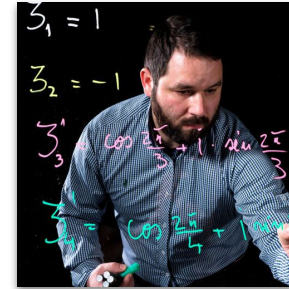
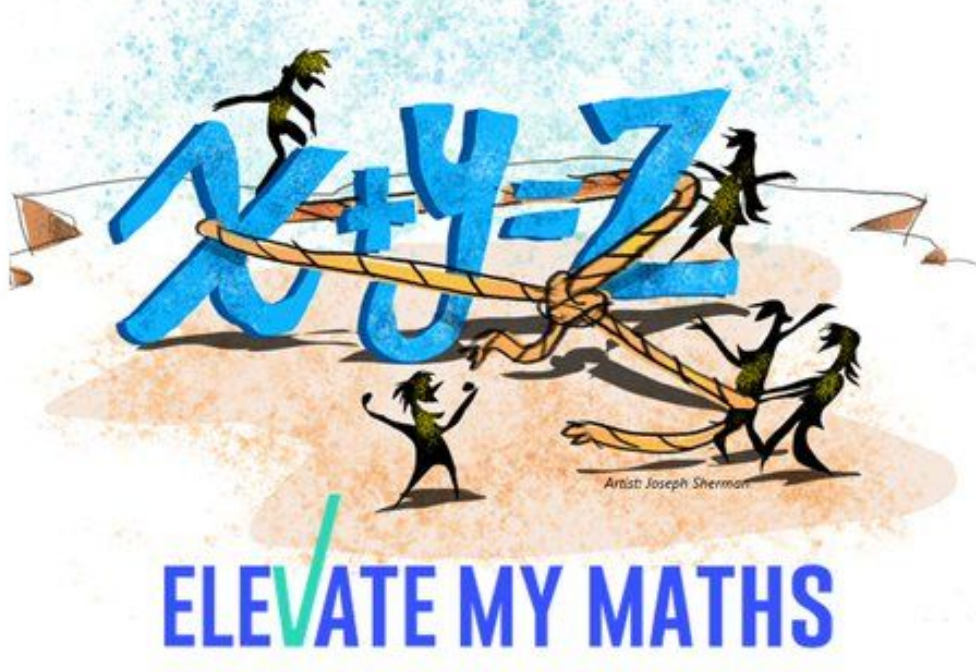


Numeracy Skills Training for all with Elevate my Maths

E-A×M+S 2022



Ovidiu Bagdasar
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James Howell
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Outline

- Numeracy Gap
- Elevate My Maths (EMM)
- From EMM 1.0 to EMM 2.0
- Validation in the Classroom; Case Studies
- Expansion beyond Academia
- Q & A

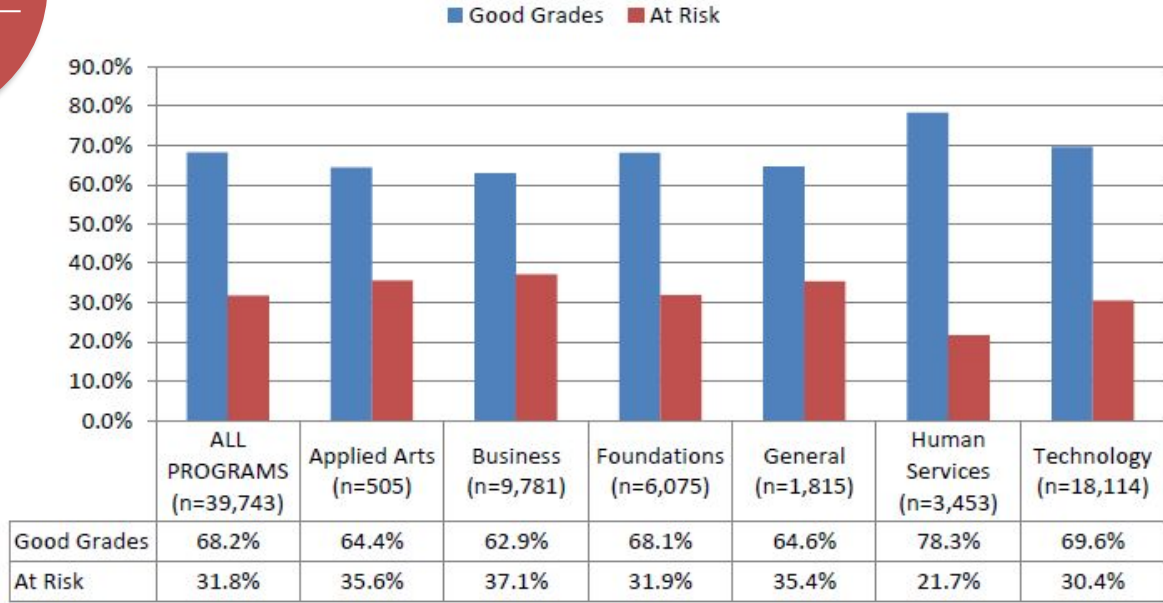
This is a follow up session to the previous submission. You can check out the recording here:

