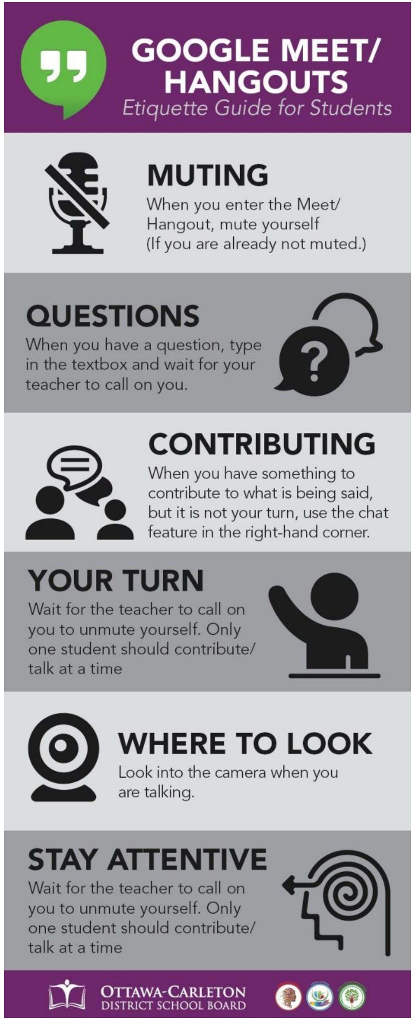
Student Evidence of Learning Portfolios in a Virtual Learning Environment

Please:
- **Mute** your microphone
- **Turn off** your video
- Participate in a professional manner when posting in the chat window.
- **We will begin at 7:30pm**



GOOGLE MEET/ HANGOUTS

Etiquette Guide for Students

MUTING

When you enter the Meet/ Hangout, mute yourself (If you are already not muted.)

QUESTIONS

When you have a question, type in the textbox and wait for your teacher to call on you.

CONTRIBUTING

When you have something to contribute to what is being said, but it is not your turn, use the chat feature in the right-hand corner.

YOUR TURN

Wait for the teacher to call on you to unmute yourself. Only one student should contribute/ talk at a time

WHERE TO LOOK

Look into the camera when you are talking.

STAY ATTENTIVE

Wait for the teacher to call on you to unmute yourself. Only one student should contribute/ talk at a time

Ottawa-Carleton District School Board

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avital.amar@yrdsb.ca
@TaliAmar5

marcel.tebokkel@yrdsb.ca
@te_bokkel

Welcome

Tali

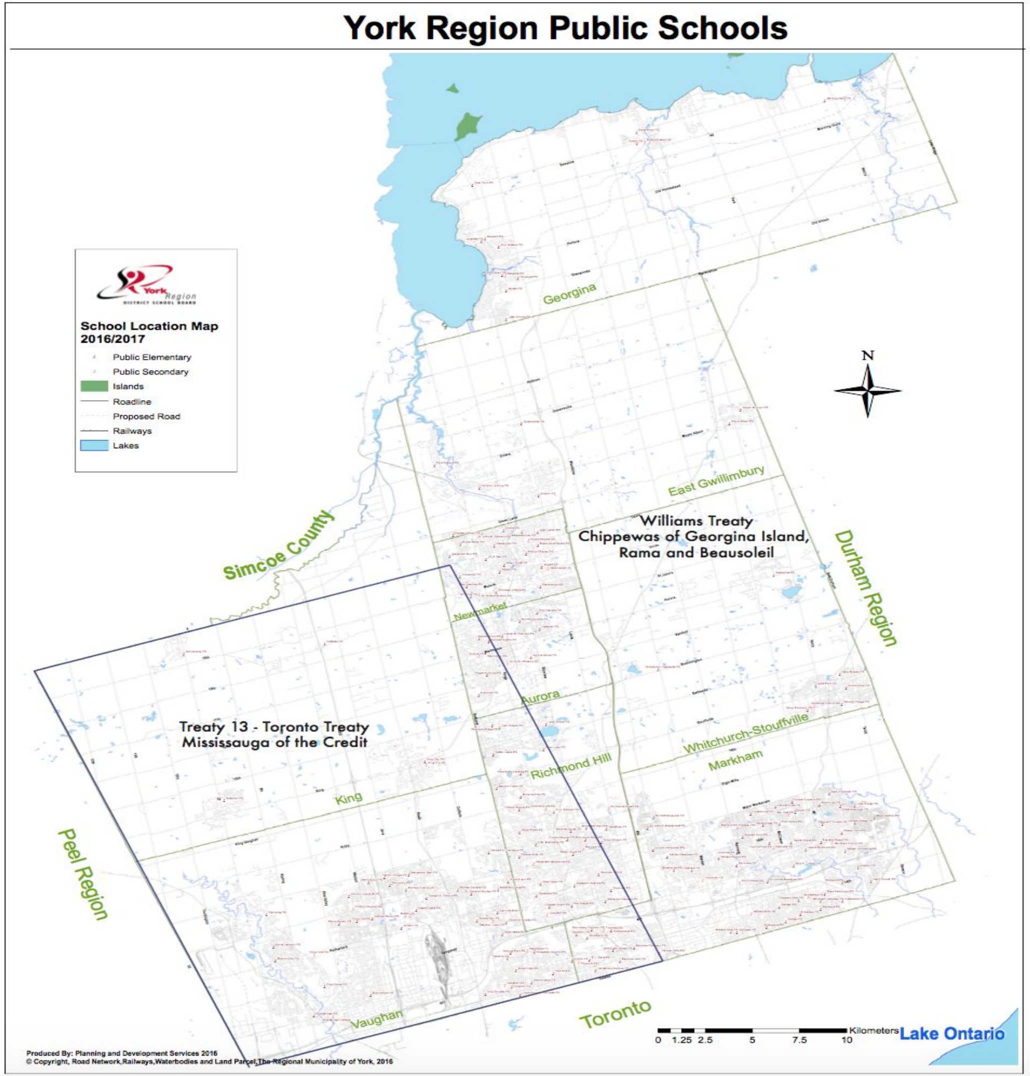
Marcel

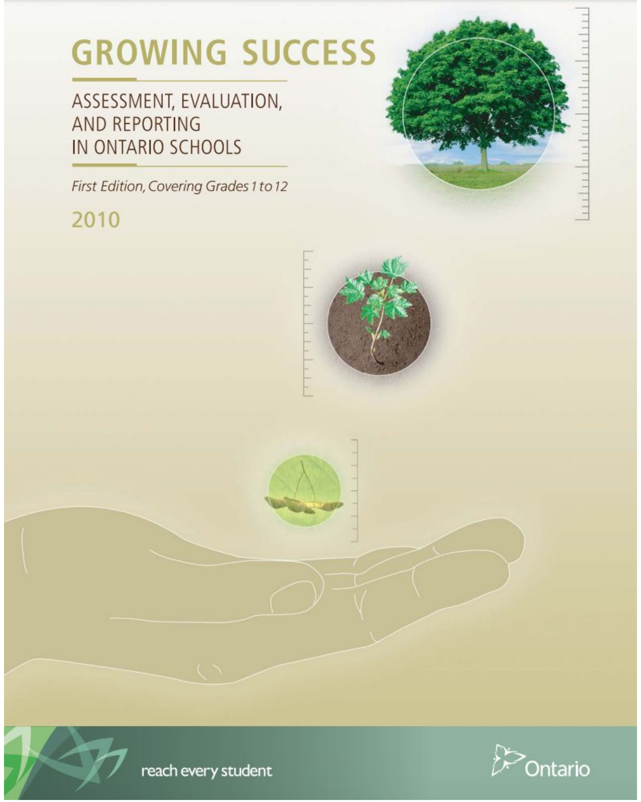
N’wiiwijnookiimin

“We learn together”

Canada 150 Truths

As a guest on Turtle Island, we would like to start by acknowledging that we are connecting virtually today from our spaces on land that has been shared with us, so that we may work and learn together in the service of students who attend our schools. These schools are on the traditional territories of the Wendat, the Haudenosaunee, and the Anishinaabe peoples, whose presence in this space continues to this day. We also would like to acknowledge the treaty lands Negotiated as the Williams Treaty and Treaty 13 and thank the signatory nations respectively for sharing these lands with us. We would also like to acknowledge the Chippewas of Georgina Island First Nation as our closest First Nation community and our partners in education.





GROWING SUCCESS

ASSESSMENT, EVALUATION,
AND REPORTING
IN ONTARIO SCHOOLS

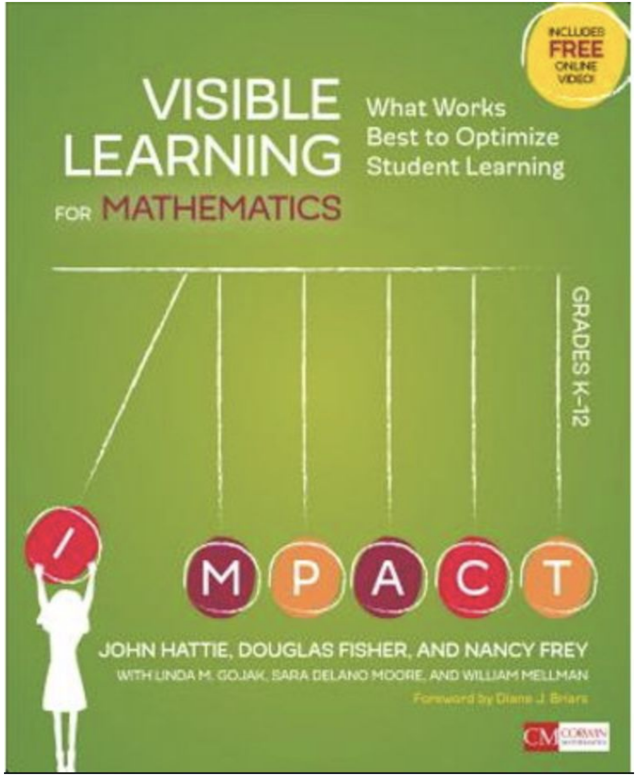
First Edition, Covering Grades 1 to 12

2010

reach every student

Ontario

The primary purpose of assessment and evaluation is to improve student learning.



“Stated simply, when one knows what the target is, there is an increased likelihood that the target will be achieved. Knowing one's learning destination is crucial for mathematics students.” (page 39)

Visible Learning For Mathematics: Grades K-12: What Works Best To Optimize Student Learning John Hattie, Douglas Fisher, Nancy Frey, Linda Gojak, Sara Moore, William Mellman. Corwin Mathematics - 2017


123.4
/LTR
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Diagnostic &
Formative

ASSESSMENT

FOR

LEARNING

Diagnostic &
Formative

ASSESSMENT

AS

LEARNING

Formative

ASSESSMENT FOR LEARNING

ASSESSMENT AS LEARNING

ASSESSMENT OF LEARNING

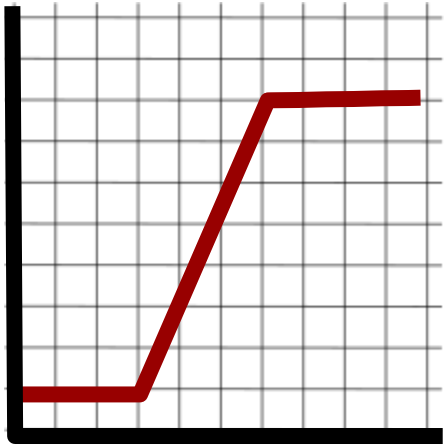
Diagnostic & Formative

Formative

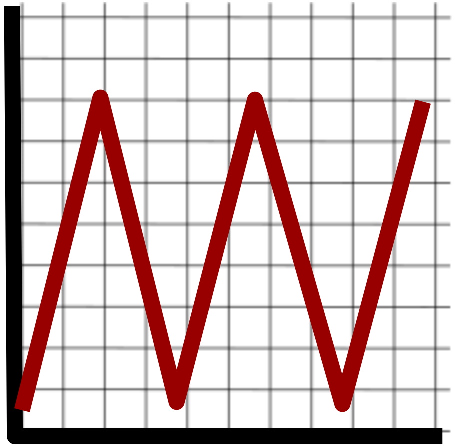
Summative

Parachute Analysis

Abigail

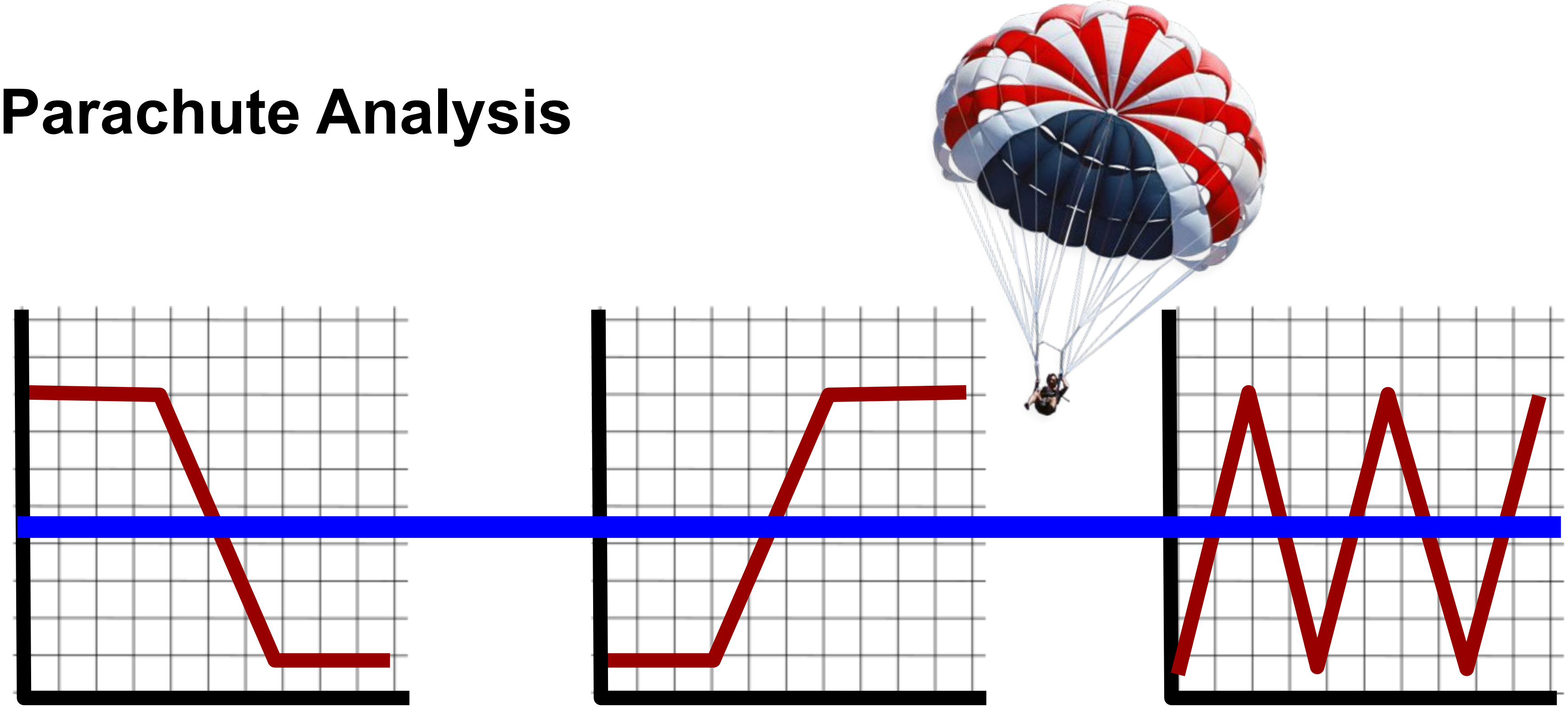


Betty



Charlie

Parachute Analysis

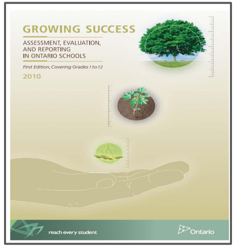


Abigail

Betty

Charlie

It is very important for students to know where they are, where they are going, and how to get there in relation to the learning intentions or success criteria



GROWING SUCCESS

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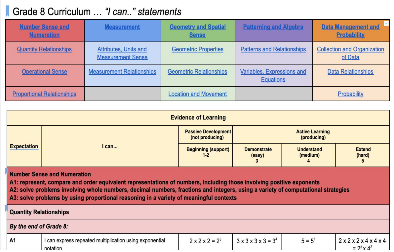
reach every student

Ontario

Student	Where am I going?	Where am I now?	How can I close the gap?
Teacher	Where are my students going?	Where are they now?	How can I help them close the gap?

