises 1I p. 35-36

GQ: How do we calculate the slant angles and lengths?

CCSS: MP5 attend to precision

1.15 Wednesday 25 Sept

Do Now: Calculate the surface area of each object

1. A cylinder 4 cm in diameter with a height of 5 millimeters
2. A sphere with a radius of 15 cm
3. A pyramid with a height of 40 feet and base 50 feet by 50 feet
4. Find the radius of a sphere with surface area 72π

Lesson: Solid geometry slant angles and lengths

Investigation 7, page 32

Homework: Return and complete exercises 1E p. 21-22

GQ: How do we calculate the slant angles and lengths?

CCSS: MP5 attend to precision

1.16 Thursday 26 Sept

Do Now: Calculate the surface area of a cone

1. Developing inquiry skills p. 38 (Mt. Everest)
2. What formula would apply?

Lesson: Solid geometry, Chapter Summary

Homework: Chapter review 1-10 p. 39-40 (revisit problems)

GQ: How do we calculate the bounds around a value?

CCSS: MP5 attend to precision

1.17 Friday 27 Sept

Do Now Quiz: Calculate Body Mass Index ([link](#))

BMI is a measure of a healthy personal weight, $BMI = \frac{w}{h^2}$

w is a person's weight in kilograms and h is height in meters

1. Given a height of 170 cm and weight of 77 kg, find the BMI
2. These measurements are not exact. Assuming the height is between 169-171 cm and weight 76-78 kg, find the bounds of the BMI.

Lesson: Solid geometry, Chapter Summary

Homework: Chapter review 11-17 p. 39-40 (revisit problems)

GQ: How do we calculate the bounds around a value?

CCSS: MP5 attend to precision

Solution to Do Now Quiz: Calculate Body Mass Index (7)

$$\begin{aligned}
 1. \quad BMI &= \frac{77}{1.70^2} && \text{M1 A1 allow } 170^2 \\
 &= 26.64359\dots \\
 &\approx 26.6 && \text{A1 (N2))}
 \end{aligned}$$

$$\begin{aligned}
 2. \quad \text{Lowerbound: } BMI &= \frac{76}{1.71^2} && \text{M1 A1} \\
 &= 25.9909\dots \\
 &\approx 26.0
 \end{aligned}$$

$$\begin{aligned}
 \text{Upperbound: } BMI &= \frac{78}{1.69^2} \\
 &= 27.30996\dots \\
 &\approx 27.3 && \text{A1 A1 (N3)}
 \end{aligned}$$

award M1 A1 f.t. for 26.6, 26.7

Proper header with full name, date, and title (5 percentage points)

GQ: How do we calculate the bounds around a value?

CCSS: MP5 attend to precision

Quiz Corrections: Calculate Body Mass Index **required**

- ▶ Proper header with full name, date, and title
- ▶ Work downward in single column on left, in pen (you can add notes and diagrams on the right)
- ▶ Skip a line and number the problem
- ▶ Label to the left of equals sign (e.g. $BMI =$)
- ▶ Show substitution step
- ▶ Write the full calculator display (with ellipse)
- ▶ Show the rounded value, 3 sig-figs (exact value is also ok)

Copy this checklist into your notebook

GQ: How do we apply trig rules to situations?

CCSS: MP5 attend to precision

1.18 Wednesday 2 October

Do Now: Classwork handout #1

- ▶ The area of a triangle
- ▶ The cosine rule
- ▶ The sine rule, including the ambiguous case

Lesson: Circle sector situations

Homework: Complete handout. (revisit Chapter review 1-17 p. 38-40)

GQ: How do we apply trig rules to situations?

CCSS: MP5 attend to precision

1.19 Thursday 3 October

Do Now: Classwork handout #1

- ▶ The area of a triangle
- ▶ The cosine rule
- ▶ The sine rule, including the ambiguous case

Lesson: Circle sector situations

Homework: Complete handout. (revisit Chapter review 1-17 p. 38-40)

GQ: How do we apply trig rules to situations?

CCSS: MP5 attend to precision

1.20 Monday 7 October

Do Now: Review exit note quiz 1.16

- ▶ Using the law of sines to solve a triangle
- ▶ The Pythagorean theorem and slant height
- ▶ The area of a triangle, including the ambiguous case

Lesson: Review bounds, rounding (BMI quiz)

Review trig law of sines, cosines, triangle area

Homework: Pretest (unit exam tomorrow)

GQ: How do we apply trig rules to situations?

CCSS: MP5 attend to precision

1.21 Tuesday 8 October

Unit Exam

- ▶ Bounds of approximation, rounding (BMI application)
- ▶ Using the law of cosines to find a \triangle length or angle
- ▶ Using the law of sines to solve a triangle
- ▶ The area of a triangle, including the ambiguous case
- ▶ The Pythagorean theorem and slant height

Homework: Statistics concepts