

*Connecting Mathematics to Current
Events and Daily Life Using
Newspaper Articles and TI Technology*

Ron Lancaster

Associate Professor, Teaching Stream
Ontario Institute for Studies in Education
of the University of Toronto

ron.lancaster@utoronto.ca

ron2718@nas.net

Connecting Mathematics to Current Events and Daily Life Using Newspaper Articles and TI Technology

Ron Lancaster

Associate Professor, Teaching Stream

Ontario Institute for Studies in Education of the University of Toronto

ron.lancaster@utoronto.ca

ron2718@nas.net

$e = 2.718...$

email address

Ronnie







DIRECT FIRE COFFEE
SINGLE ORIGIN H C
POUR OVER 55 55
COLD BREW 50
ESPRESSO BASED

OTHERS H C
CHAI LATTE 38 42
CHOCOLATE 38 42
MATCHA 40 42
FRESH 38
IK 42
ARK 38
A 2
SAM

ZEROONE
COFFEE & ROASTERY

ESPRESSO BASED

	HOT	COLD
ESPRESSO	30	-
AMERICANO	32	36
MACCHIATO	34	-
PICCOLO	34	-
LATTE	38	42
CAPPUCCINO	38	-
FLAT WHITE	38	-
MOCHA	40	45

OAT MILK +3

EXTRA SHOT +4

OTHERS

	HOT	COLD
CHOCOLATE	38	42
CHAI LATTE	38	42



Media Clips, The Mathematics Teacher, NCTM

September 1994 – May 2017



Media Clips

Edited by Ron Lancaster, St. Mildred's-Lightbourne School, Oakville, ON L6J 2L1
Charlie Marion, Lakeland High School, Shrub Oak, NY 10588

In the NCTM's *Curriculum and Evaluation Standards for School Mathematics* (1989, 140–41), Standard 2 for grades 9–12 includes the following information:

[A]ll students need extensive experience listening to, reading about, writing about, speaking about, reflecting on, and demonstrating mathematical ideas. . . . Providing opportunities for discussions about issues, people, and the cultural implications of mathematics reinforces student understanding of the connection between mathematics and our society. . . . Assignments that require students to read mathematics and respond both orally and in writing to questions based on their reading should be an integral part of the 9–12 mathematics program.

Material for the experiences suggested by Standard 2 can be found in many places. One of the most current, readily available, and abundant sources is the print media of the United States and

Canada. “Media Clips” will be a monthly department devoted to articles about, and references to, mathematics that teachers have found and used in their classrooms in various ways to implement Standard 2. Even cartoons will find their way into this department, some just for a smile and others to illustrate a genuine mathematics problem.

We welcome and encourage submissions to this department, which will comprise resources that teachers can use immediately or file away for future use. The assignments generated by these entries may range from starters for an entire class to full-blown projects that are optional. Each lesson, though, should help convince our students that mathematics is useful, current, and newsworthy. Please send submissions to Media Clips, *Mathematics Teacher*, 1906 Association Drive, Reston, VA 22091-1593.

Reasons for using a newspaper in a mathematics classroom include ...

Relevancy

Critical reading

Citizenship

Relevancy

To engage students, focus on relevancy rather than computations.

By David Wees, Edutopia, August 15, 2011

The objective of good math teaching should not be to "cover the curriculum" but to show students how to explore our fascinating and beautiful world through the lens of mathematics. We must change our focus in math education from a focus on a largely irrelevant and uninteresting set of learning objectives to a focus on making math relevant and engaging for students.

Critical reading

Critical reading is a form of language analysis that does not take the given text at face value, but involves a deeper examination of the claims put forth as well as the supporting points and possible counterarguments.

https://en.wikipedia.org/wiki/Critical_reading

To read critically, you must think critically. This involves analysis, interpretation, and evaluation. Each of these processes helps you to interact with the text in different ways: highlighting important points and examples, taking notes, testing answers to your questions, brainstorming, outlining, describing aspects of the text or argument, reflecting on your own reading and thinking, raising objections to the ideas or evidence presented, etc.

Jennifer Duncan. The Writing Centre, University of Toronto Scarborough. Modified by Michael O'Connor

Citizenship

A healthy and vibrant democracy is based on an active and engaged citizenry, where all citizens are ready, willing and able to participate. Engagement includes staying informed, debating issues, engaging with politicians and participating in the voting process.

<http://civix.ca/resources/secondary-lesson-12/>

When I was in Hong Kong in July, 2019, there was a protest at the airport in the arrivals area of the airport on the day when I left. Here is what things looked like from the departures area.





Thousands of protesters calling for 'Free Hong Kong' **converge** on airport.