“I can ...” statements



Grade 8 Curriculum … *“I can..” statements*

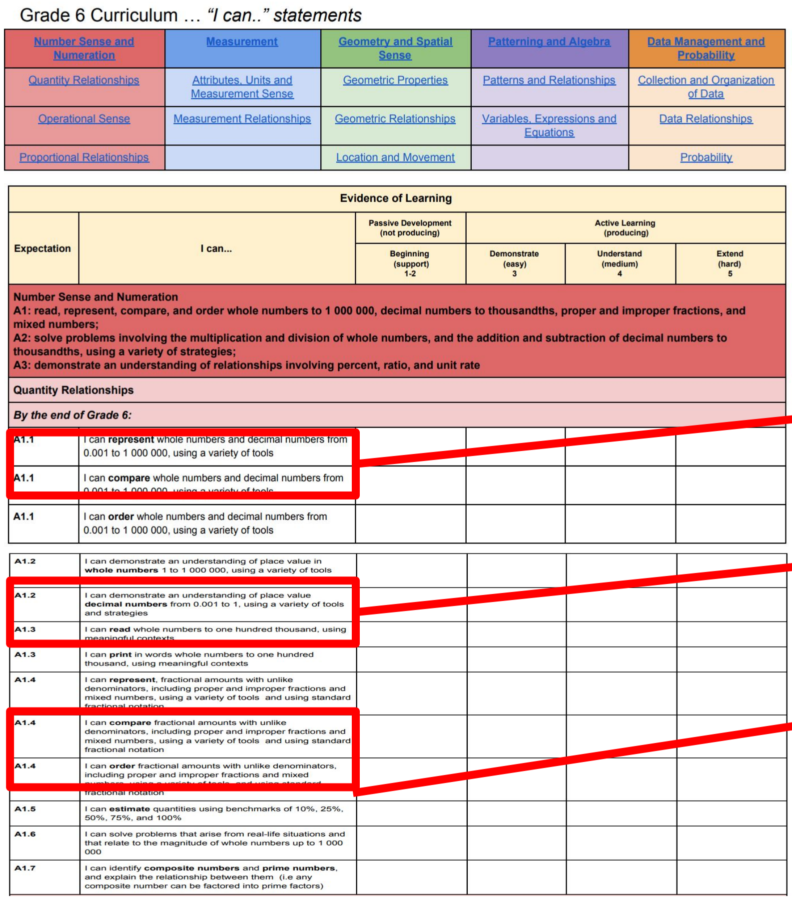
Number Sense and Numeration	Measurement	Geometry and Spatial Sense	Patterning and Algebra	Data Management and Probability
Quantity Relationships	Attributes, Units and Measurement Sense	Geometric Properties	Patterns and Relationships	Collection and Organization of Data
Operational Sense	Measurement Relationships	Geometric Relationships	Variables, Expressions and Equations	Data Relationships
Proportional Relationships		Location and Movement		Probability

Evidence of Learning					
Expectation	I can...	Passive Development (not producing)	Active Learning (producing)		
		Beginning (support) 1-2	Demonstrate (easy) 3	Understand (medium) 4	Extend (hard) 5
Number Sense and Numeration **A1: represent, compare and order equivalent representations of numbers, including those involving positive exponents** **A2: solve problems involving whole numbers, decimal numbers, fractions and integers, using a variety of computational strategies** **A3: solve problems by using proportional reasoning in a variety of meaningful contexts**					
Quantity Relationships					
By the end of Grade 8:					
A1	I can express repeated multiplication using exponential notation	$2 x 2 x 2 = 2^3$	$3 x 3 x 3 x 3 = 3^4$	$5 = 5^1$	$2 x 2 x 2 x 4 x 4 x 4 = 2^3 x 4^2$

"I can ..." statements are the curriculum expectations **deconstructed** into the **knowledge** and **skills** embedded within the curriculum.

We have created these for you already for Grade 9-12 and will give you them towards the end of the presentation.

Evidence of Learning Template

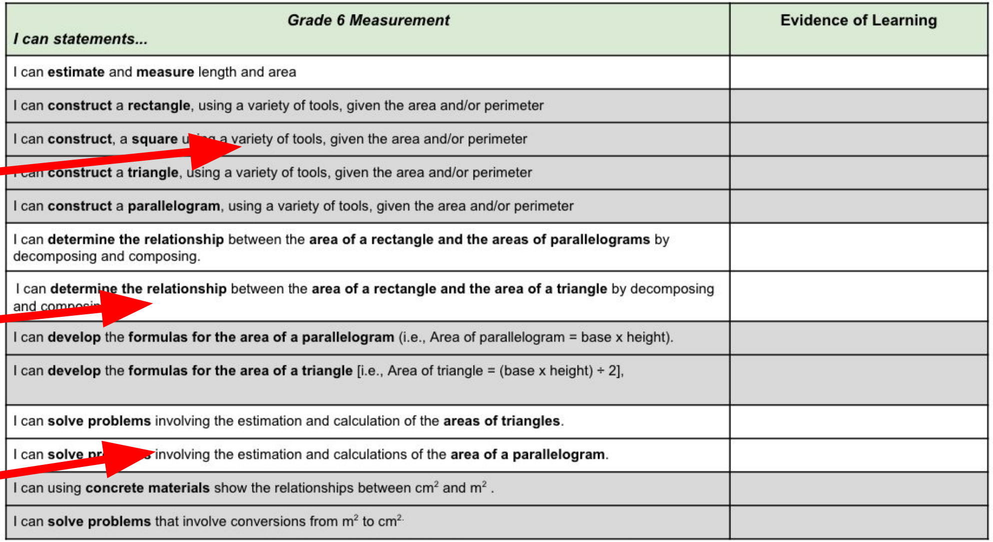


Grade 6 Curriculum … *"I can.." statements*

Number Sense and Numeration	Measurement	Geometry and Spatial Sense	Patterning and Algebra	Data Management and Probability
Quantity Relationships	Attributes, Units and Measurement Sense	Geometric Properties	Patterns and Relationships	Collection and Organization of Data
Operational Sense	Measurement Relationships	Geometric Relationships	Variables, Expressions and Equations	Data Relationships
Proportional Relationships		Location and Movement		Probability

Evidence of Learning					
Expectation	**I can...**	**Passive Development (not producing)**	**Active Learning (producing)**		
		Beginning (support) 1-2	**Demonstrate (easy) 3**	**Understand (medium) 4**	**Extend (hard) 5**
Number Sense and Numeration **A1: read, represent, compare, and order whole numbers to 1 000 000, decimal numbers to thousandths, proper and improper fractions, and mixed numbers;** **A2: solve problems involving the multiplication and division of whole numbers, and the addition and subtraction of decimal numbers to thousandths, using a variety of strategies;** **A3: demonstrate an understanding of relationships involving percent, ratio, and unit rate**					
Quantity Relationships					
By the end of Grade 6:					
A1.1	I can **represent** whole numbers and decimal numbers from 0.001 to 1 000 000, using a variety of tools				
A1.1	I can **compare** whole numbers and decimal numbers from 0.001 to 1 000 000, using a variety of tools				
A1.1	I can **order** whole numbers and decimal numbers from 0.001 to 1 000 000, using a variety of tools				

A1.2	I can demonstrate an understanding of place value in **whole numbers** 1 to 1 000 000, using a variety of tools				
A1.2	I can demonstrate an understanding of place value **decimal numbers** from 0.001 to 1, using a variety of tools and strategies				
A1.3	I can **read** whole numbers to one hundred thousand, using meaningful contexts				
A1.3	I can **print** in words whole numbers to one hundred thousand, using meaningful contexts				
A1.4	I can **represent**, fractional amounts with unlike denominators, including proper and improper fractions and mixed numbers, using a variety of tools and using standard fractional notation				
A1.4	I can **compare** fractional amounts with unlike denominators, including proper and improper fractions and mixed numbers, using a variety of tools and using standard fractional notation				
A1.4	I can **order** fractional amounts with unlike denominators, including proper and improper fractions and mixed numbers, using a variety of tools and using standard fractional notation				
A1.5	I can **estimate** quantities using benchmarks of 10%, 25%, 50%, 75%, and 100%				
A1.6	I can solve problems that arise from real-life situations and that relate to the magnitude of whole numbers up to 1 000 000				
A1.7	I can identify **composite numbers** and **prime numbers**, and explain the relationship between them (i.e any composite number can be factored into prime factors)				

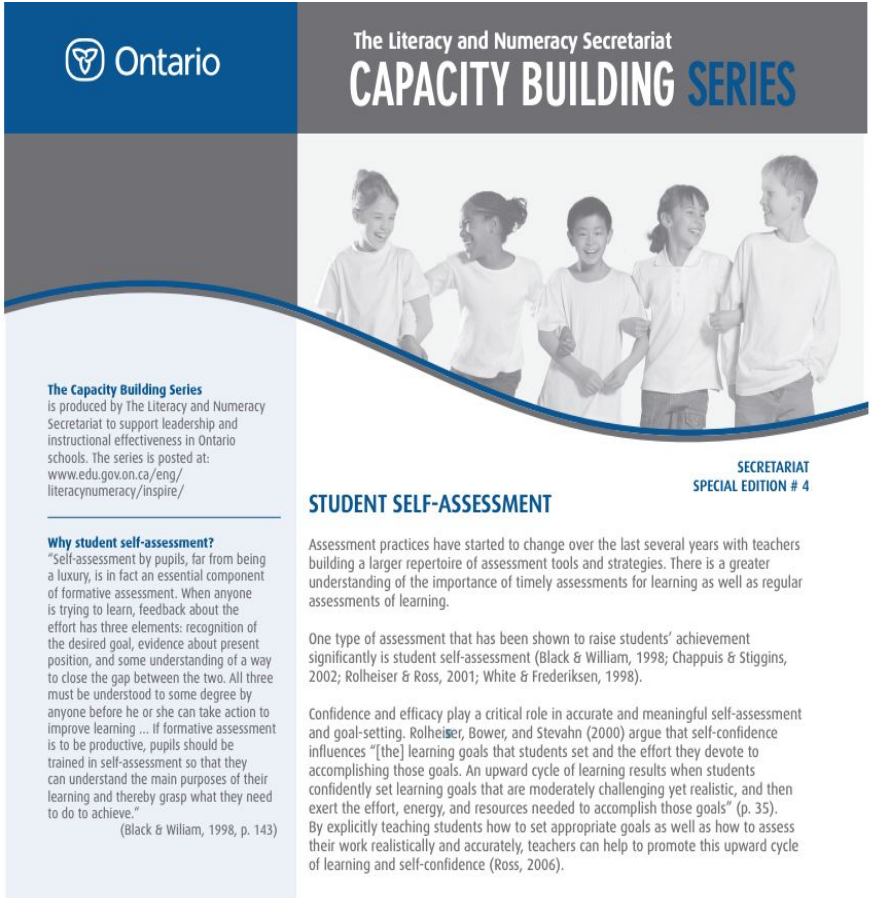


Grade 6 Measurement ***I can statements...***	**Evidence of Learning**
I can **estimate** and **measure** length and area	
I can **construct** a **rectangle**, using a variety of tools, given the area and/or perimeter	
I can **construct**, a **square** using a variety of tools, given the area and/or perimeter	
I can **construct** a **triangle**, using a variety of tools, given the area and/or perimeter	
I can **construct** a **parallelogram**, using a variety of tools, given the area and/or perimeter	
I can **determine the relationship** between the **area of a rectangle and the areas of parallelograms** by decomposing and composing.	
I can **determine the relationship** between the **area of a rectangle and the area of a triangle** by decomposing and composing.	
I can **develop** the **formulas for the area of a parallelogram** (i.e., Area of parallelogram = base x height).	
I can **develop** the **formulas for the area of a triangle** [i.e., Area of triangle = (base x height) ÷ 2],	
I can **solve problems** involving the estimation and calculation of the **areas of triangles**.	
I can **solve problems** involving the estimation and calculations of the **area of a parallelogram**.	
I can using **concrete materials** show the relationships between cm^2 and m^2 .	
I can **solve problems** that involve conversions from m^2 to cm^2.	

The process of **developing and supporting student metacognition**. Students are **actively engaged** in this assessment process: that is, they **monitor their own learning; use assessment feedback from teacher, self, and peers to determine next steps; and set individual learning goals.** Assessment as learning requires students to have a **clear understanding of the learning goals and the success criteria.** Assessment as learning focuses on the role of the **student as the critical connector between assessment and learning.**

(Adapted from Western and Northern Canadian Protocol for Collaboration in Education, 2006, p. 41.)