[EAMS 2021 Presentation of Case Study of EMM Implementation at Derby](#)

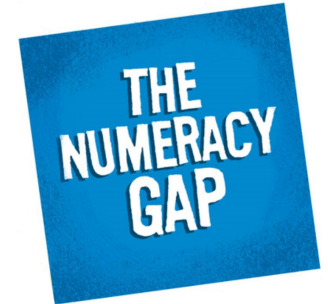
Numeracy Trends: Canada

~1/3
AT RISK

Research shows students are “at risk” of **not completing their** program due to their grades in first semester mathematics courses



Present Levels of Numeracy



Required Levels of Numeracy

[College Student Achievement Project Final Report*](#)
Reproduced with permission from Prof. G. Orpwood

Response in Ontario, Canada



ASSESSMENT FOR LEARNING FOR STUDENT SUCCESS AND RETENTION

- Psychometrically validated assessment items paired with interactive pedagogies.
- Developed in collaboration with **all 24 Community Colleges** in Ontario through the College Student Achievement Project, funded by the Ministry of Education and the Ministry of Training, Colleges and Universities.



Vretta's Elevate My Maths system

Vretta: Award winning Canadian educational technology company

Motto: "Our vision is a world where everyone enjoys maths"

1 DIAGNOSTIC ASSESSMENT

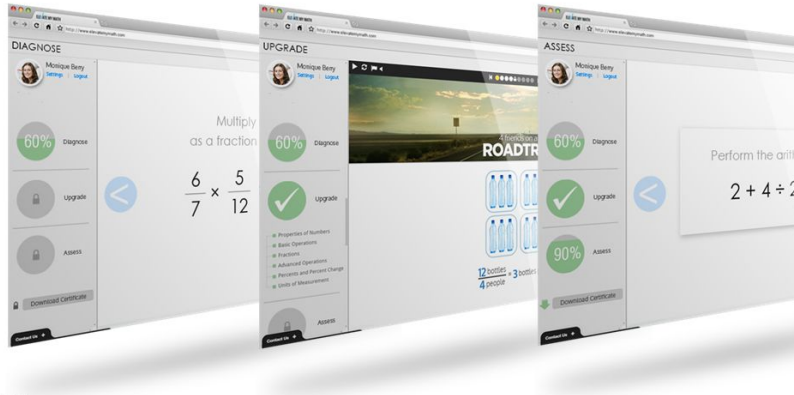
IDENTIFY SKILLS THAT REQUIRE MASTERY

2 UPGRADING MODULES

ACHIEVE MASTERY

3 SUMMATIVE ASSESSMENT

ASSESS LEVEL OF MASTERY



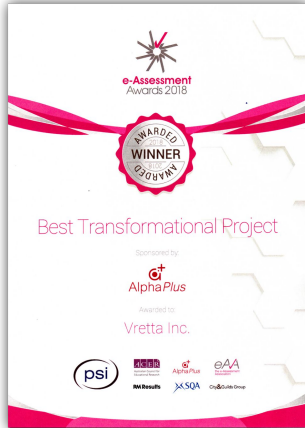
- Basic maths for College students
- Fills gaps in prior knowledge
- Assessment for learning



International Recognition

2018 WINNER

BEST TRANSFORMATIONAL PROJECT



For Raising the Level of Numeracy & Supporting Student Success

2018 & 2019 WINNER



- 2018 BHG Gold for Best Advance in Skills and Competencies Development
- 2019 BHG Silver for Best Advance in Custom Content

Products: EMM (Canada, UK), Mathematic (Luxembourg), IntroMath, etc.