The Globe and Mail, July 26, 2019

Original version said the protestors **stormed** the airport.

"Organizers said some 15,000 people took part in the protest over 11 hours, while police put the figure at 4,000 at its peak."

<https://www.theglobeandmail.com/world/us-politics/article-protesters-calling-for-free-hong-kong-converge-on-airport/>

How would you estimate the number of people in a crowd?
Who would want to know this estimate and why would it be important to them?

Time out for a field trip

Let's visit the large fountain between the four Commerce Court buildings in downtown Toronto where my students have estimated the size of a crowd since the mid-1990s on a Math Trail.





Suppose that a concert is to be held in this courtyard and that you are in charge of determining how many people could stand comfortably within this area.

Decide by estimating, which of the following numbers is closest to the number of people who could gather in this area for the concert.

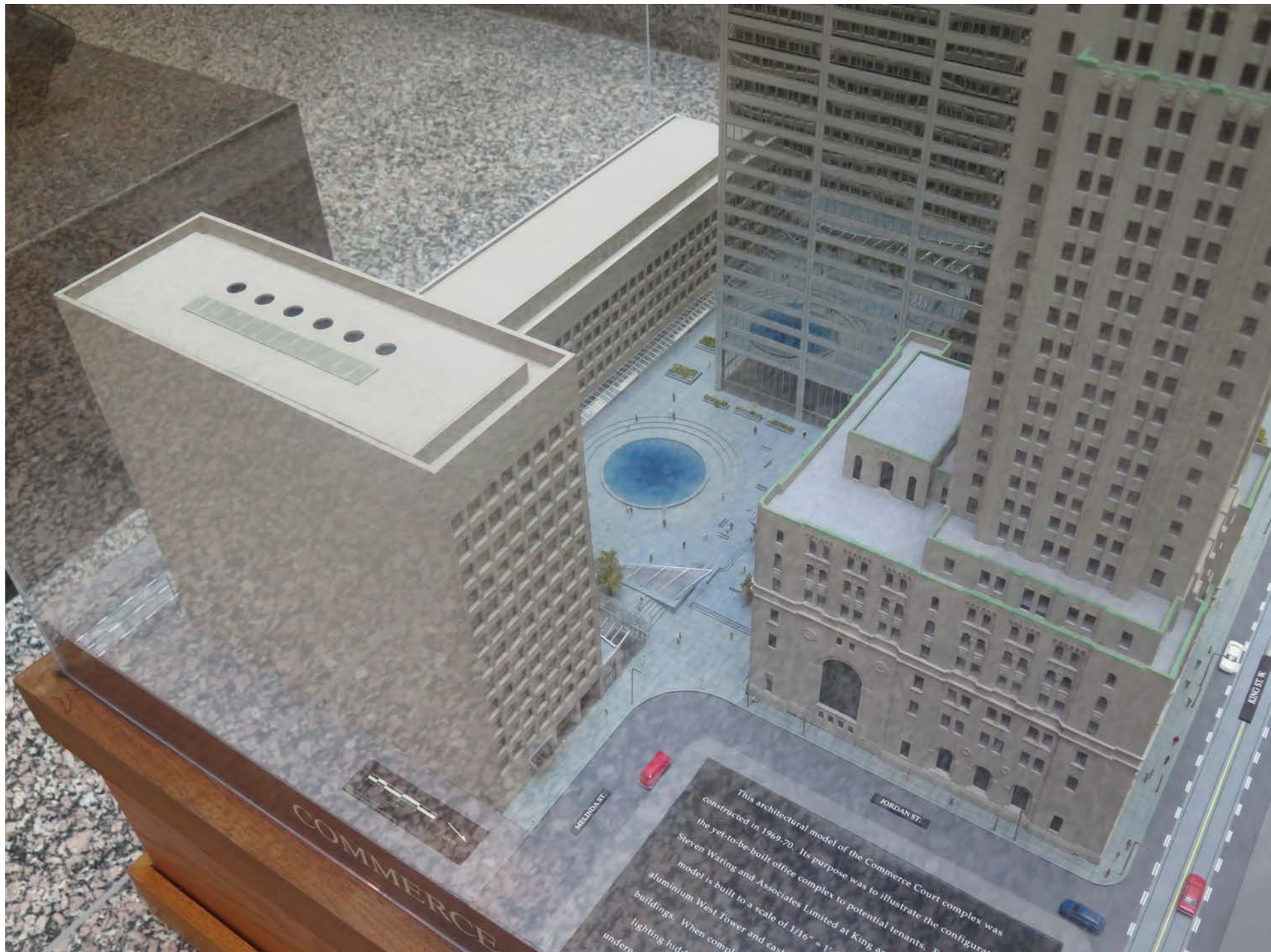
1,000 people

2,000 people

3,000 people

4,000 people

Develop an action plan for determining an accurate estimate of the number of people who could stand in this area



COMMERCE

MELINDA ST.