Growing Success 2010



Ontario

The Literacy and Numeracy Secretariat

CAPACITY BUILDING SERIES

The Capacity Building Series is produced by The Literacy and Numeracy Secretariat to support leadership and instructional effectiveness in Ontario schools. The series is posted at: www.edu.gov.on.ca/eng/literacynumeracy/inspire/

Why student self-assessment?
"Self-assessment by pupils, far from being a luxury, is in fact an essential component of formative assessment. When anyone is trying to learn, feedback about the effort has three elements: recognition of the desired goal, evidence about present position, and some understanding of a way to close the gap between the two. All three must be understood to some degree by anyone before he or she can take action to improve learning ... If formative assessment is to be productive, pupils should be trained in self-assessment so that they can understand the main purposes of their learning and thereby grasp what they need to do to achieve."
(Black & Wiliam, 1998, p. 143)

SECRETARIAT
SPECIAL EDITION # 4

STUDENT SELF-ASSESSMENT

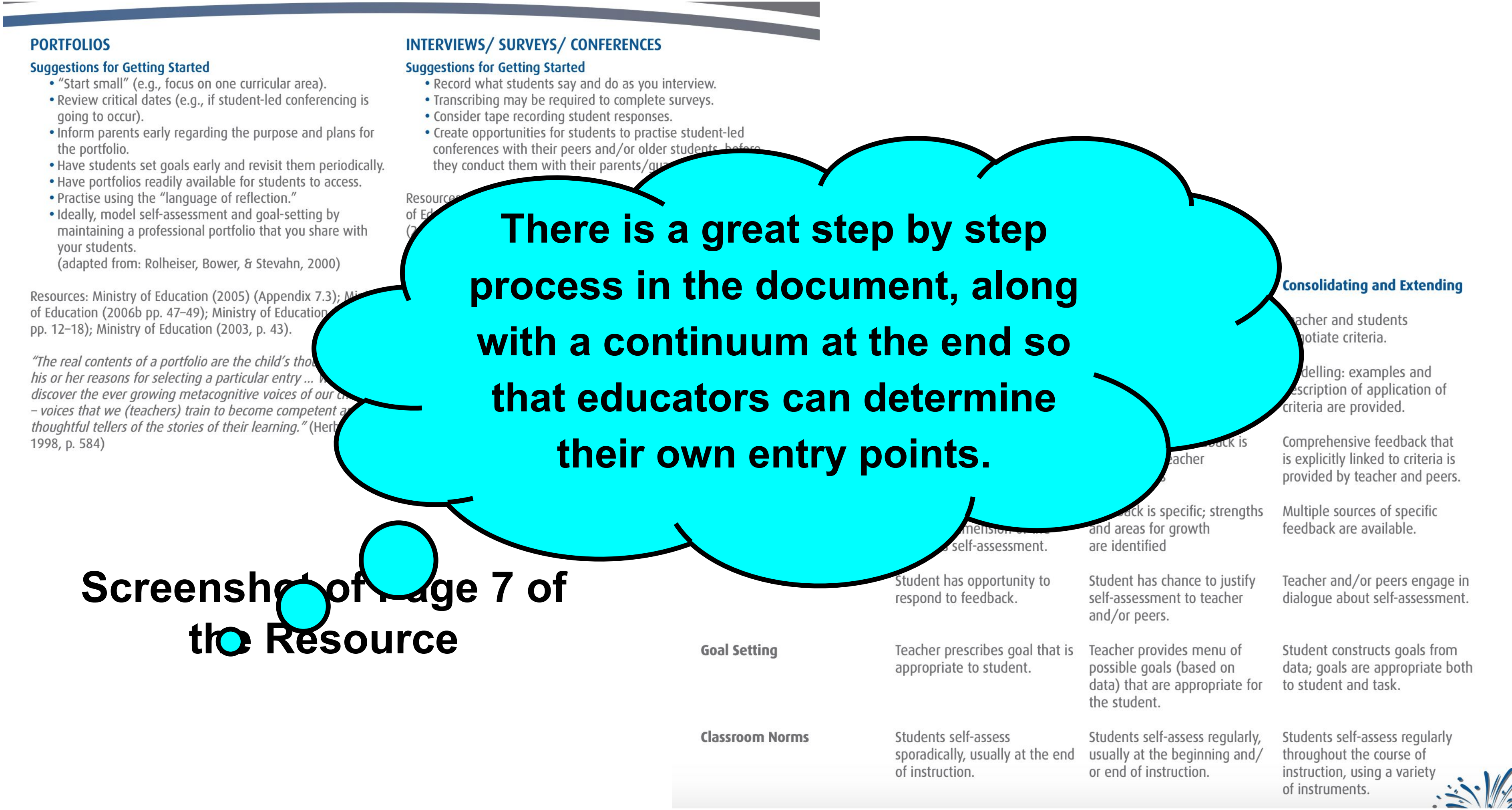
Assessment practices have started to change over the last several years with teachers building a larger repertoire of assessment tools and strategies. There is a greater understanding of the importance of timely assessments for learning as well as regular assessments of learning.

One type of assessment that has been shown to raise students' achievement significantly is student self-assessment (Black & William, 1998; Chappuis & Stiggins, 2002; Rolheiser & Ross, 2001; White & Frederiksen, 1998).

Confidence and efficacy play a critical role in accurate and meaningful self-assessment and goal-setting. Rolheiser, Bower, and Stevahn (2000) argue that self-confidence influences "[the] learning goals that students set and the effort they devote to accomplishing those goals. An upward cycle of learning results when students confidently set learning goals that are moderately challenging yet realistic, and then exert the effort, energy, and resources needed to accomplish those goals" (p. 35). By explicitly teaching students how to set appropriate goals as well as how to assess their work realistically and accurately, teachers can help to promote this upward cycle of learning and self-confidence (Ross, 2006).

"If we want assessment-capable learners who engage in the assessment process, then there are things that we need to do to set it up."

- ***John Almarode***



PORTFOLIOS

Suggestions for Getting Started

- "Start small" (e.g., focus on one curricular area).
- Review critical dates (e.g., if student-led conferencing is going to occur).
- Inform parents early regarding the purpose and plans for the portfolio.
- Have students set goals early and revisit them periodically.
- Have portfolios readily available for students to access.
- Practise using the "language of reflection."
- Ideally, model self-assessment and goal-setting by maintaining a professional portfolio that you share with your students.

(adapted from: Rolheiser, Bower, & Stevahn, 2000)

Resources: Ministry of Education (2005) (Appendix 7.3); Mi of Education (2006b pp. 47–49); Ministry of Education pp. 12–18); Ministry of Education (2003, p. 43).

"The real contents of a portfolio are the child's tho his or her reasons for selecting a particular entry ... W discover the ever growing metacognitive voices of our ch – voices that we (teachers) train to become competent a thoughtful tellers of the stories of their learning." (Herb 1998, p. 584)

INTERVIEWS/ SURVEYS/ CONFERENCES

Suggestions for Getting Started

- Record what students say and do as you interview.
- Transcribing may be required to complete surveys.
- Consider tape recording student responses.
- Create opportunities for students to practise student-led conferences with their peers and/or older students before they conduct them with their parents/gu

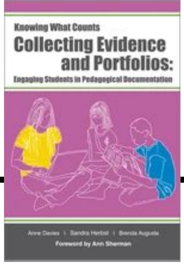
Resource of Ed (2

			Consolidating and Extending
			acher and students otiate criteria.
			delling: examples and escription of application of criteria are provided.
		ack is eacher	Comprehensive feedback that is explicitly linked to criteria is provided by teacher and peers.
	mension of the self-assessment.	ack is specific; strengths and areas for growth are identified	Multiple sources of specific feedback are available.
	Student has opportunity to respond to feedback.	Student has chance to justify self-assessment to teacher and/or peers.	Teacher and/or peers engage in dialogue about self-assessment.
Goal Setting	Teacher prescribes goal that is appropriate to student.	Teacher provides menu of possible goals (based on data) that are appropriate for the student.	Student constructs goals from data; goals are appropriate both to student and task.
Classroom Norms	Students self-assess sporadically, usually at the end of instruction.	Students self-assess regularly, usually at the beginning and/ or end of instruction.	Students self-assess regularly throughout the course of instruction, using a variety of instruments.

There is a great step by step process in the document, along with a continuum at the end so that educators can determine their own entry points.

Screenshot of Page 7 of the Resource

Why use a portfolio?



Knowing What Counts

Collecting Evidence and Portfolios:

Engaging Students in Pedagogical Documentation

Anne Davies | Sandra Herbst | Brenda Augusta

Foreword by Ann Sherman

Pg 21, 22

Teacher's Perspective:

- they serve as an opportunity to be in conversation with students about learning
- they support student learning , inform instructional design and communicate to parents and others
- they serve as a method by which students engage in pedagogical documentation (Assessment AS Learning)
- they support teacher professional judgement
- they transform assessment from an event to a process

Students Perspective:

- What I have learned?
- How can I show you what I've learned
- How can I take my learning to the next place?
- How can I better understand myself as a learner?

Schedule Intentional Reflection Times

- Not to have it only done just before reporting (Portfolio Flurry)
- Schedule times to reflect upon the learning (e.g. at end of a the week, 4 times a unit, every 3rd Friday)
- Be intentional about having students reflect
- Ongoing reflection of learning, not a one off
- Provide meaningful actionable feedback

How to create evidence of Learning Portfolios with Students

1) Make a template using Google Slides based on what is going to be covered academically, (linked to the “ I can …” statements)
2) Provide master template slides of what the students can fill out as they input their evidence of learning, to document the growth of learning over time (see templates provided)
3) Create it as an assignment in Google classroom, being sure to set it to make ONE copy for each student…..
4) Students then complete the evidence logs to demonstrate evidence of learning over time (reflecting on what they have learned and mastered)
    - *Showing students how to [link to slides within the slide deck](#) to help with the organization*

Key Details to Include in a Portfolio Template

- Linked to “ I can…” statement / curriculum expectation
- Piece of Evidence *(e.g. pictures, video, recorded conversation, manipulatives image, online tool demonstration)*
- Explanation of WHY this evidence was chosen -
  - *“I used to think.. But now I think”*
  - *Trash it*
  - *This is my best thinking because…..*
  - *Anecdotal Notes - Proof Card*
- Opportunity for teacher to give feedback and students to respond

Example of Learning Portfolios

Grade 7 - Spatial Sense (Circles)	Grade 8 - Algebra
Grade 12 - Calculus	

Take a few minutes to browse a few samples of a learning portfolio.

Example

Evidence of Learning Portfolio for a Unit in Grade 7

Back to Examples

Tali’s
Evidence of Learning Portfolio
Grade 7

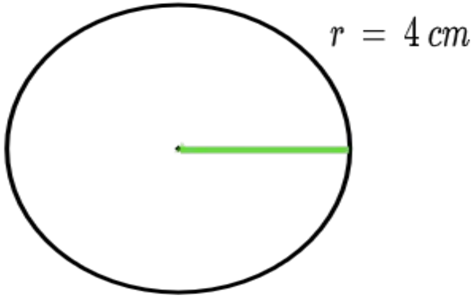
	Grade 7 - Spatial Sense (Circles) ***I can statements...***	**Evidence of Learning**
E2.3	I can **use** the relationships between the radius, diameter, and circumference of a circle to **explain the formula for finding the circumference**	1
E2.3	I can **use** the relationships between the radius, diameter, and circumference of a circle to **solve related problems**	2
E2.4	I can **construct** circles when given the radius, diameter, or circumference	3 , 4
E2.5	I can **show** the relationships between the radius, diameter, and area of a circle, and use these relationships to **explain the formula for measuring the area of a circle**	5, 6
E2.5	I can **apply** the relationships between the radius, diameter, and area of a circle, and use these relationships to **solve related problems**	7, 8

I CAN Statement: I can use the relationships between the radius, diameter, and circumference of a circle to explain the formula for finding the circumference

→ 1
Date: April 28

Evidence

What is the circulmference of this circle ?



$$r\ x\ 2 = d$$
$$4cm\ x\ 2 = 8cm$$

$$d\ x\ \pi = C$$
$$8cm\ x\ 3.14 = 25.12\ cm$$

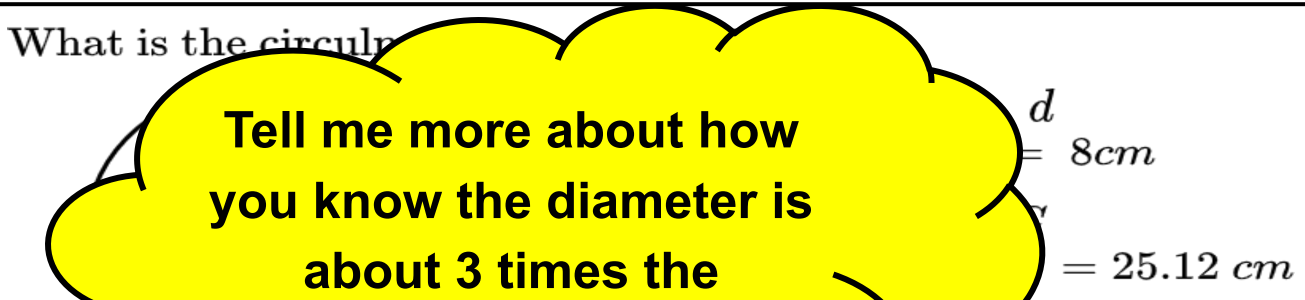
Notes

I know that the diameter is double the radius. I also know that the diameter is about 3 times the circumference, so when I multiply by pi (3.14), I get the circumference of the circle !

I CAN Statement: I can use the relationships between the radius, diameter, and circumference of a circle to explain the formula for finding the circumference

→ 1
Date: April 28

Evidence


What is the circul

d

$= 8cm$

$= 25.12\ cm$

Tell me more about how you know the diameter is about 3 times the circumference ?

Notes

I know that the diameter is double the radius. I also know that the diameter is about 3 times the circumference, so when I multiply by pi (3.14), I get the circumference of the circle !

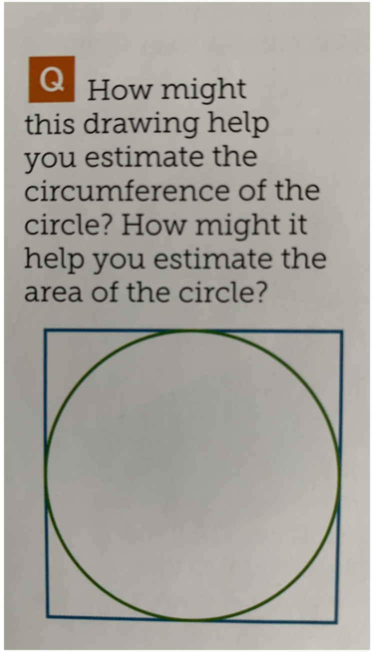
Proof Card

I can use the relationships between the radius, diameter, and circumference of a circle to solve related problems.