Numeracy Trends: United Kingdom

Government statistics from 2021 suggest that:

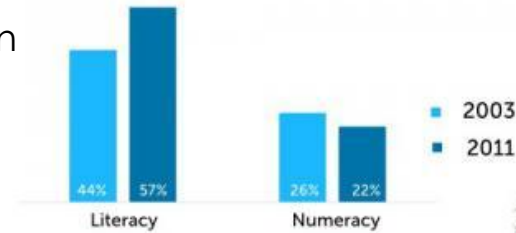
- 17 million adults – 49% of the working-age population of England – have the numeracy level that we expect of primary school children
- Economic Impact: £20 billion a year
- The gap between literacy/numeracy is increasing

Conclusion: Current approach not delivering a numerate workforce...

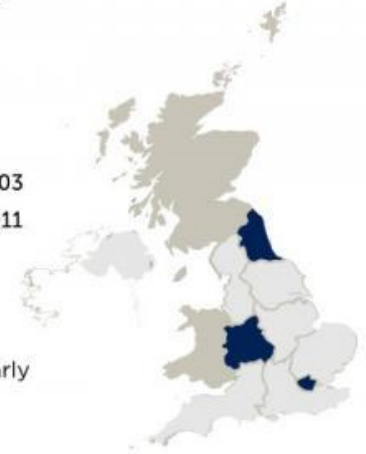
Numeracy at University?

- To support all learners (students and staff)
- To improve University KPIs (attainment, progression, employability)

Proportion of the English population with skills at GCSE "C" grade or above



Areas of particularly poor numeracy across England



www.nationalnumeracy.org.uk
©National Numeracy
#nnevidence

<https://www.nationalnumeracy.org.uk/research-and-resources/skills-life-survey-2011>

https://www.nationalnumeracy.org.uk/sites/default/files/documents/nn124_essentials_numeracyreport_for_web.pdf

https://www.nationalnumeracy.org.uk/sites/default/files/documents/Our_year_in_numbers/national_numeracy_day_2019.pdf

First Steps at University of Derby

1) Apr 2018 – UoD: “*Current issues in Mathematical Education*”

2) Dec 2018 – UoD: “*Effective Mathematical Education: Improving accessibility, reducing anxiety*”

Topics: Maths Anxiety, Teacher Development, Assessment, Roles of technology.

Participants: Researchers, Teachers, Vretta, ITS, IMA, Spaghetti Maths

Inform (News): <https://bit.ly/2QvRwnu>, REF, TEF, KEF, NSS,...



Image description: 2nd UoD Workshop, Dec 2018

Maths Anxiety Research

Working and playing with @Brom25 @LCFC_Community last month made us think of you @dr_tom_hunt... #maths #moveandlearn 😊

“I used to think I was rubbish at Maths - but now I know I’m not!”

Ethan, Year 5,
Leicester



EMM 1.0 Implementation at Derby

Advanced Numeracy Skills (60 questions)



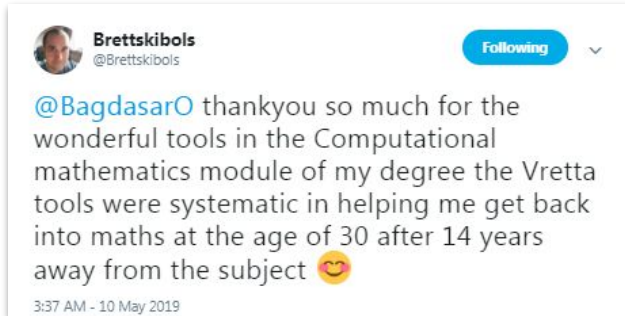
College of Engineering & Technology

- Mathematics Year 1 (30)
- Computing Year 1 (130)
- Foundation Year 0 (110)
- Computing Med College (30)

Module KPI's:

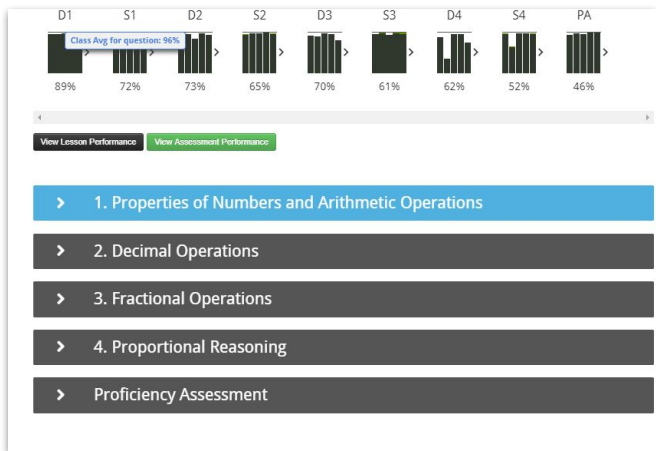
- **Engagement:** 102 min (Pre-Test), 230 min (Remediation), 46 min (Post Test)
- **Improvement:** 14% Maths, 17% Year 0, 20% Comp Maths, 39% Comp Maths (Athens)
- **Pass rate (4CC503):** Up to 90%, from 84-85% in previous years.
- **Student Feedback:** "Found it very useful as I hadn't studied Math for over 25yrs. I had a lot of remedy videos to get through, and spent many hours going through additional learning resources."

Advance HE STEM 2019

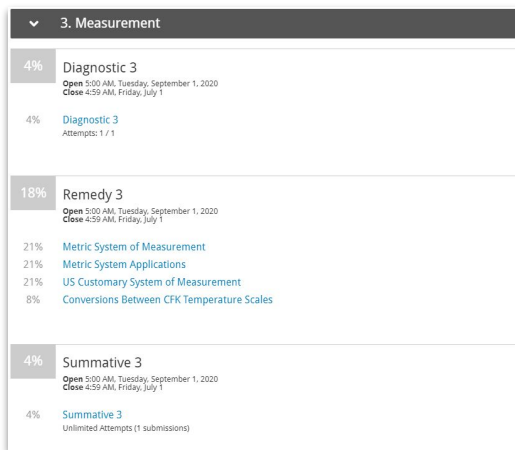


EMM 2.0

Modular Design:

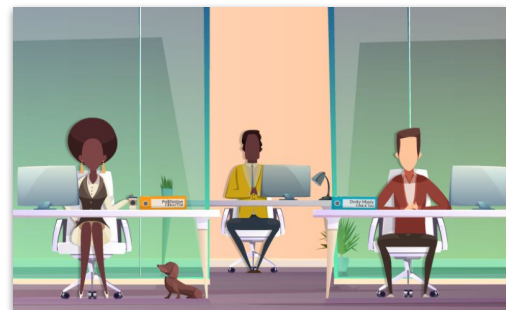


Formative Looping:



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EDI Formative Examples:



UoD inspired innovations:

- New courses build (by UoD academics)
- EMM 2.0 design: Topics have diagnostic, remedy lessons, summative assessment
- Assessment for learning: Repeatable summative tests (flexible, engaging)
- Library Maths Skills Guide: <https://libguides.derby.ac.uk/maths>
- Interactive dashboards design, placements

Impact in the Classroom

Case Study: EMM Computational Mathematics @ Derby

4CC503 Computational Mathematics		Module reports		EMM Impact		
	Stud No	1st Pass (>=40%)	AB (>=60%)	1st Pass (>=40%)	AB (>=60%)	
2015-16		168	140	99	83%	59%
2016-17		148	125	90	84%	61%
2017-18		133	115	77	86%	58%
2018-19	All	122	108	71	89%	58%
	EMM	107	99	69	93%	64%
2019-20	All	180	160	131	89%	73%
	D1	148	139	119	94%	80%
	D1&D2	123	121	107	98%	87%
2020-21	All	159	141	112	89%	70%
	D1	137	125	101	91%	74%
	D1&D2	113	108	94	96%	83%

Module KPIs: First pass rate (40%+), "good grades" (AB, 60%+).

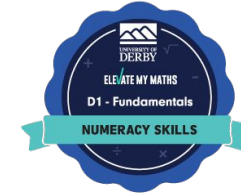
Numeracy training courses can help you build immunity against course failure.