JORDAN ST.

KING ST. W.

This architectural model of the Commerce Court complex was constructed in 1969-70. Its purpose was to illustrate the configuration of the yet-to-be-built office complex to potential tenants. The model is built to a scale of 1/16" = 1'-0". The model is made of aluminum West Tower and East Tower buildings. When completed, the buildings will have a lighting hidden under the



Connecting Mathematics to Current Events and Daily Life Using Newspaper Articles and TI Technology Example 1

New city rules specify how big the numbers on your house must be

The Globe and Mail, February 12, 2005

As she trudged the aisles of Home Depot this week, Maihyet Burton had the harried look that comes with running a business and owning a home in downtown Toronto. Like a juggler with several flaming torches, a few balls and perhaps a chainsaw in the air all at the same time, Ms. Burton had a lot of things to think about.

And now, she learned, she had one more: The size of the numbers on her house and her clothing store. Unbeknownst to Ms. Burton, and almost everyone else in Toronto, the city has written new rules that specify how large the numbers on a home or business must be.

Ms. Burton, who had just purchased a new five, a four and a one to place on the front of her store -- Lilith Design, at 541 Queen St. W. -- sagged when she learned that she may have bought non-regulation digits.

"They have rules about that?" Ms. Burton said. "What next? How big do they have to be?"

The answer: It depends. If your house is 60 metres from the curb, for example, the new rules require numbers at least 80 centimetres high. If it's closer to the street, they may be as small as 10 centimetres.

Although they may strike some as a nitpicking exercise dreamed up by a regulation-happy bureaucrat with nothing better to do, the new rules are inspired by a serious concern -- many house and business numbers are virtually invisible to police, fire and ambulance workers.





AMERICAN GREETINGS
...says it best®



© AGC, Inc.
MADE IN U.S.A.



Municipal Addressing and Display

Toronto Municipal Code, Chapter 598, *Numbering of Properties* designates a minimum number size for the posting of addresses on properties based upon the setback of the posted address from the curb.

Number sizes are based on the setback of the posted address from the curb or edge of the roadway where no curb exists. [Where a sign or post displays an address](#) for a property that is closer to the road than the building, required number sizes can be calculated based on the setback of the sign/post from the curb, and not the building.

The following tables summarize the minimum number size requirements for residential properties and commercial, industrial, and multi-unit residential properties. Chapter 598 states setback and number size in metres, however, imperial conversions have been provided in the tables for your convenience.

Single Family Residential Properties:

Maximum setback from curb		Minimum number size	
Metres	Yards (approx.)	Centimetres	Inches (approx.)
15	16	10	4
22.5	24	15	6
30	32	20	8
45	49	30	12
60	65	40	16

Let x represent the **maximum setback** from the curb and let y represent the **minimum number size** for single family residential properties. Find a mathematical model for y in terms of x .

Let x represent the **maximum setback** from the curb and let y represent the **minimum number size** for single family residential properties. Find a mathematical model for y in terms of x .

Use your equation to calculate the minimum number size if the maximum setback from the curb is 100 metres.

Time out for a puzzle

My house is on a road where the numbers run 1, 2, 3, 4, ... consecutively. By a curious coincidence, the sum of all house numbers less than mine is the same as the sum of all house numbers greater than mine. What is my number and how many houses are there on my road if my house number is in the thirties?

Connecting Mathematics to Current Events and Daily Life Using Newspaper Articles and TI Technology Example 2

Good morning, class. Time to put on your thinking caps for the Middle Kingdom math test.

CAN you solve the following problem?

There are 200 fish in an aquarium, and 99 per cent of them are guppies.

How many guppies must be removed to reduce the tank's guppy population to 98 per cent?

Rich Reifsnyder knows the correct answer; it made him the new junior-high mathematics champion of the United States.

The 14-year-old Grade 8 student from Louisville, Ky. Rich, outlasted 227 other Grade 7 and 8 contestants in last week's final round of the Mathcounts contest. They were all who remained in the running from 300,000 participants in 50 states, the District of Columbia, Puerto Rico, Guam, U.S. Virgin Islands, Northern Mariana Islands and

schools operated overseas by the U.S. Defence and State departments.

The victor doesn't exactly come from a long line of mathematicians. Both his parents (father Robert Reifsnyder is president of the United Way in Louisville) majored in English at Princeton University.