→ **1**
Date: May 5

Problem Solver

This piece shows I am a **great** problem solver because….



Q How might this drawing help you estimate the circumference of the circle? How might it help you estimate the area of the circle?

My group and I worked on this task for a long time. We were really stuck at first and didn't know where to start. We knew the fact that the circle was in a square, with all sides being the same, was important.

I knew that the perimeter of the square was going to be larger than the circle because the straight edges in the corner of the square was longer than the rounded edge of the circle (we measured with string to be sure!).

Sooo … after some thinking we realized the diameter (the distance from one side of the circle to the other, that goes through the center) was the same distance as the length of the square !

So we decided just to multiply the diameter (or the length of the square) by 3 to get an estimate of the circumference of the circle !

Proof Card

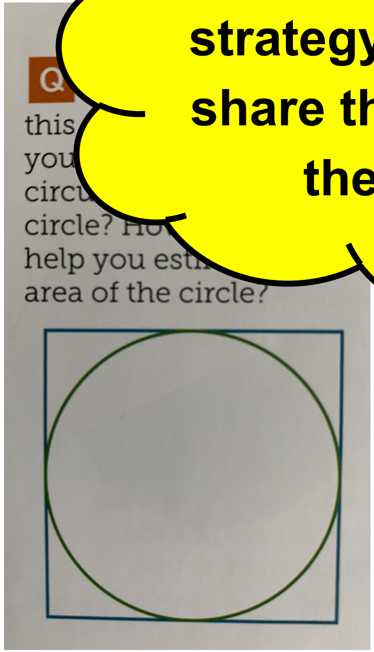
I can use the relationships between the radius, diameter, and circumference of a circle to solve related problems.

\# → 1
Date: May 5

Proble

This p oblem solver because….

That was a very resourceful strategy! Be sure to share that idea with the class !



Q
this
you
circu
circle? Ho
help you esti
area of the circle?

this task for a long time. We were really stuck at e to start. We knew the fact that the circle was in a eing the same, was important.

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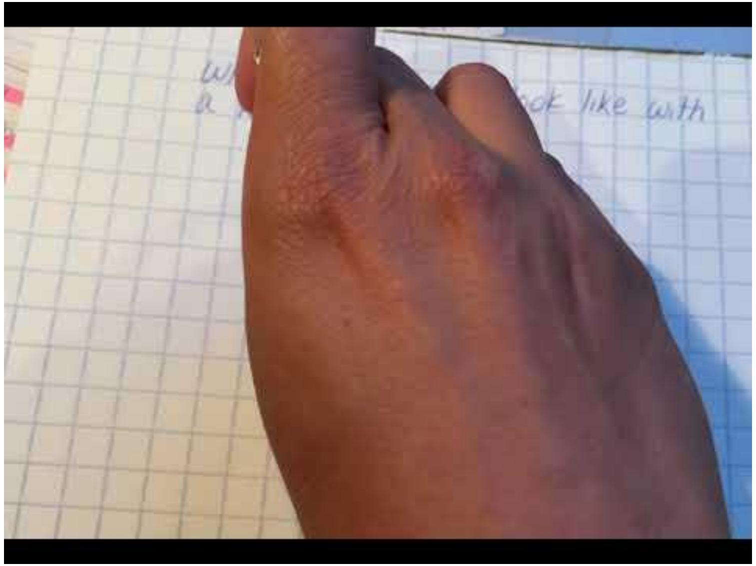
Sooo … after some thinking we realized the diameter (the distance from one side of the circle to the other, that goes through the center) was the same distance as the length of the square !

So we decided just to multiply the diameter (or the length of the square) by 3 to get an estimate of the circumference of the circle !

Annotated Notes

I can construct circles when given the radius, diameter, or circumference

 # → 3
Date: May 10



What will I see in the clip?

In this clip I walk you through how to draw a circle when you are told the radius.

I started by placing a dot in the center of my circle, then I measured 3 cm for my radius. I then used my compass and put the point at the center and then pencil at the 3cm mark and drew the circle !

If I was given the diameter, I would have done it almost the same way. I would have drawn the diameter of the circle, found the halfway point, put the center dot and then put my compass point ther and the pencil on the outer edge and then drawn the circle, but

Annotated Notes

I can construct circles when given the radius, diameter, or circumference

→ 3
Date: May 10

Would this same strategy work when given only the circumference ?

hat will I see in the clip?

his clip I walk you through how to draw a circle when you old the radius.

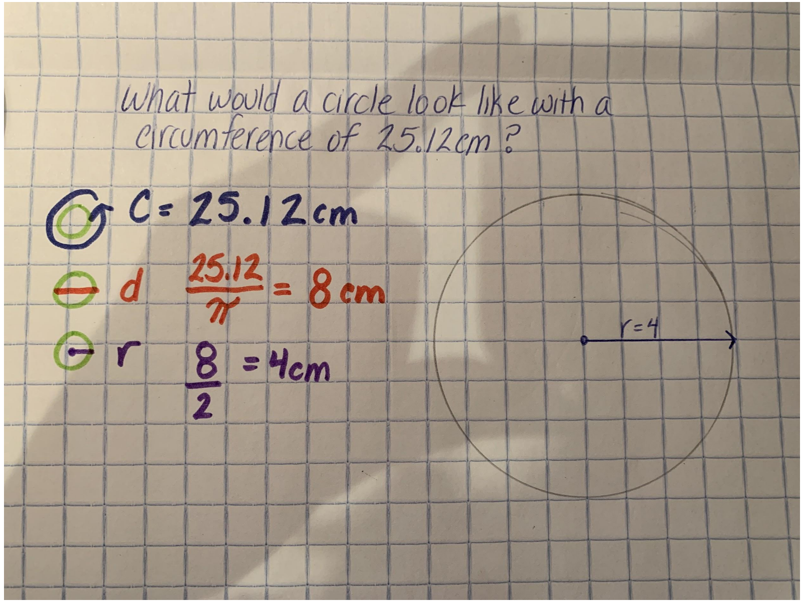
tarted by placing a dot in the center of my circle, then I measured 3 cm for my radius. I then used my compass and put the t at the center and then pencil at the 3cm mark and drew the circl

If I was given the diameter, I would have done it almost the same way. I would have drawn the diameter of the circle, found the halfway point, put the center dot and then put my compass point ther and the pencil on the outer edge and then drawn the circle, but

I CAN Statement: I can construct circles when given the radius, diameter, or circumference

→ 4
Date: May 14

Evidence


What would a circle look like with a circumference of 25.12cm?

C = 25.12cm

d $\frac{25.12}{\pi} = 8$ cm

r $\frac{8}{2} = 4$cm

Notes

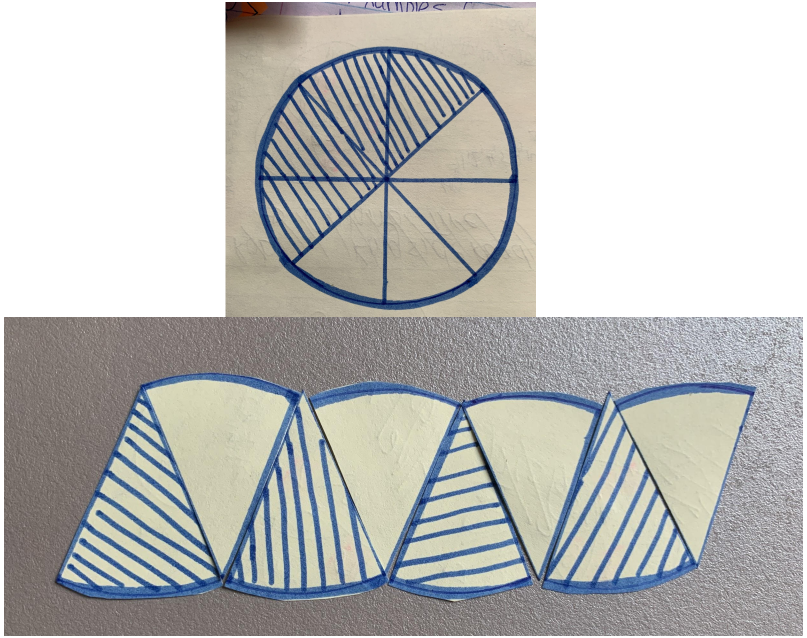
To be able to draw a circle with a circumference of 25.12cm, I had to break it down first. I first figured out what the diameter was (in red) by dividing the circumference by π . Then I divided the diameter by 2 to get the radius (in purple) and I got 4m. From there I was able to create a center point, draw the radius and then with my compass draw the circle.

Picture This

→ 5

Date: May 18

I can show the relationships between the radius, diameter, and area of a circle, and use these relationships to explain the formula for measuring the area of a circle



There is more to this photo than you can see. This is photo of an activity that we did in class to figure out how to find the area of a circle.

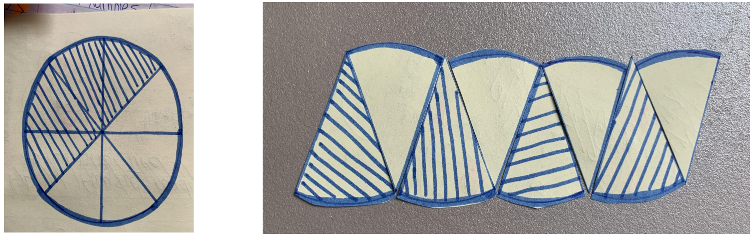
I want you to notice that:

- We tried to create a parallelogram from our 1/8th pieces the best we could
- The height of the parallelogram is the same as the radius of the circle
- The base of the parallelogram is ½ of the circumference (because you can see the 4 colored pieces across the bottom, which was half the circle)
- So from what I know about the area of a parallelogram the area of a circle should the the radius x ½ the circumference !

I can show the relationships between the radius, diameter, and area of a circle, and use these relationships to explain the formula for measuring the area of a circle

\# → 6
Date: May 20

I used to think….



I used to think about the area of a circle being just the radius time ½ of the circumference, but then someone showed me it another way.

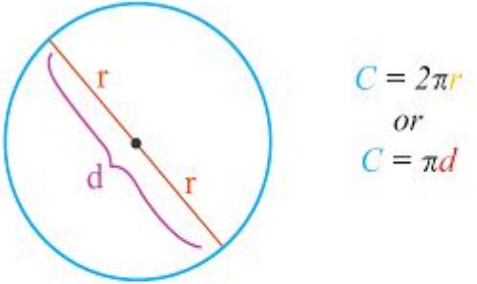
I still don’t think this is wrong, but this is just another way to think about it !

But now I think….

I know that to find the circumference of a circle I can use the diameter and multiply it by π….. but if I want just half of the circumference (to find the area) I could just multiply the radius times π… cause the radius is half of the diameter !...

So then I would be doing **r x r x π** ….which is the same as **π x r^2**

🙂

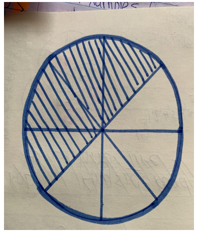


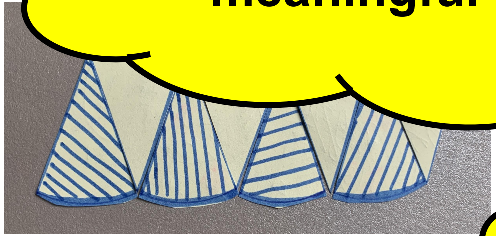
I can show the relationships between the radius, diameter, and area of a circle, and use these relationships to explain the formula for measuring the area of a cir

→ 6
Date: May 20

Be sure to add this thinking to your meaningful notes!

I used to th… y I think….





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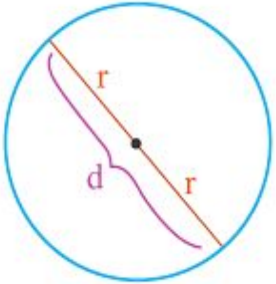


$C = 2\pi r$

or

$C = \pi d$

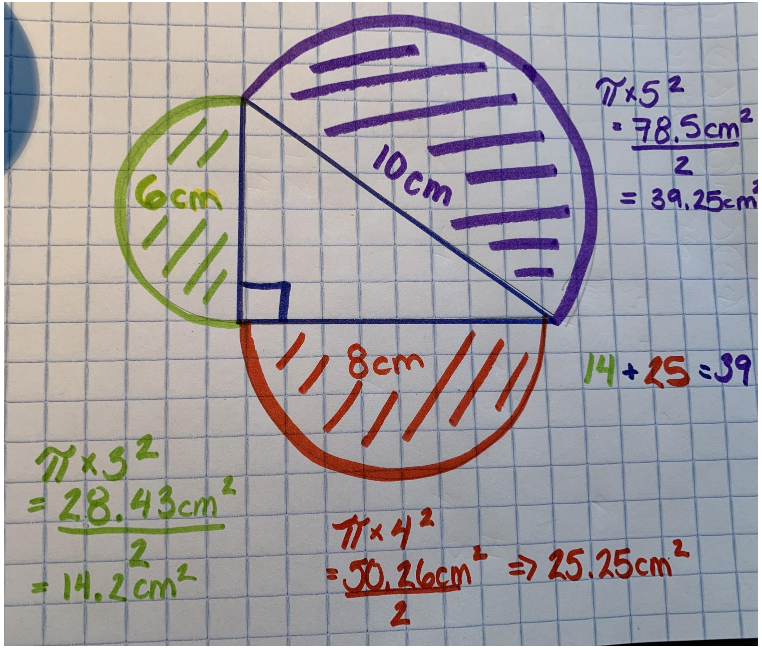
Proof Card

I can apply the relationships between the radius, diameter, and area of a circle, and use these relationships to solve related problems

 # → 7
Date: May 25

Improvement

This piece of work shows my improvement because...



Draw a right triangle with three different side lengths. On each side of the triangle, that is a flat side draw a half circle. Determine the area of each half circle. What relationship do you notice among the areas of these three half circles ?

I was able to use the area of a circle formula that my friend showed me, to quickly be able to find the areas of these half circles that I made with my right triangle.

I noticed and thought that it was pretty cool that the 2 smaller sides of the triangles half circles areas added to that of the longer side of my triangle !