Link: [Case Studies Published Vretta Blog](#)

Link: [eAA Case Study on Derby EMM](#)

Link: [UK Technews Press Release](#)

Receive Badge Social Media Share



Expansion Beyond Academia

Delivered the @DerbyUni course "Getting to Grips with Data: Numeracy and Problem Solving Skills" to @SadaccaLimited in Sheffield, and got my own badge. openbadgefactory.com/v1/assertion/5... ✓

The courses are free, and sponsored by the ESF project. #OpenHouseBadgeFactory @DerbyOppArea



8:00 AM · Apr 11, 2022 · Twitter Web App



European Union

European
Social Fund



In
partnership
with

**Department
for Work &
Pensions**

"The course was really powerful and practical. It helped me to refresh my numeracy skills whilst teaching me how to apply mathematical concepts to solve workplace problems. I believe everyone in business would benefit from learning these skills."

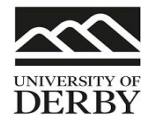
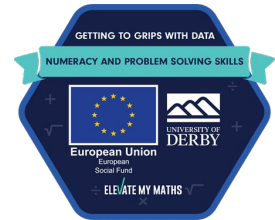


Olivier Tsemo

Chief Executive Officer, SADACCA



SADACCA



Summary of Applications

Maths & Numeracy Support

- 50+ modules, 2500+ students, 500+ badges
- Math Skills MOOC for UoD Applicants
- 13 Numeracy courses for Maths Hub
- SME Upskilling for the workplace (ESF)

Pedagogic Research

- Erasmus+ KA2 grant (March 2019)
- REF 2021 Impact Case Study - UoA4 Psychology
- ALT-C: [Annual Learning Technology Conference 2021](#)
- EAMS 2021: [Closing the Numeracy Gap](#)

Present and Future Uses of EMM

- National Association of School-based Teacher Training
- Learning Communities
- European Social Fund
- Transnational Partnerships
- SMEs partners of Academic Institutions

Recognition of Innovation



Wish us Luck!

ELEVATE MY MATHS

Future Collaborators and Allies

Teacher Training, Outreach, SMEs, Learning Communities

- 8000 teachers from NASBTT (school based teachers)
- Setup classrooms with online courses through the COVID pandemic
- Partnership to provide training to SADACCA, FEFZ and Derby Opportunity area
- ESF Numeracy skills training to corporate partners (SMEs): [Derby Advertisement ESF](#)
- ESF Training Case Studies: ([Pro Media Design](#), [SADACCA](#))

Selected international partners

Turkey



Sweden



Romania



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Resource List

- > 1. Fractions
- > 2. Ratios & Proportions
- > 3. Decimals
- > 4. Percentages
- > 5. Basic Operations
- > 6. Measurement
- > 7. Data and Statistics
- ▼ Proficiency Assessment

96% Proficiency Assessment
Open 12:00 AM, Thursday, December 2
Close 11:59 PM, Sunday, December 4, 2022

96% Proficiency Assessment
Unlimited Attempts (1 submissions)

Easy to navigate, colour coded.

Assessment View

Due In: 72 days 8 hours

Questions

- Question 1 (2)
- Question 2 (4)
- Question 3 (3)
- Question 4 (2)
- Question 5 (4)
- Question 6 (2)
- Question 7 (2)
- Question 8 (2)

Question 3 of 8

Lucy, Alicia, and Monica jointly purchased an estate for £162,000. Their individual investments in the estate were in the ratio of 4 : 3 : 2, respectively.

a. Calculate their individual investment amounts.

Lucy:

Alicia:

Monica:

Round your answers to the nearest penny

b. Each of them decided to invest an additional £2,000 to develop the estate into a small family resort. What is the new ratio after the additional investment?

: :

Express the ratio in its simplest form

Intuitive design, tech support, or instructor support available in 1-click.

Formative Lesson View

Convert the Percentage into its Decimal form

43.0%

43.0% = 0.430

Method 1: divide the number by 100 and remove the percentage sign.

Method 2: move the decimal point two places to the left.

Feedback

Engaging Interactive voice-enabled upgrading lessons with feedback.