However, according to a story on the Scripps Howard News Service, he wants to become an aerospace engineer, which is fitting. The contest is sponsored by the National Society of Professional Engineers, as well as CNA Insurance Companies, General Motors Foundation,

Intel Foundation, Texas Instruments Inc., National Council of Teachers of Mathematics and National Aeronautics and Space Administration.

For his efforts, he received a gold medal, an \$8,000 scholarship, notebook computer and a week at the U.S. Space Camp in Huntsville, Ala.

Both runners-up also were Grade 8 boys, perhaps not surprising given the gender breakdown of the finalists: 197 boys and 31 girls.

And what about the guppies, you ask? The correct answer: 100 must be removed to reach 98 per cent.

Here are two more queries from the competition to test your mathematical mettle:

1. A group of math teachers go to a restaurant for lunch. They agree to split the bill equally. When the bill arrives, two of them discover they have forgotten their money. The others in the group agreed to make up the difference by each paying an extra \$1.30. If the total bill is \$78, how many teachers are in the group?

2. Mr. Smith's bank balance was \$97 on Jan. 1. On the fifth of each month a \$1.50 service charge is assessed, regardless of the balance. Mr. Smith

makes a \$10 withdrawal on the 20th day of the month. If he continues this pattern, what will his balance be on Sept. 1?

Answers: 12 teachers and \$5. How'd you do?

Middle Kingdom appears five days a week as a forum for explanatory journalism — the middle ground between reporting the news and figuring out what it means. We look for the hows and whys that shape world events and everyday life.

Readers with suggestions and comments may call our toll-free line, 1-800-461-3298. Freelance submissions may be sent to the page c/o The Globe and Mail, 444 Front St. W., Toronto, Ont., M5V 2S9. And now we're on the Internet:

midking@GlobeAndMail.ca

Family Matters

A problem with guppies

A Problem with guppies, The Globe and Mail, May 1, 1995
Can you solve the following problem?

There are 200 fish in an aquarium and 99 per cent of them are guppies. How many guppies must be removed to reduce the tank's guppy population to 98 per cent?

Rick Reifsnyder knows the correct answer; it made him the new junior-high mathematics champion of the United States. The 14-year old Grade 8 student from Louisville, Kentucky Rich, outlasted 227 other Grade 7 and 8 contestants in last week's final round of the Mathcounts contest.

Question 1

(a) How many guppies must be removed to reduce the tank's guppy population to 98 per cent?

(b) Let y represent the percentage of guppies in the aquarium after x guppies have been removed. What are the restrictions on the value of x ? Determine an equation for y as a function of x .

(c) Graph y versus x for $0 \leq x \leq 198$. Describe how the value of y changes from $x = 0$ to $x = 198$.

(d) How many guppies must be removed to reduce the tank's guppy population to 50 per cent?

Connecting Mathematics to Current Events and Daily Life Using Newspaper Articles and TI Technology Example 3

In March 2015, I was in Abu Dhabi to do consultant work for the American Community School. On the evening of March 15, I was sitting outside at the Intercontinental Hotel where I was enjoying a meal while looking at the Etihad Towers.



I was reading the National newspaper and came across a full page article that left me speechless.

The Fast and the Furious Etihad Towers stunt: can it be done? Jonathan Gornall , The National, March 17, 2015
<http://www.thenational.ae/arts-lifestyle/film/the-fast-and-the-furious-etihad-towers-stunt-can-it-be-done>

Supercar jumps between Etihad towers

The Fast & Furious franchise is known for its preference for real stunts rather than computer-generated imagery, but one scene showcased in the trailer blends the two techniques, to stunning effect.



Lykan HyperSport

The first supercar to hail from the Middle East, the HyperSport features diamonds in its headlights as standard equipment.

Yours for only
US\$3.4 million

The third most expensive car ever made, and one of the rarest: only seven will be made.

The engine

Powered by a twin turbo flat-six 3.7-litre (3746 cc) engine from Porsche.

385kph Top speed. 0–100kph acceleration is 2.8sec

The jump

The calculation assumes there is no air or rolling resistance, that the distance between the towers is exactly 50 metres, and that the car is travelling at 100kph when it leaves the first building.

We convert speed to velocity by dividing 100kph by 3.6, giving a horizontal velocity of 27.8 metres per second.

With a horizontal velocity of 27.8 ms and a vertical velocity of 17.64 ms, it would touch down at 118.5kph, at an angle of 32 degrees.

If other factors are considered, (weight of car, thickness of glass, rate of acceleration) we can conclude that the glass (wall) will slow the car by only about 0.1ms.