Proof Card

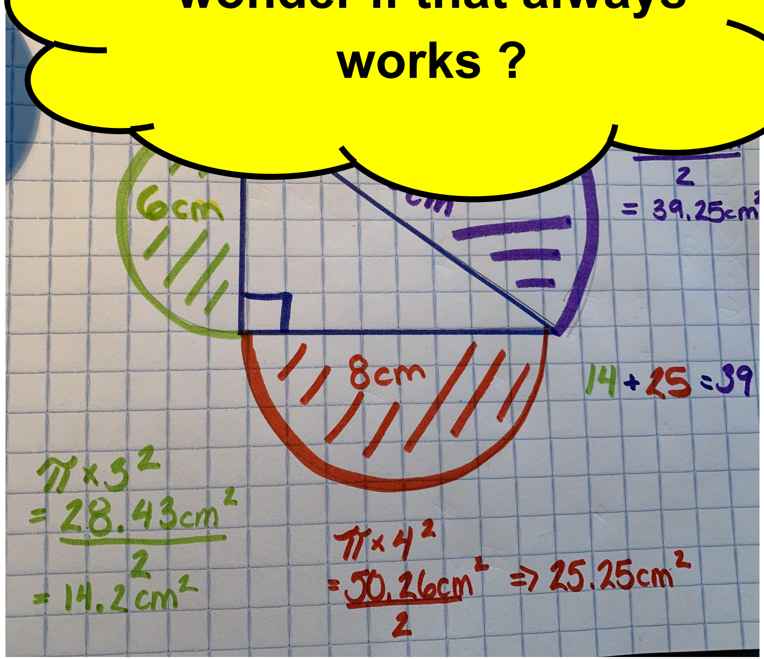
I can apply the relationships between the radius, diameter, and area of a circle, and use these relationships to solve related problems

→ 7
Date: May 25

Imp

Th rovement because...

That’s interesting ! I wonder if that always works ?



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Proof Card

I can apply the relationships between the radius, diameter, and area of a circle, and use these relationships to solve related problems

→ 8
Date: May 30

Connections I made mathematical connections. I know this because...

In this task I was asked to find the best deal when ordering pizza based on size. I had to use my knowledge of unit rate to help me figure this out. I was about the figure out how much area each pizza had based on the diameter of the pizza. Then I divided the area of the pizza by the cost to figure out how much of the pizza I would get for $1. The large seems like the best bang for your buck...however what if I didn't want that much pizza ?

Build Your Own Pizzas

SMALL
6 Slices / 10"
Cheese $9.00

MEDIUM
8 Slices / 12"
Cheese $11.50

LARGE
10 Slices / 14"
Cheese $14.00

Small	Medium	Large
5^2 x π = 78.53cm^2	6^2 x π = 113.09cm^2	7^2 x π = 153.94cm^2
78.53/ $9.00 = **8.72**cm^2 of pizza for $1	113.09/ $11.50 = **9.83**cm^2 of pizza for $1	153.94/ $14 = **10.99**cm^2 of pizza for $1
		BEST DEAL

Proof Card

I can apply the relationships between the radius, diameter, and area of a circle, and use these relationships to solve related problems

→ 8
Date: May 30

Conn … onnections. I know this

bee

Do you think this would still be the case if we had to pay for extra toppings ?

my

out. I was … area each pizza had based on the diameter of the pizza. Then I divided the area of the pizza by the cost to figure out how much of the pizza I would get for $1. The large seems like the best bang for your buck...however what if I didn't want that much pizza ?

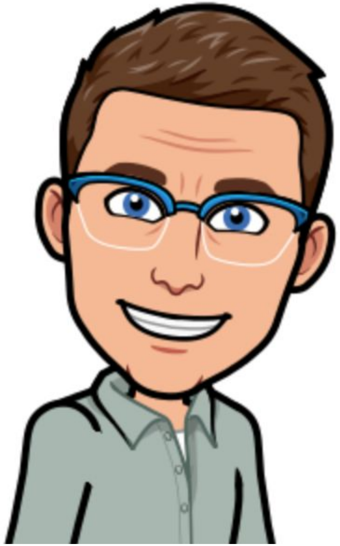
Small	Medium	Large
5^2 x π = 78.53cm^2	6^2 x π = 113.09cm^2	7^2 x π = 153.94cm^2
78.53/ $9.00 = **8.72**cm^2 of pizza for $1	113.09/ $11.50 = **9.83**cm^2 of pizza for $1	153.94/ $14 = **10.99**cm^2 of pizza for $1
		BEST DEAL

Example

Evidence of Learning Portfolio for a Unit in Grade 8

Back to Examples

Marcel's
Evidence of Learning Portfolio
Grade 8



Patterns and Algebra
C1: identify, describe, extend, create, and make predictions about a variety of patterns, including those found in real-life contexts

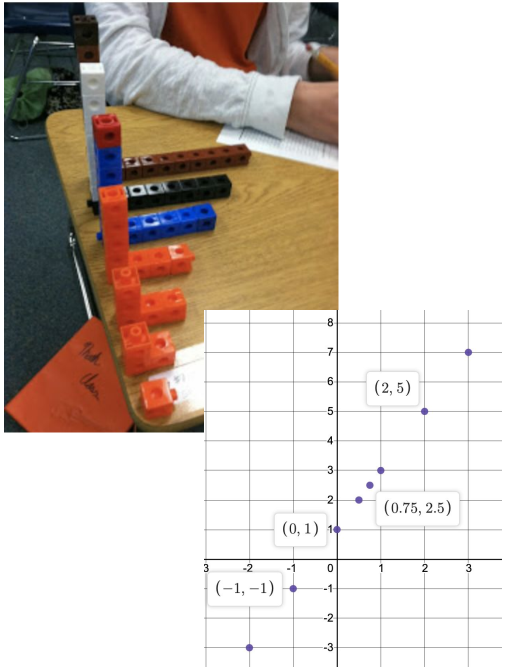
Expectation	**I can...**	**Evidence of Learning**
By the end of the course...		
C1.1	I can identify and compare a variety of repeating, growing, and shrinking patterns, including patterns found in real-life contexts	Journal Entry Proof Card
C1.1	I can compare linear growing and shrinking patterns on the basis of their constant rates and initial values	
C1.2	I can create and translate repeating, growing, and shrinking patterns involving rational numbers using various representations	Picture This
C1.2	I can create and translate repeating, growing, and shrinking patterns involving rational numbers using algebraic expressions and equations for linear growing and shrinking patterns	Annotated Notes
C1.3	I can determine pattern rules	I used to...but now I think
C1.3	I can use pattern rules to extend patterns, make and justify predictions, and identify missing elements in growing and shrinking patterns involving rational numbers	
C1.3	I can use algebraic representations of the pattern rules to solve for unknown values in linear growing and shrinking patterns	Picture This
C1.4	I can create and describe patterns to illustrate relationships among rational numbers	Proof card

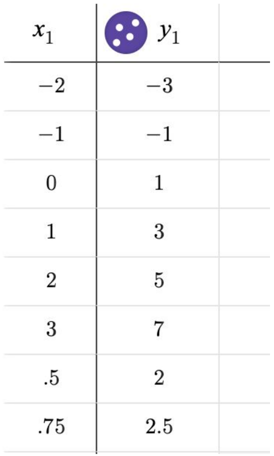
Picture This

\# →

Date:

I can….use algebraic representations of the pattern rules to solve for unknown values in linear growing and shrinking patterns





x_1	● y_1
−2	−3
−1	−1
0	1
1	3
2	5
3	7
.5	2
.75	2.5

There is more to this photo than you can see. This is photo of a pattern that grows in a positive, linear way that can be represented by

Number of blocks = 2(term number) + 1

I want you to notice that:

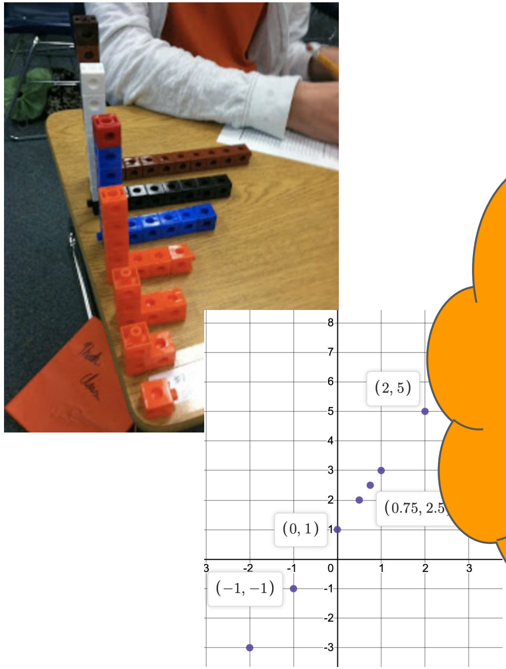
- **As the x value goes up by 1 each time, I see that the y value goes up by 2 each time for the integers.**
- **I don't have to build the 15th term to know that it will have 31 blocks.**
- **I can find the values for rationals → 0.5 and 0.75**

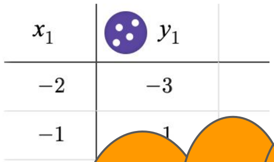
Picture This

→

Date:

I can….use algebraic representations of the pattern rules to solve for unknown values in linear growing and shrinking patterns





x_1	y_1
-2	-3
-1	1

This is very nice. Can you explain how to model the situation with 0.5 block or 0.75 blocks?

There is more to this photo than you can see. This is photo of a pattern that grows in a positive, linear way that can be represented by

umber of blocks = 2(term number) + 1

ant you to notice that:

As the x value goes up by 1 each time, I see that the y value goes up by 2 each time for the integers.

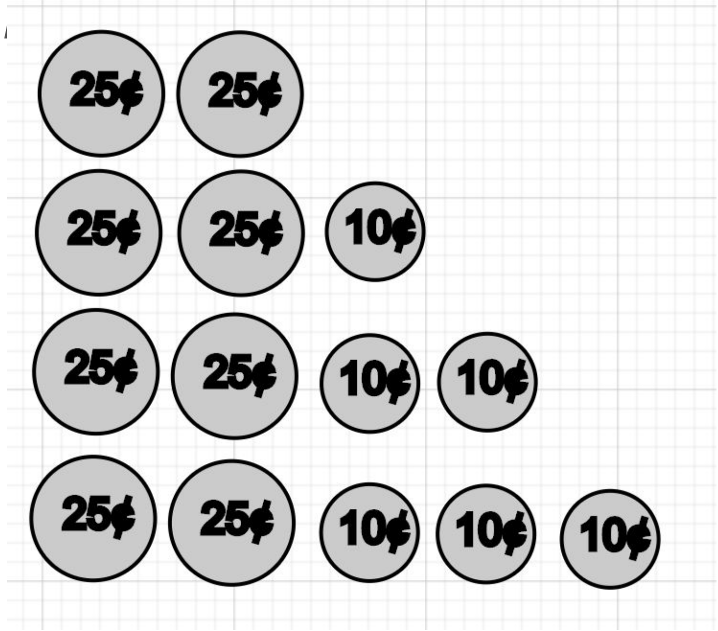
- **I don't have to build the 15th term to know hat it will have 31 blocks.**
- **I ca find the values for rationals → 0.5 and 0.75**

Picture This

→

Date:

I can use pattern rules to extend patterns, make and justify predictions, and identify missing elements in growing and shrinking patterns involving rational numbers



There is more to this photo than you can see. This is photo of a growing pattern involving rational numbers.

I want you to notice that:

- **The list could be re-written as**

$$\frac{1}{2,}\frac{1}{2}+\frac{1}{10},\ \frac{1}{2}+\frac{2}{10},\ \frac{1}{2}+\frac{3}{10},\dots$$

$$=\frac{5}{10},\frac{6}{10},\frac{7}{10},\frac{8}{10},\dots$$

- **The equation is 50cents plus 10cents times (1 less than the term number)**
- **The equation would be**

$$y=\frac{1}{10}x+\frac{4}{10}$$

- **The 10th sum of money I can find using**

$$\frac{1}{2}+\frac{9}{10}=\frac{5}{10}+\frac{9}{10}=\frac{14}{10}=1\frac{4}{10}\text{ or }y=\frac{1}{10}(10)+\frac{4}{10}=\frac{14}{10}=1\frac{4}{10}$$

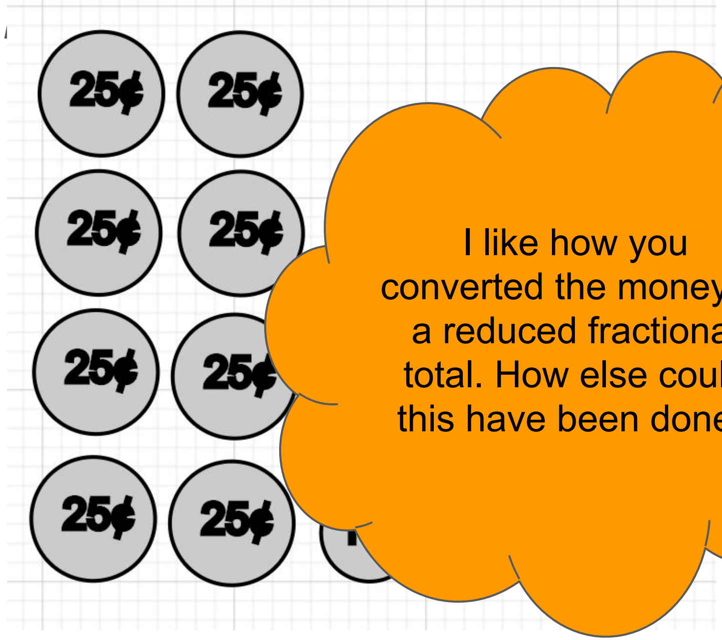
- **Which is $1.40**

Picture This

 # →

Date:

I can use pattern rules to extend patterns, make and justify predictions, and identify missing elements in growing and shrinking patterns involving rational numbers



I like how you converted the money to a reduced fractional total. How else could this have been done?

There is more to this photo than you can see. This is photo of a growing pattern involving rational numbers.

I want you to notice that:

- **The list could be re-written as**

$\frac{1}{2}$, 2 [illegible] $\frac{1}{10}$, $\frac{1}{2} + \frac{2}{10}$, $\frac{1}{2} + \frac{3}{10}, \ldots$

$$= \frac{5}{10}, \frac{6}{10}, \frac{7}{10}, \frac{8}{10}, \ldots$$

The equation is 50cents plus 10cents times (1 less than the term number)

- **The equation would be** $y = \frac{1}{10}x + \frac{4}{10}$
- **The 10th sum of money I can find using**

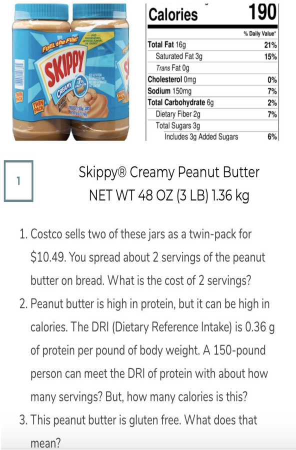
$$\frac{1}{2} + \frac{9}{10} = \frac{5}{10} + \frac{9}{10} = \frac{14}{10} = 1\frac{4}{10} \text{ or } y = \frac{1}{10}(10) + \frac{4}{10} = \frac{14}{10} = 1\frac{4}{10}$$

- **Which is $1.40**

Annotated Notes

I can create and translate repeating, growing, and shrinking patterns involving rational numbers using algebraic expressions and equations for linear growing and shrinking patterns

 # →
Date:



Calories	190
	% Daily Value*
Total Fat 16g	21%
Saturated Fat 3g	15%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 150mg	7%
Total Carbohydrate 6g	2%
Dietary Fiber 2g	7%
Total Sugars 3g	
Includes 3g Added Sugars	6%

1

Skippy® Creamy Peanut Butter
NET WT 48 OZ (3 LB) 1.36 kg

1. Costco sells two of these jars as a twin-pack for $10.49. You spread about 2 servings of the peanut butter on bread. What is the cost of 2 servings?
2. Peanut butter is high in protein, but it can be high in calories. The DRI (Dietary Reference Intake) is 0.36 g of protein per pound of body weight. A 150-pound person can meet the DRI of protein with about how many servings? But, how many calories is this?
3. This peanut butter is gluten free. What does that mean?