ELEVATE MY MATHS

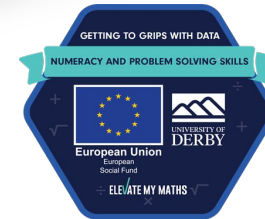
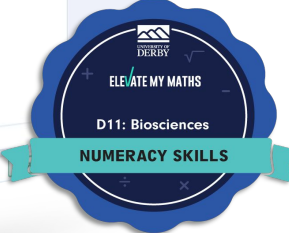
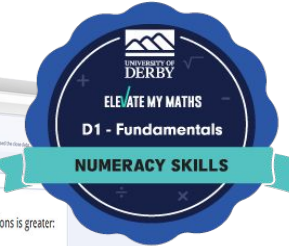
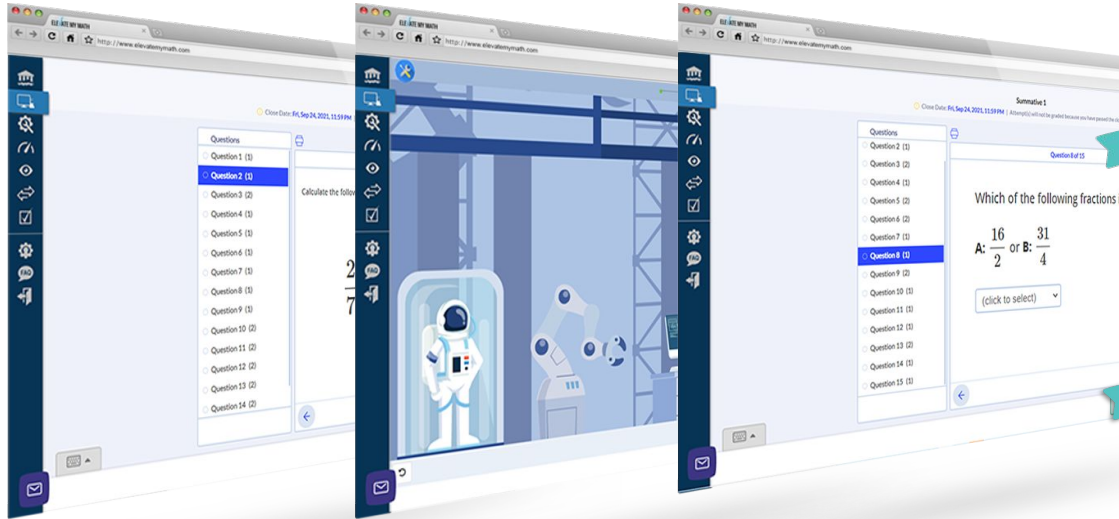
Diagnostic Assessments

Upgrading Lessons

Check Mastery

Receive Badge

Social Media Share

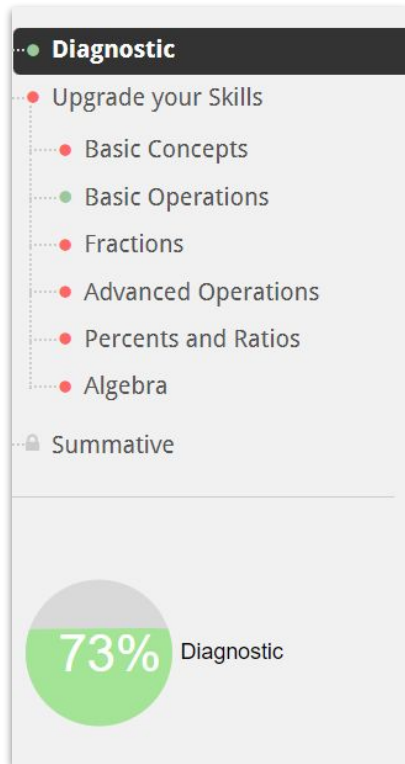


Assessment for Learning solution to Fill numeracy gaps



Derby Pilot Project 2018-19

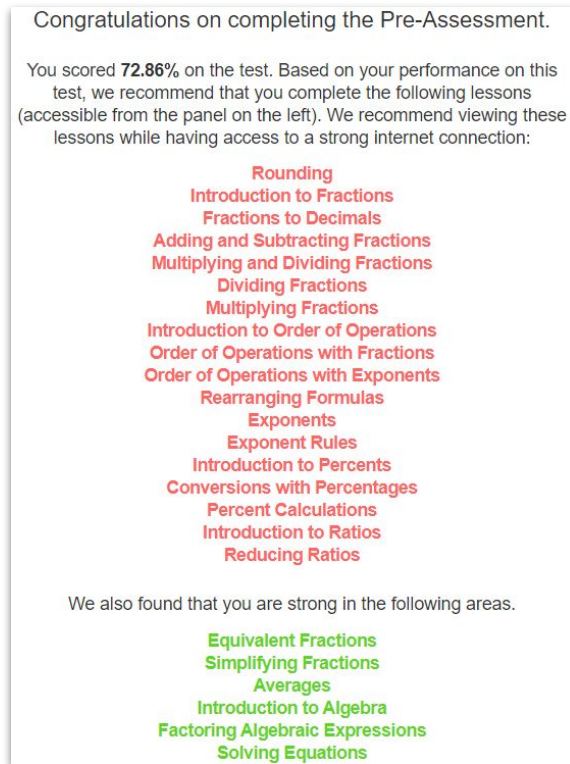
Initial Launch version:



Diagnostic

- Upgrade your Skills
 - Basic Concepts
 - Basic Operations
 - Fractions
 - Advanced Operations
 - Percents and Ratios
 - Algebra
- Summative

73% Diagnostic



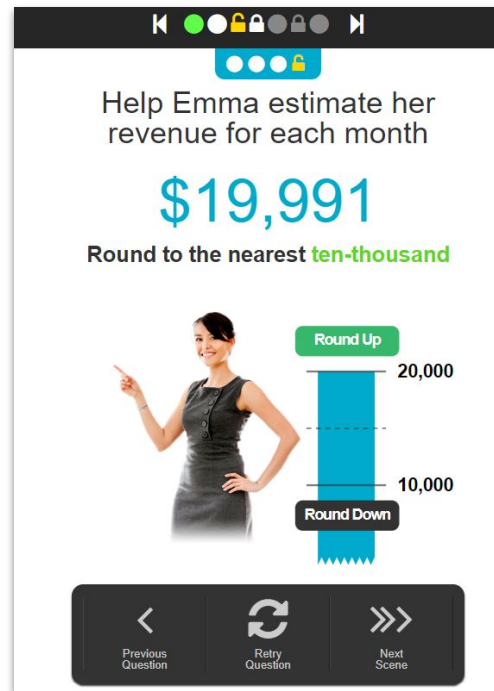
Congratulations on completing the Pre-Assessment.

You scored **72.86%** on the test. Based on your performance on this test, we recommend that you complete the following lessons (accessible from the panel on the left). We recommend viewing these lessons while having access to a strong internet connection:

- Rounding
- Introduction to Fractions
- Fractions to Decimals
- Adding and Subtracting Fractions
- Multiplying and Dividing Fractions
- Dividing Fractions
- Multiplying Fractions
- Introduction to Order of Operations
- Order of Operations with Fractions
- Order of Operations with Exponents
- Rearranging Formulas
- Exponents
- Exponent Rules
- Introduction to Percents
- Conversions with Percentages
- Percent Calculations
- Introduction to Ratios
- Reducing Ratios

We also found that you are strong in the following areas.

- Equivalent Fractions
- Simplifying Fractions
- Averages
- Introduction to Algebra
- Factoring Algebraic Expressions
- Solving Equations



Help Emma estimate her revenue for each month

\$19,991

Round to the nearest **ten-thousand**

Round Up

20,000

10,000

Round Down

Previous Question Retry Question Next Scene

ELEVATE MY MATHS

Topic Module Complete

▼ 1. Fractions

100% Diagnostic 1
Open 12:00 AM, Monday, August 30
Close 11:59 PM, Friday, December 30, 2022

100% [Diagnostic 1](#)
Attempts: 1 / 1

100% Upgrading 1
Open 12:00 AM, Tuesday, August 31
Close 11:59 PM, Friday, December 30, 2022

100% [Introduction to Fractions](#)

100% [Simplifying Fractions](#)

100% [Equivalent Fractions](#)

100% [Multiplying and Dividing Fractions](#)

100% [Adding and Subtracting Fractions](#)

100% [Applications: Fractions](#)