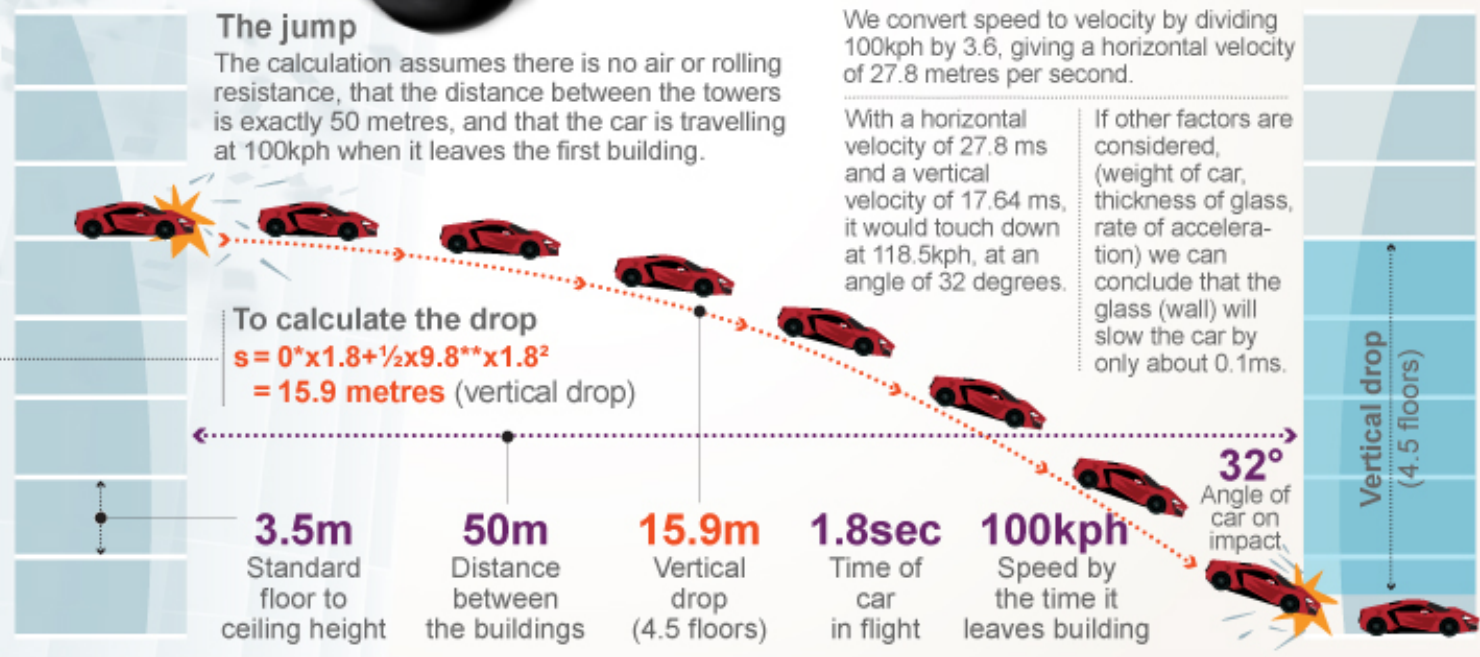
Fast formula for a furious flightpath

$$s = ut + \frac{1}{2}at^2$$

s = distance travelled
u = initial velocity
a = acceleration
t = time travel

*initial velocity in this case is zero

**commonly used approximation for acceleration due to gravity is 9.8



kph = kilometres per hour ms = metres per second

Graphic: Ramon Peñas Jr. Source: The National

Connecting Mathematics to Current Events and Daily Life Using Newspaper Articles and TI Technology Example 4

‘Beyond insane’: Teen charged after BMW clocked at 254 km/h on Highway 403 in Mississauga

Incident occurs after a string of high speeders on GTA highways

Louie Rosella Mississauga News, March 22, 2019

<https://www.thespec.com/news-story/9234785--beyond-insane-teen-charged-after-bmw-clocked-at-254-km-h-on-highway-403-in-mississauga/>






















A 19-year-old is facing stunt driving charges after the OPP clocked a BMW going an unbelievable 254 km/h on Highway 403 in Mississauga early Friday (March 22).

The Oakville teen was arrested after the traffic stop was made near the Erin Mills Parkway exit.

OPP Sgt. Kerry Schmidt tweeted the driver was “out for an evening drive” when the radar gun caught him.

In addition to the stunt driving charges, the luxury car will be impounded for seven days and the teen will have his licence suspended for a week.

Newspaper articles about speeding from my collection...