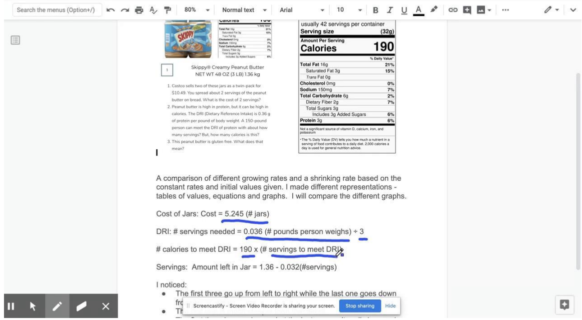
Nutrition Facts

usually 42 servings per container

Serving size	**(32g)**
Amount Per Serving	
Calories	**190**
	% Daily Value*
Total Fat 16g	21%
Saturated Fat 3g	15%
Trans Fat 0g	
Cholesterol 0mg	0%
Sodium 150mg	7%
Total Carbohydrate 6g	2%
Dietary Fiber 2g	7%
Total Sugars 3g	
Includes 3g Added Sugars	6%
Protein 3g	6%

Not a significant source of vitamin D, calcium, iron, and potassium

*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.



usually 42 servings per container
Serving size (32g)
Amount Per Serving
Calories 190

Skippy® Creamy Peanut Butter
NET WT 48 OZ (3 LB) 1.36 kg

A comparison of different growing rates and a shrinking rate based on the constant rates and initial values given. I made different representations - tables of values, equations and graphs. I will compare the different graphs.

Cost of Jars: Cost = 5.245 (# jars)

DRI: # servings needed = 0.036 (# pounds person weighs) ÷ 3

calories to meet DRI = 190 x (# servings to meet DRI)

Servings: Amount left in Jar = 1.36 - 0.032(#servings)

I noticed:
- The first three go up from left to right while the last one goes down

What will I see in the clip?

A comparison of different growing rates and a shrinking rate based on the constant rates and initial values given. I made different representations - tables of values, equations and graphs. I will compare the different graphs.

Cost of Jars: Cost = 5.245 (# jars)

DRI: # servings needed = 0.00036 (# pounds person weighs) ÷ 0.003

calories to meet DRI = 190 x (# servings to meet DRI)

Servings: Amount left in Jar = 1.36 - 0.032(#servings)

I noticed:

- The first three go up from left to right while the last one goes down from left to right
- The first one is much steeper than the others
- The first three keep going up, but the last one can't really keep going down (jar is empty eventually)

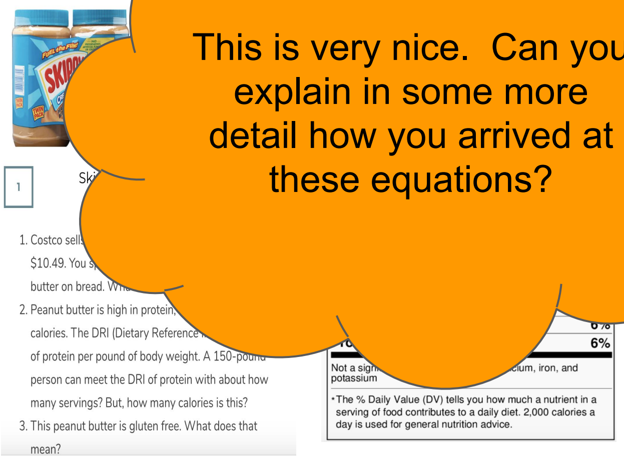
Annotat

I can create and translate repeating, growing, and shrinking
atterns involving rational numbers using algebraic expressions
equations for linear growing and shrinking patterns

 # →

Date:

This is very nice. Can you explain in some more detail how you arrived at these equations?



1 Sk

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	6%
	6%

Not a sign cium, iron, and potassium

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I see in the clip?

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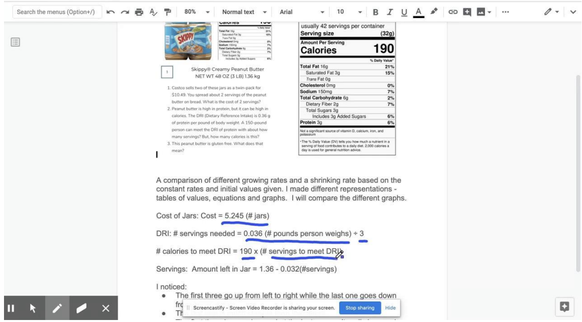

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I noticed:

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- Th

Screencastify - Screen Video Recorder is sharing your screen.

I can determine pattern rules

 # →
Date:

I used to think....

I used to think that when I was building the patterns it did not matter the blocks I was using, as long as the pattern was right. I sometimes found the pattern rules, but sometimes I did not. I just thought “oh well, I must have done something wrong.”

The one looks like y = 6x + 2 (which I now know is not right). I would have said this because the first one had 6 blocks and then each term after was 2 blocks more.

But now I think....

But then my friend showed me how using two colours made it easier to see.

This one is really y = 2x+4. I see the 4 in the yellow - it stays the same always. I see the 2 in the blue - as the pattern goes up by two blue blocks each time.

So I now look for the part that stays the same in each term and make it one colour. That becomes the part we add onto the end. I then look for the part that grows, and it multiplies the x in the equation

I can determine pattern rules

 # →
Date:

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The one looks like y is not right). I would have the first one had 6 blocks and then eac after was 2 blocks more.

This observation is very important. How did you decide that the yellow should be staying the same at 4? And the blue as the part that grows by 2?

But now I think....

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Learning Outcomes Journal Entry

→
Date:

I CAN Statement: I can identify and compare a variety of repeating, growing, and shrinking patterns, including patterns found in real-life contexts

This is evidence of identifying a growing patterns found in real-life contexts. This store was offering cash cards based on the amount purchased in gift cards.

I think this is good evidence of patterns in real life because the value of gift cards increases by $25 each time while the value of cash cards increases by $5. So both values are increasing in an adding way.

To learn and improve in this area I will find an example where two patterns can be compared. Maybe to find which of two similar items is a better buy.

I will know I have improved because by finding two patterns and comparing them, I will be able to see how they are the same, how they are different and to solve a problem with them.

Learning Outcomes Journal Entry

→
Date:

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b
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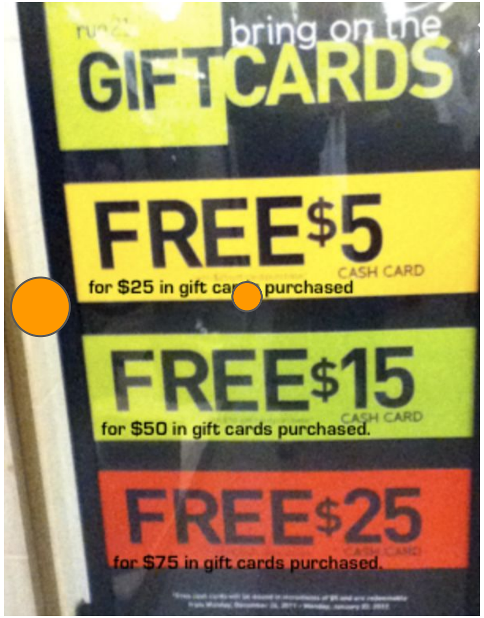
I think
e the value of gift cards
increa
ncreases by $5. So
b

To
ere two patterns can be
c
better buy.

I will kn
o patterns and comparing them,
I will be abl
ame, how they are different and to solve a
problem with them.

This is a good example. If you were the manager, what would you say to a customer who wants to get a cash card for spending $100?



Proof Card

I CAN Statement: I can identify and compare a variety of repeating, growing, and shrinking patterns, including patterns found in real-life contexts

→
Date:

My Favorite

This is my favourite piece of work because I like lemonade!

In Option A - the growing pattern is for every 1 pitcher you get 2 litres of lemonade. The pattern grows like this:

# pitchers	1	2	3	4	5
# litres of Lemonade	2	4	6	8	10

In Option B: the growing pattern is 4 boxes each with 250ml. I will convert to litres, so it is 4 boxes each with 0.250 l. That means each box has 0.250l. The pattern grows like this:

Would you rather have Option A or Option B?

OPTION A

A pitcher of 2 liters of lemonade

OPTION B

4 juice boxes with 250 mL of lemonade in each

# boxes	1	2	3	4	5	6	7	8
# litres	0.25	0.5	0.75	1	1.25	1.5	1.75	2

I would rather option A because when I have 1 pitcher, that would be like 8 boxes since both would have 2 litres of lemonade. That would be like having 8 friends over instead of 4 friends.

I can identify and compare a variety of repeating, growing, and shrinking patterns, including patterns found in real-life contexts

Proof Card

I CAN Statement: I can identify and compare a variety of repeating, growing, and shrinking patterns, including patterns found in real-life contexts

 # →
Date:

My Favorite

This is my favo[illegible] work because I like lemonade!

In Option A - th[illegible] you get 2 litres of lemonade. The pattern grows like this:

# pitchers	[illegible]	5
# litres	[illegible]	10

A nice extension of the problem to include why having more lemonade is meaningful to you!

In Option B[illegible]0ml. I will convert to litres, so it[illegible] each box has 0.250l. The pattern gro[illegible]

# boxes	1	2	[illegible]	4	5	6	7	8
# litres	0.25	0.5	0.75	1	[illegible]25	1.5	1.75	2

Would you rather have Option A or Option B?

OPTION A

A pitcher of 2 liters of lemonade

OPTION B

4 juice boxes with 250 mL of lemonade in each

I would rather option A because when I have 1 pitch[illegible], that would be like 8 boxes since both would have 2 litres of lemonade. That would be like having 8 friends over instead of 4 fr[illegible]nds.

Proof Card

I CAN Statement: I can create and describe patterns to illustrate relationships among rational numbers

 # →
Date:

Connections

I made mathematical connections.

I know this because when we worked with patterns, we looked at growth patterns that were not whole numbers. When we looked at compound and simple interest, we examined how the different forms of interest affected the growth rate. These patterns grew by multiplying and adding. We looked at this for for both debt reduction and saving scenarios.

	Retirement Savings Account Amount	**Interest Rate**	**Interest Earned**	**Year-End Account Balance**
Year 1	$1,000.00	5%	$50.00	$1,050.00
Year 2	$1,050.00	5%	$52.50	$1,102.50
Year 3	$1,102.50	5%	$55.12	$1,157.62
Year 4	$1,157.63	5%	$57.89	$1,215.51
Year 5	$1,215.51	5%	$60.77	$1,276.28
Year 6	$1,276.23	5%	$63.81	$1,340.10

Proof Card

I CAN Statement: I can create and describe patterns to illustrate relationships among rational numbers

 # →
Date:

Connections

I made mathematical connectio

I know this because when w
growth patterns that were no d at
compound and simp interest, w nt
forms of interest affected the growth rate. T atterns grew by
multiplying and adding. We looked at this for for both debt reduction
and saving scenarios.

Nice connection of growing patterns to the different types of interest calculations. In the real world, how long with the rates stay the same keeping the patterns growing in the same way?

	Retirement Savings Account Amount	Interest Rate	Interest Earned	Year-End Account Balance
Year 1	$1,000.00	5%	$50.00	$1,050.00
Year 2	$1,050.00	5%	$52.50	$1,102.50
Year 3	$1,102.50	5%	$55.12	$1,157.62
Year 4	$1,157.63	5%	$57.89	$1,215.51
Year 5	$1,215.51	5%	$60.77	$1,276.28
Year 6	$1,276.23	5%	$63.81	$1,340.10

End of Unit Reflection

Having student complete a reflection at the end of a unit gives them an opportunity to reflect on the bigger picture and plan for their next steps in learning. ***Some reflections questions may include:***

- What was your area of strength in this unit ?
- How did collaborating with others help in this unit ? What I learned from another student was ?
- What area do you need to continue working on?
- What are your next steps to move towards developing mastery of these skills?
- Something I need to be sure I look out for or remember are…. (e.g silly errors I always make, watch out for units)
- Tools/Manipulatives/ Strategies that I found supported my learning in this unit were...

Example

Evidence of Learning Portfolio for a Unit in Grade 12 Calculus

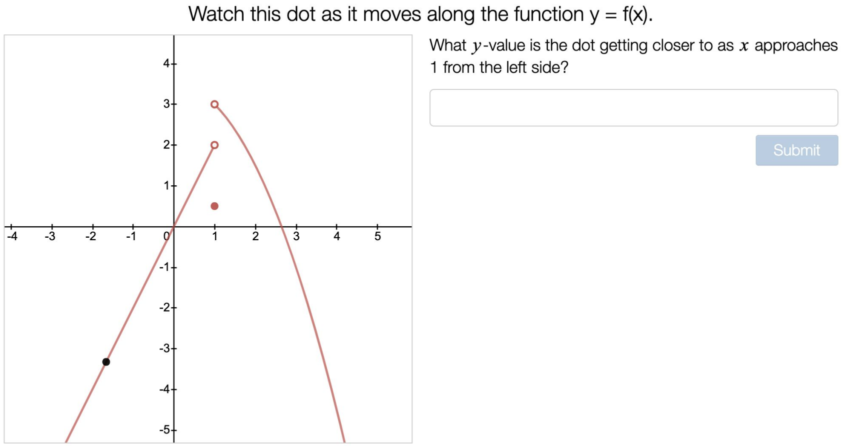
Back to Examples

Michael's
Evidence of Learning Portfolio
Grade 12

MCV4U Limits ***I can statements...***	**Evidence of Learning**
I can **recognize**, through investigation with or without technology, graphical and numerical examples of limits	1. Annotated Note
I can **explain the reasoning involved**, through investigation with or without technology, graphical and numerical examples of limits	2. Picture This
I can **make connections**, for a function that is smooth over the interval a ≤ x ≤ a + h, between the **instantaneous rate of change** of the function at x = a and the value of $\lim_{h \to 0} \frac{f(a+h)-f(a)}{h}$	3. Proof Card
I can **compare**, through investigation, the calculation of instantaneous rates of change at a point (a, f(a)) for polynomial functions [e.g., f(x) = x^2 , f(x) = x^3], with and without simplifying the expression $\frac{f(a+h)-f(a)}{(a+h)-a}$ before substituting values of h that approach zero	
I can **take** the limit of a simplified expression as h approaches zero [i.e., determining $\lim_{h \to 0} \frac{f(a+h)-f(a)}{h}$]	4. I used to think, but now I think...
I can **determine** the derivatives of polynomial functions by simplifying the algebraic expression $\frac{f(a+h)-f(a)}{(a+h)-a}$	5. Journal
I can **verify** the constant, constant multiple, sum, and difference rules **numerically**	5. Journal
I can **read and interpret** proofs involving $\lim_{h \to 0} \frac{f(a+h)-f(a)}{h}$ of the constant, constant multiple, sum, and difference rules	

1. May 6, 2020

Annotated Note: Limits and Continuity - Graphs



Watch this dot as it moves along the function y = f(x).