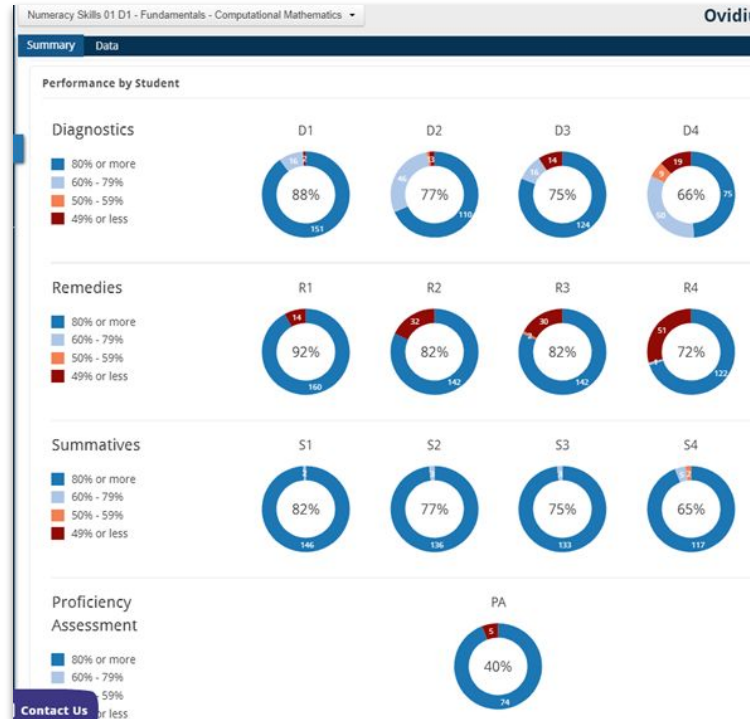
100% [Multiplying Fractions](#)

100% [Dividing Fractions](#)

100% Summative 1
Open 12:00 AM, Tuesday, August 31
Close 11:59 PM, Friday, December 30, 2022

100% [Summative 1](#)
Unlimited Attempts (1 submissions)

Dashboard View



D1 (Comp Maths 2020-21)

- (R1) 174: Engagement
- (S4) 128: Achievement
- (PA) 74: Completion

- KPI's at a glance, clickable dashboard features to get more granular detail as required.

Derby Development and Refinement (2019-20)

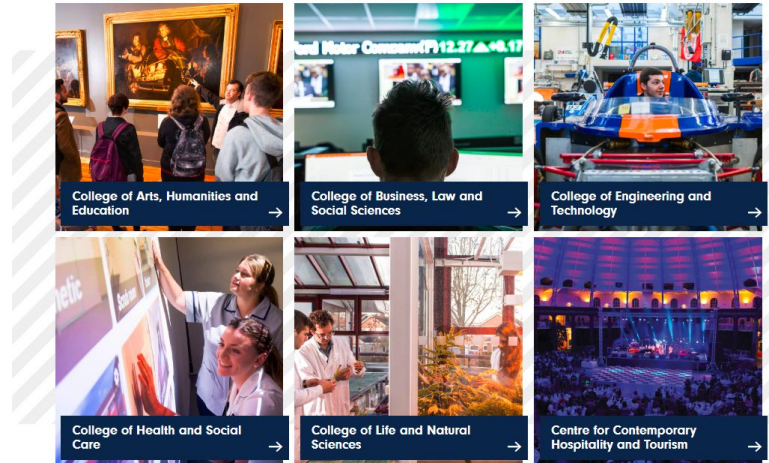
EMM full catalogue (Summer 2019)

- ❖ Number sense (Units 1-6)
- ❖ Proportional reasoning (Units 7-8)
- ❖ Algebra (Units 9-10)
- ❖ Measurement and Geometry (Units 11-14)
- ❖ Data Management and Statistics (Units 15-20)
- ❖ Business and Financial Maths (Units 21-28)
- ❖ Health Sciences Mathematics (Units 29-30)

New EMM courses developed @UoD (Sept 2019)

- ❖ D1 - Fundamentals
- ❖ D2 - Basic Algebra and Geometry
- ❖ D3 - Numbers, Proportions and Applications
- ❖ D4 - Statistics, Data Analysis and Probabilities
- ❖ D5 - Basic Financial Mathematics
- ❖ D6 - Applied Financial Mathematics
- ❖ D7 - Algebra and Measurement for Finance
- ❖ D8 - Business and Financial Mathematics
- ❖ D9 - Basic Algebra and Statistics for Finance
- ❖ D10 Proportions, Statistics and Dosage Calculations
- ❖ D11 - Biosciences (Released in February 2022)
- ❖ D0 Basic Numeracy Skills

Our Colleges



Integration with Blackboard (Dec 2019)

Key areas (Jan 2020)	EMM courses	Modules	Programmes
Engineering	30	8	1
Apprentices	35		7
Derby Business School	26	9	
Psychology	2		1
Maths Hub	10		
Total	103	17	9