 105 km/h in a 80 km/h zone.doc
 121 km/h in a 60 km/h zone.doc
 130 km/h in a 60 km/h zone.doc
 134 km/h in a 70 km/h zone.doc
 136 km/h in a 50 km/h zone.doc
 139 km/h in a 60 km/h zone.doc
 142 km/h in a 50 km/h zone.doc
 146 km/hr in a 90 km/h zone.doc
 148 km/h in a 40 km/h zone.doc
 155 km/h in a 70 km/h.doc
 166 km/h in a 100 km/h zone.doc
 175 km/h in 60 km/h zone.doc
 175 km/h in a 100 km/h zone.doc
 193 km/h in a 100 km/h zone.doc
 203 km/h in a 60 km/h zone.doc
 208 km/h in a 100 km/h zone.doc
 221 km/h in a 100 km/h zone.doc
 223 km/h in a 100 km/h zone.doc
 228 km/h in a 100 km/h zone.doc
 230 km/h in a 100 km/h zone.doc
 254 km/h in a 100 km/h zone.doc

Stopping (Braking) Distance Calculator

<http://forensicsdynamics.com/stopping-braking-distance-calculator>

Stopping (Braking) Distance Calculator

Common questions that arise in traffic accident reconstructions are "What was the vehicle's initial speed given a skid length?" and "What distance is required to stop from this speed?". You will be able to answer these questions by simply entering the road surface type, units, and speed or distance below.

Pick Metric or Imperial, and chose a friction surface. The stopping distance or skid length with be displayed after you press the "Calculate" button.

Select units:

Metric (km/h & meters) ▼

Choose your road condition:

Dry Asphalt ▼

Initial Speed Calculator	Stopping Distance Calculator
Enter skid length: <input type="text"/>	Enter speed: <input type="text"/>
<input type="button" value="Calculate Speed"/>	<input type="button" value="Calculate Distance"/>
Result:	Result:

Question 1

Use this calculator to calculate the braking distance for each of the speeds in Table 1 for a car driving on dry asphalt.

Table 1 dry asphalt	
speed (km/h) x	braking distance y
10	
20	
30	
40	
50	
60	
70	
80	
90	
100	

Table 1 dry asphalt	
speed (km/h) x	braking distance y
10	0.56
20	2.24
30	5.06
40	8.99
50	14.05
60	20.24
70	27.55
80	35.99
90	45.55
100	56.23

Question 2

(a) Determine the first and second differences for the data in Table 1. Is the data linear or non-linear? How do you know?

(b) Graph y versus x . How does this graph support your answer in part (b) about the data being linear or non-linear?

Question 3

Most drivers probably believe that if you double your speed, the braking distance will also double. Is this true. Why or why not?

Question 4

Predict the braking distance for the car discussed in the article given below.

Ontario police clock driver at 111 km/h over limit, The Canadian Press, April 19, 2012

<http://toronto.ctvnews.ca/ontario-police-clock-driver-at-111-km-h-over-limit-1.798654>

Question 5

Determine an equation for y as a function of x .

Use the equation to calculate the braking distance for the car discussed in the article given in Question 4. Compare your calculation with your prediction from Question 4.

Table 2 wet asphalt	
speed (km/h) x	braking distance y
10	0.71
20	2.86
30	6.44
40	11.45
50	17.89
60	25.76
70	35.07
80	45.80
90	57.97
100	71.57

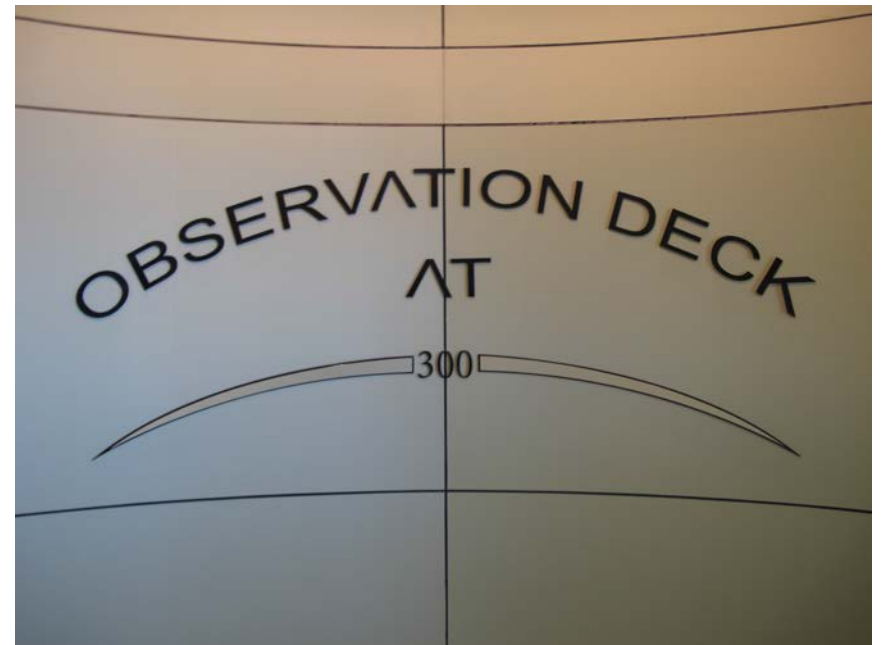
Table 3 ice	
speed (km/h) x	braking distance y
10	2.62
20	10.49
30	23.62
40	41.99
50	65.61
60	94.48
70	128.6
80	167.96
90	212.58
100	262.45