What y-value is the dot getting closer to as x approaches 1 from the left side?

Success Criteria:

I can **explain the reasoning involved**, through investigation with or without technology, graphical and numerical examples of limits

I chose this example and used desmos as I could explain various situations

Annotated note made using the following:

Screencastify - Screen Video Recorder

Offered by: https://www.screencastify.com

desmos

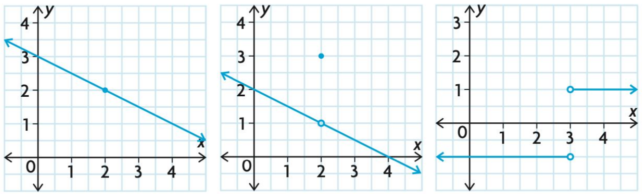
2. May 10, 2020

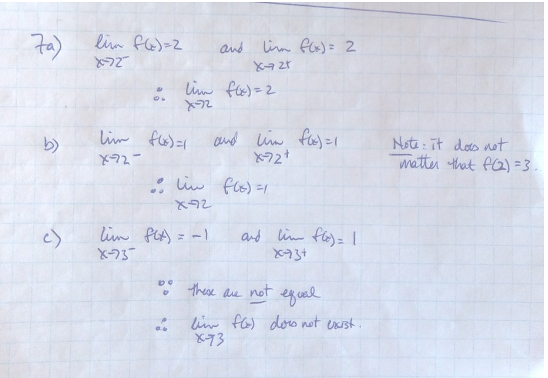
Picture This

I can….**explain the reasoning involved**, through investigation with or without technology, graphical and numerical examples of limits

7. Use the graph to find the limit, if it exists.

a. $\lim_{x\to2} f(x)$ b. $\lim_{x\to2} f(x)$ c. $\lim_{x\to3} f(x)$





7a) $\lim_{x\to2^-} f(x)=2$ and $\lim_{x\to2^+} f(x)=2$

$\therefore \lim_{x\to2} f(x)=2$

b) $\lim_{x\to2^-} f(x)=1$ and $\lim_{x\to2^+} f(x)=1$ Note: it does not matter that $f(2)=3$.

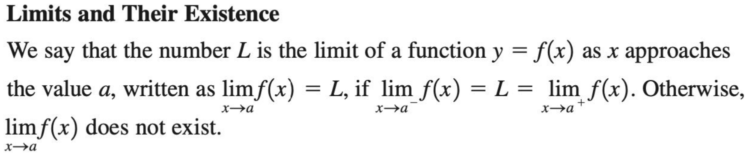
$\therefore \lim_{x\to2} f(x)=1$

c) $\lim_{x\to3^-} f(x)=-1$ and $\lim_{x\to3^+} f(x)=1$

$\because$ these are not equal

$\therefore \lim_{x\to3} f(x)$ does not exist.

There is more to this photo than you can see. This is photo illustrating the following principle:



Limits and Their Existence

We say that the number L is the limit of a function $y = f(x)$ as x approaches the value a, written as $\lim_{x\to a} f(x) = L$, if $\lim_{x\to a^-} f(x) = L = \lim_{x\to a^+} f(x)$. Otherwise, $\lim_{x\to a} f(x)$ does not exist.

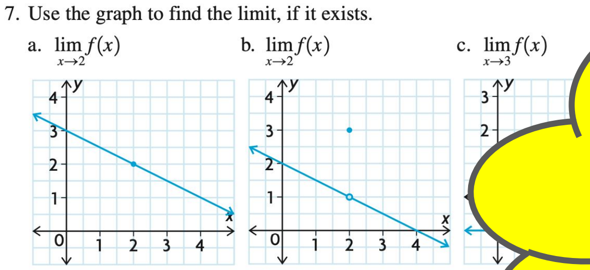
I want you to notice that:

- **That I compare left and right hand limits**
- **I understand *L* to be the value the limit approaches and not the value of the function at the value *a***
- **I understand '→' to mean approaching *a* but not at *a***

2. May 10, 2020

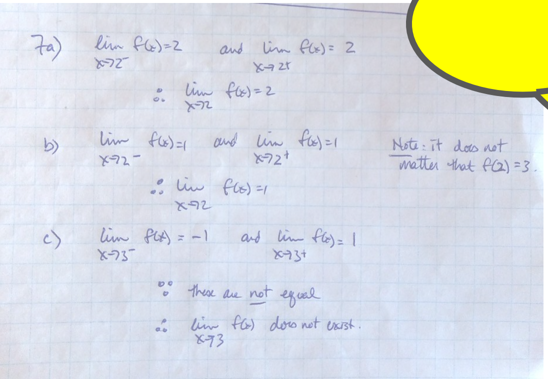
Picture This

I can….**explain the reasoning involved**, through investigation with or without technology, graphical and numerical examples of limits



7. Use the graph to find the limit, if it exists.

a. $\lim_{x \to 2} f(x)$ b. $\lim_{x \to 2} f(x)$ c. $\lim_{x \to 3} f(x)$



7a) $\lim_{x \to 2^-} f(x) = 2$ and $\lim_{x \to 2^+} f(x) = 2$

$\therefore \lim_{x \to 2} f(x) = 2$

b) $\lim_{x \to 2^-} f(x) = 1$ and $\lim_{x \to 2^+} f(x) = 1$

Note: it does not matter that $f(2) = 3$.

$\therefore \lim_{x \to 2} f(x) = 1$

c) $\lim_{x \to 3^-} f(x) = -1$ and $\lim_{x \to 3^+} f(x) = 1$

$\because$ these are not equal

$\therefore \lim_{x \to 3} f(x)$ does not exist.

Nice explanation for the graphs using algebra. What might a numerical example look like to show your understanding?

n you can

llowing

roaches

Otherwise,

tice that:

- **That I compare left and right hand limits**
- **I understand *L* to be the value the limit approaches and not the value of the function at the value *a***
- **I understand '→' to mean <u>approaching</u> *a* but not <u>at</u> *a***

Proof Card

I can **make connections**, for a function that is smooth over the interval a ≤ x ≤ a + h, between the **instantaneous rate of change** of the function at x = a and the value of $\lim_{h\to0}\frac{f(a+h)-f(a)}{h}$

3. Date: May 18/20

Connections

I made mathematical connections between the instantaneous rate of change and the value of $\lim_{h\to0}\frac{f(a+h)-f(a)}{h}$. I know this because for a function that is smooth over the interval a ≤ x ≤ a + h:

(1) The IROC is found by take the slope between the point x = a and x = a + h, where h is moved ever so close a but not equal to a. This looks like $\frac{f(a+h)-f(a)}{(a+h)-a}$

(2) In $\lim_{h\to0}\frac{f(a+h)-f(a)}{h}$, we see a different form of the same IROC formula. The numerators are exactly the same. The denominator is just simplified as (a+h)-a = h. The lim h→ 0 is a shorthand way of saying “h is moved ever so close to a”. For the IROC formula, I would use a table of values and choose values of h getting closer to a. In the limit expression, we do the same thing algebraically.

Proof Card

I can **make connections**, for a function that is smooth over the interval a ≤ x ≤ a + h, between the **instantaneous rate of change** of the function at x = a and the value of $\lim_{h\to 0}\frac{f(a+h)-f(a)}{h}$

3. Date: May 18/20

Connections

I made mathematical connecti … and

the value of $\lim_{h\to 0}\frac{f(a+h)-f(a}{h}$ … ver

the interval a ≤ x ≤ a +

(1) The IROC is found b … ed

ever so close a but no

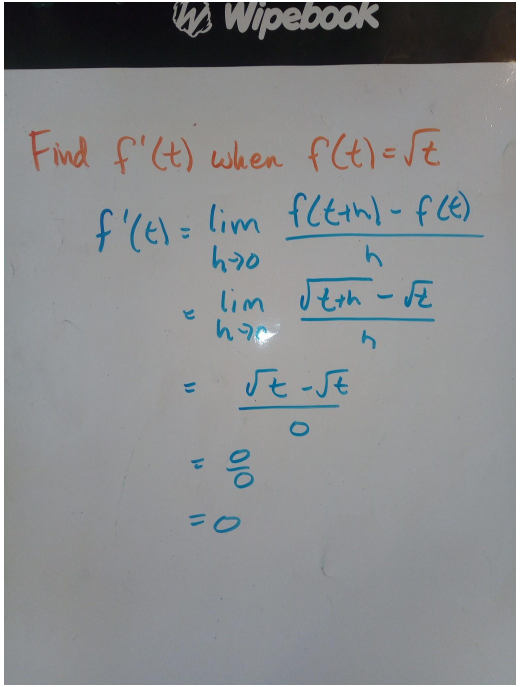
Nice explanation. I am wondering what “ever so close to a” might look like on a table of values? How did that idea look in Advanced Functions?

(2) In $\lim_{h\to 0}\frac{f(a+h)-f(a)}{h}$, we see a different lo … of th … ormula. The numerators are exactly the same. The denominator is ju … nplified as (a+h)-a = h. The lim h→ 0 is a shorthand way of saying “h is moved ever so close to a”. For the IROC formula, I would use a table of values and choose values of h getting closer to a. In the limit expression, we do the same thing algebraically.

1. **May 13, 2020**

I CAN Statement: I can **take** the limit of a simplified expression as h approaches zero

I used to think….



Wipebook

Find $f'(t)$ when $f(t)=\sqrt{t}$

$$f'(t) = \lim_{h \to 0} \frac{f(t+h) - f(t)}{h}$$

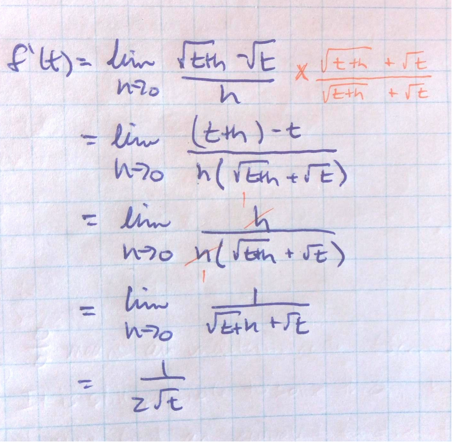
$$= \lim_{h \to 0} \frac{\sqrt{t+h} - \sqrt{t}}{h}$$

$$= \frac{\sqrt{t} - \sqrt{t}}{0}$$

$$= \frac{0}{0}$$

$$= 0$$

But now I think….



$$f'(t) = \lim_{h \to 0} \frac{\sqrt{t+h}\ \sqrt{t}}{h} \times \frac{\sqrt{t+h} + \sqrt{t}}{\sqrt{t+h} + \sqrt{t}}$$

$$= \lim_{h \to 0} \frac{(t+h) - t}{h(\sqrt{t+h} + \sqrt{t})}$$

$$= \lim_{h \to 0} \frac{\overset{1}{\cancel{h}}}{\underset{1}{\cancel{h}}(\sqrt{t+h} + \sqrt{t})}$$

$$= \lim_{h \to 0} \frac{1}{\sqrt{t+h} + \sqrt{t}}$$

$$= \frac{1}{2\sqrt{t}}$$

0/0 is called the indeterminate form. It is possible to solve the limit, but I need to make a simplified form of the function by reducing, factoring, rationalizing or dividing out the factor that causes the 0/0.

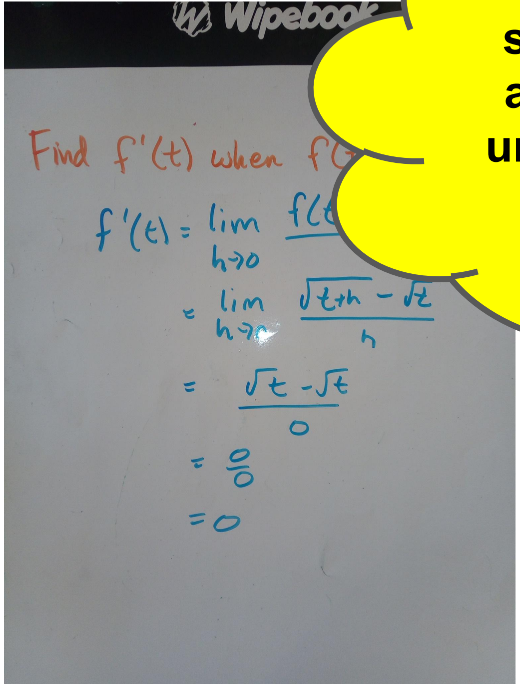
1. May 13, 2020

I CAN Statement: I can **take** the limit of a simplified expression as h approaches zero

I used to think….

nk….

You have shown how to simplify a limit of a rational and demonstrated that you understand what 0/0 tells us. This is important!



Wipebook

Find f'(t) when f(

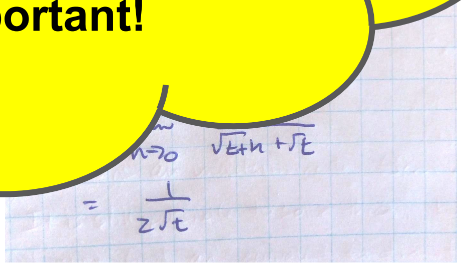
$f'(t) = \lim_{h\to 0} f(t$

$= \lim_{h\to 0} \frac{\sqrt{t+h} - \sqrt{t}}{h}$

$= \frac{\sqrt{t} - \sqrt{t}}{0}$

$= \frac{0}{0}$

$= 0$



$h\to 0$ $\sqrt{t+h} + \sqrt{t}$

$= \frac{1}{2\sqrt{t}}$

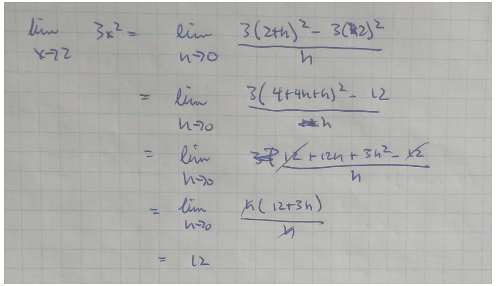
0/0 is called the indeterminate form. It is possible to solve the limit, but I need to make a simplified form of the function by reducing, factoring, rationalizing or dividing out the factor that causes the 0/0.