Connecting Mathematics to Current Events and Daily Life Using Newspaper Articles and TI Technology

Example 5

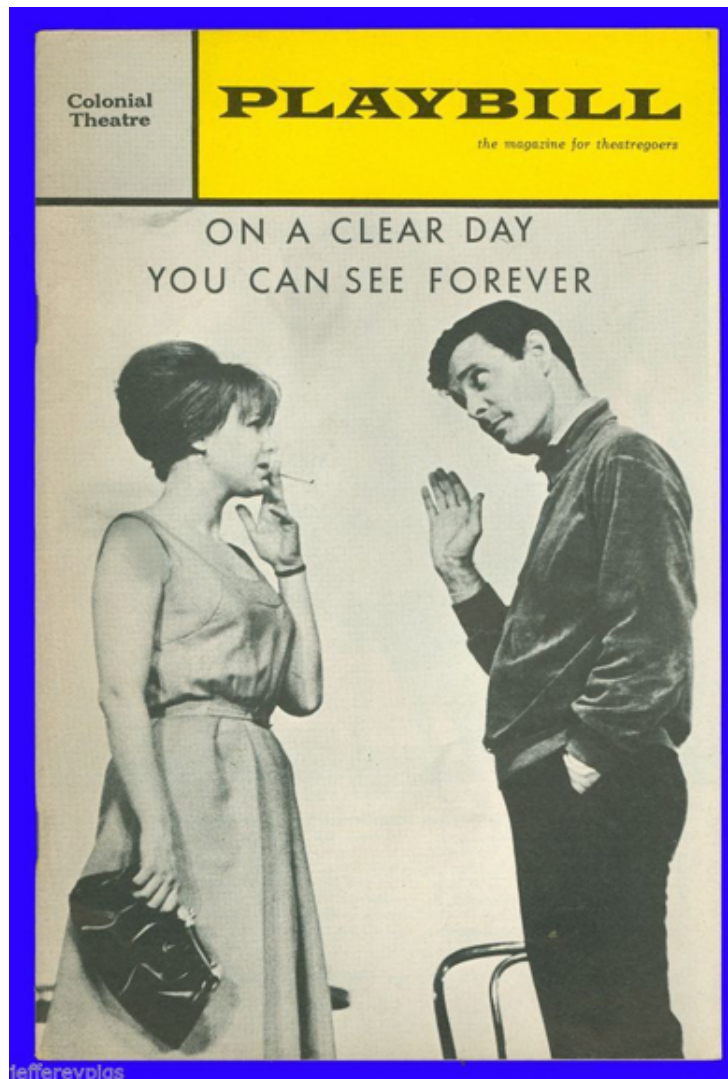
Time Out: Field Trip

Let's visit the lookout on the 74th floor of the Jumeirah Hotel in the Etihad Towers where we will have 360° views of Abu Dhabi.



When you look out the window from the 74th floor on a clear day, how far away is the horizon?

On a clear day you can see forever.
Musical (1965), film (1970)



I Can See for Miles

Song written by Pete Townshend of the Who (1967)



When you look out the window from the 74th floor on a clear day, how far away is the horizon?

Ask a journalist

The Globe and Mail, September 20, 2002

Why do tall guys find it easier to get dates than us normal-sized guys?

They can see farther. There's a simple formula you can use to calculate the distance (in kilometres) to the horizon from any vantage point, says physicist Robert Matthews of Britain's Aston University; Multiply your height in metres by 10, add on a third to the result and take the square root. Thus a six-footer can see 4.939 km compared with 4.690 km for a normal-sized person.

Let y be the distance to the horizon (km) from a height x (m). According to Matthew, what is the mathematical model for y in terms of x ?

Ask a journalist

The Globe and Mail, September 20, 2002

Why do tall guys find it easier to get dates than us normal-sized guys?