5. May 16, 2020

Learning Outcomes Journal Entry

I CAN Statement: I can **verify** the constant, constant multiple, sum, and difference rules **numerically**

I think this is good evidence because I have used the first principles of the limit property in two ways on the same function. Using the value of x → 2 allows me to find the numerical value of the limit. And it worked!



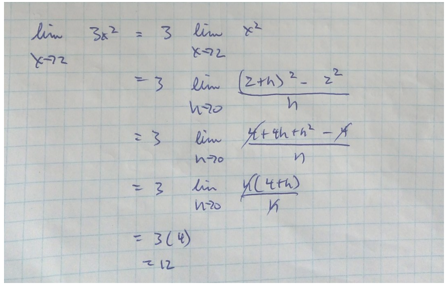
$$\lim_{x\to 2} 3x^2 = \lim_{h\to 0} \frac{3(2+h)^2 - 3(2)^2}{h}$$

$$= \lim_{h\to 0} \frac{3(4+4h+h)^2 - 12}{h}$$

$$= \lim_{h\to 0} \frac{\cancel{12}+12h+3h^2-\cancel{12}}{h}$$

$$= \lim_{h\to 0} \frac{\cancel{h}(12+3h)}{\cancel{h}}$$

$$= 12$$



$$\lim_{x\to 2} 3x^2 = 3\lim_{x\to 2} x^2$$

$$= 3\lim_{h\to 0} \frac{(2+h)^2 - 2^2}{h}$$

$$= 3\lim_{h\to 0} \frac{\cancel{4}+4h+h^2-\cancel{4}}{h}$$

$$= 3\lim_{h\to 0} \frac{\cancel{h}(4+h)}{\cancel{h}}$$

$$= 3(4)$$

$$= 12$$

To learn and improve in this area I will have to watch the notation, set up the difference quotient properly, and watch that I don't make trivial algebraic mistakes (which I often do). I need to think about factoring out the coefficient to make the whole process simpler to work with. I also need to keep reminding myself of what this all means. I know that we are trying to find the instantaneous rate of change at the point x = 2 and that this is also the slope of the tangent line.

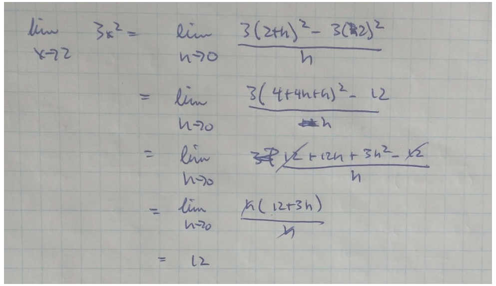
I will know I have improved because being able to efficiently and accurately solve these types of problems should not take a long time. Also, when I can recognize when the question is asking for IROC, slope of tangent or equation of the tangent line, I can use this property which simplifies the work I need to do.

5. May 16, 2020

Learning Outcomes Journal Entry

I CAN Statement: I can **verify** the constant, constant multiple, sum, and difference rules **numerically**

I think this is good evidence because I have used the first p the same function. Using the value of x → 2 allows me to find the numerical value of



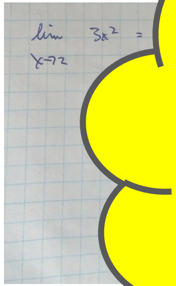
$$\lim_{x\to 2} 3x^2 = \lim_{h\to 0} \frac{3(2+h)^2 - 3(2)^2}{h}$$

$$= \lim_{h\to 0} \frac{3(4+4h+h)^2 - 12}{h}$$

$$= \lim_{h\to 0} \frac{\cancel{12} + 12h + 3h^2 - \cancel{12}}{h}$$

$$= \lim_{h\to 0} \frac{\cancel{h}(12+3h)}{\cancel{h}}$$

$$= 12$$



$$\lim_{x\to 2} 3x^2 =$$

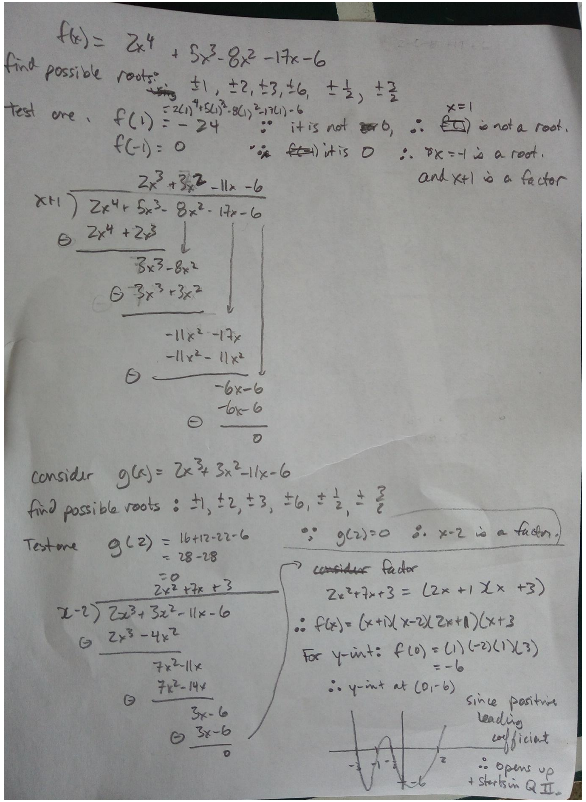
Great that you have shown your work in two ways. But which rule have you demonstrated?

To learn and improve in this area I will have to watch the perly, and watch that I don't make trivial algebraic mistakes (which I often do). I need to think ab ient to make the whole process simpler to work with. I also need to keep reminding myself of what this all means w that we are trying to find the instantaneous rate of change at the point x = 2 and that this is also the slope of the tangent line.

I will know I have improved because being able to efficiently and accurately solve these types of problems should not take a long time. Also, when I can recognize when the question is asking for IROC, slope of tangent or equation of the tangent line, I can use this property which simplifies the work I need to do.

#. Date

Annotated Note: Sketch a Polynomial (MHF4U example)



$f(x) = 2x^4 + 5x^3 - 8x^2 - 17x - 6$

find possible roots: ~~using~~ $\pm 1, \pm 2, \pm 3, \pm 6, \pm \frac{1}{2}, \pm \frac{3}{2}$

test one. $f(1) = 2(1)^4 + 5(1)^3 - 8(1)^2 - 17(1) - 6 = -24$ ∵ it is not ~~zero~~ 0, ∴ ~~f(1)~~ $x=1$ is not a root.

$f(-1) = 0$ ∵ ~~f(-1)~~ it is 0 ∴ $x = -1$ is a root. and $x+1$ is a factor

$$\begin{array}{r} 2x^3 + 3x^2 - 11x - 6 \\ x+1 \overline{) 2x^4 + 5x^3 - 8x^2 - 17x - 6} \\ \ominus \underline{2x^4 + 2x^3} \\ 3x^3 - 8x^2 \\ \ominus \underline{3x^3 + 3x^2} \\ -11x^2 - 17x \\ \ominus \underline{-11x^2 - 11x^2} \\ -6x - 6 \\ \ominus \underline{-6x - 6} \\ 0 \end{array}$$

consider $g(x) = 2x^3 + 3x^2 - 11x - 6$

find possible roots: $\pm 1, \pm 2, \pm 3, \pm 6, \pm \frac{1}{2}, \pm \frac{3}{2}$

Test one $g(2) = 16 + 12 - 22 - 6 = 28 - 28 = 0$ ∵ $g(2) = 0$ ∴ $x - 2$ is a factor.

$$\begin{array}{r} 2x^2 + 7x + 3 \\ x-2 \overline{) 2x^3 + 3x^2 - 11x - 6} \\ \ominus \underline{2x^3 - 4x^2} \\ 7x^2 - 11x \\ \ominus \underline{7x^2 - 14x} \\ 3x - 6 \\ \ominus \underline{3x - 6} \\ 0 \end{array}$$

~~consider~~ factor

$2x^2 + 7x + 3 = (2x + 1)(x + 3)$

∴ $f(x) = (x+1)(x-2)(2x+1)(x+3$

For y-int: $f(0) = (1)(-2)(1)(3) = -6$

∴ y-int at $(0, -6)$

since positive leading coefficient ∴ opens up + starts in Q II.

Success Criteria:

I can **describe** key features of the graphs of polynomial functions

I can **make connections, through investigation,** using graphing technology, between a polynomial function given in factored form and the x-intercepts of its graph

I can **sketch** the graph of a polynomial function given in factored form using its key features

I selected this problem because in going through the process to sketch a polynomial, I discuss all of the above I can statement ideas.

Annotated note made using the Google Suite extensions:

Screencastify - Screen Video Recorder

Offered by: https://www.screencastify.com

Web Paint

Offered by: Top_Ext

End of Unit Reflection

Having student complete a reflection at the end of a unit also gives then opportunity to reflect on the bigger picture and plan for their next steps in learning. ***Some reflections questions may include:***

- What was your area of strength in this unit ?
- How did collaborating with others help in this unit ? What I learned from another student was ?
- What area do you need to continue working on?
- What are your next steps to move towards developing mastery of these skills?
- Something I need to be sure I look out for or remember are…. (e.g silly errors I always make, watch out for units)
- Tools/Manipulatives/ Strategies that I found supported my learning in this unit were...

Proof Card - Unit Reflection

Connections I made mathematical connections. I know this because	**Problem Solver** This piece shows I am a ____ problem solver because….	**Working Towards Outcome in Math** This evidence of learning shows I am working towards the learning expectation for this grade level because….
Working with Others This piece shows I can work with others to solve problems. I know this because	**My best Math response** This is my best math response. You can see it is because	**My Favorite** This is my favourite piece of work because
Improvement This piece of work shows my improvement because	**My Best Problem of the Week** This piece shows I am a ____ problem solver because	**Trash It** One reason this evidence should be trashed is If I did it over again I would

Key Ideas to Remember

- Evidence should reflect learning over time, not just a one off of only the best work
- Encourage documentation of making mistakes and reflecting upon on them to show growth to develop mastery
- Students can continue to include documentation of all learning until the grade/course is completed
- Encourage student to document conversations, observations, and products
- Provide feedback to students along the way (add comments in the slide deck)
  - This reminds me of the _____ problem we solved the other day
  - Take a look at _____ 's strategy/work/anchor chart
  - This would be a key idea to include in your meaningful notes!

Master Portfolio Templates

“I can…”s Grade 9-12

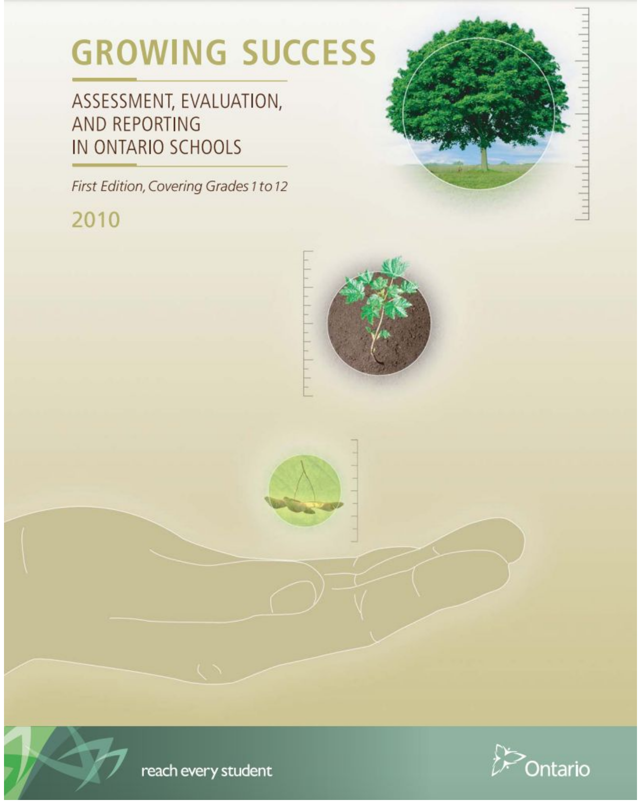
Portfolio Templates and “ I can…” statements for Grades 9-12 can be found linked in the title above

Please feel free to use them with your students and to adjust them to meet your needs.

Back to Examples

Secondary “I can …” Statements

Grade 9		
Gr 9 -Applied		Gr 9 -Academic
Grade 10		
Gr 10 -Applied		Gr 10 -Academic
Grade 11		
MBF3C		MCF3M
MCR3U		MEL3E
Grade 12		
MCV4U	MHF4U	MDM4U
MAP4C	MCT4C	MEL4E



GROWING SUCCESS

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The primary purpose of assessment and evaluation is to improve student learning.

High Impact Instructional Practices in Mathematics

This resource focuses on practices that researchers have consistently shown to have a high impact on teaching and learning mathematics;

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- Direct Instruction
- Problem-Solving Tasks and Experiences
- Teaching about Problem Solving
- Tools and Representations
- Math Conversations
- Small-Group Instruction
- Deliberate Practice
- Flexible Groupings


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High-Impact
Instructional Practices
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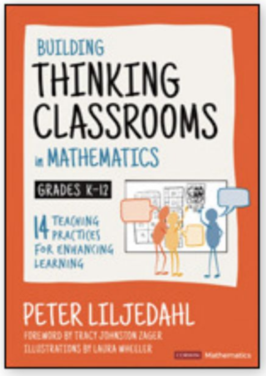

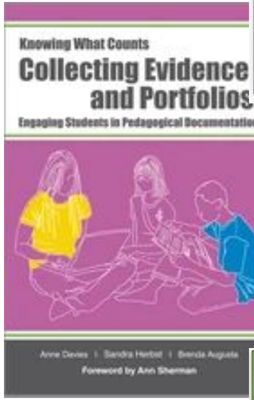

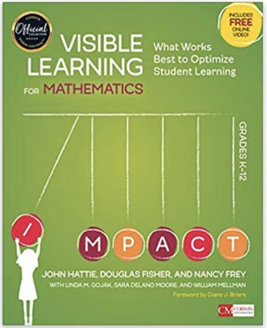


Questions
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Answers
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