They can see farther. There's a simple formula you can use to calculate the distance (in kilometres) to the horizon from any vantage point, says physicist Robert Matthews of Britain's Aston University; Multiply your height in metres by 10, add on a third to the result and take the square root. Thus a six-footer can see 4.939 km compared with 4.690 km for a normal-sized person.

Let y be the distance to the horizon (km) from a height x (m). According to Matthew, what is the mathematical model for y in terms of x ?

$$y = \sqrt{10x + \frac{1}{3}} \text{ or } y = \sqrt{10x + \frac{10x}{3}}$$

Ask a journalist

The Globe and Mail, September 20, 2002

Why do tall guys find it easier to get dates than us normal-sized guys?

They can see farther. There's a simple formula you can use to calculate the distance (in kilometres) to the horizon from any vantage point, says physicist Robert Matthews of Britain's Aston University; Multiply your height in metres by 10, add on a third to the result and take the square root. Thus a six-footer can see 4.939 km compared with 4.690 km for a normal-sized person.

$$y = \sqrt{10x + \frac{10x}{3}}$$

Ask a journalist

The Globe and Mail, September 20, 2002

Why do tall guys find it easier to get dates than us normal-sized guys?

They can see farther. There's a simple formula you can use to calculate the distance (in kilometres) to the horizon from any vantage point, says physicist Robert Matthews of Britain's Aston University; Multiply your height in metres by 10, add on a third to the result and take the square root. Thus a six-footer can see 4.939 km compared with 4.690 km for a normal-sized person.

Robert Matthews could have described the formula by saying "Find the square root of the height and multiply this result by 3.65".

$$\begin{aligned} y &= \sqrt{10x + \frac{10x}{3}} \\ &= \sqrt{\frac{40x}{3}} \\ &= \sqrt{\frac{40}{3}} \sqrt{x} \\ &\simeq 3.65\sqrt{x} \end{aligned}$$

When you look out the window from the 74th floor on a clear day, how far away is the horizon?



Question 1

How far can you see (the distance to the horizon) from each of the following locations?

- (a) Outdoor observation deck of the CN Tower (342 meter)
- (b) The Outdoor Observatory 90th floor, Taipei 101

Question 2

From what height could you see 10 km?

$$y = 3.65\sqrt{x}$$

Read the excerpt of the article given below. Use the formula to check if the information given in the article about how far you can see from the top of the ride is correct.

'I couldn't even scream': The world's tallest and fastest coaster, the new Kingda Ka at N.J.'s Six Flags, hurtles earthward from a height of 45 storeys

By Rebecca Santana, The Globe and Mail, June 1, 2005

JACKSON, N.J. -- They say you can see Manhattan from the top of the world's tallest and fastest roller coaster. All I saw was my life flash before my eyes.

The new 139-metre-tall ride, Kingda Ka, opened at Six Flags Great Adventure in Jackson, N.J., on May 20, and I got a preview the day before. Along with other reporters and winners of an auction, I was catapulted down a track from a standstill to 206 kilometres per hour in 3.5 seconds, then shot up at a 90-degree angle to more than 45 storeys in the air. For a few breathtaking seconds at the top, the coaster slowed almost to a stop before it plunged, twisting as it hurtled back to earth.

Six Flags officials say that, on a clear day, brave riders who open their eyes at the summit can see the buildings of downtown Manhattan, 135 kilometres to the northeast. But for the nanosecond I peeked, all I could see was a green blur.

Collected Wisdom by Philip Jackman

Sign language of the mouth

The Globe and Mail, March 6, 2010

THE QUESTION: If you're standing on the beach and looking out to sea on a clear day, how far can you see? Bob Bainbridge of Toronto wants to know.

THE ANSWER: Well, we received many formulas on calculating how far away the visible horizon is. But for simplicity, we like this response from Bryn Harris and Sandor Mathe, who are sailors currently living in Halifax on board their 35-foot sloop. “The distance from you to your horizon depends on the height of your eyes,” they write. “The simplified formula giving the distance in nautical miles is 1.17 times the square root of the height in feet.”

Now we have two formulas. Are they the same? How do you know?

$$y = 3.65\sqrt{x}$$

$$y = 1.17\sqrt{x}$$

Connecting Mathematics to Current Events and Daily Life Using Newspaper Articles and TI Technology

Example 6

Letter to the Editor from Bill Irvine, The Hamilton
Spectator, September 6, 2019

Your decision on changing fonts and especially size was really inane and frankly, thoughtless! Your readership, as you must know, is primarily older folks, probably 35 to whenever they pass. Your font is awful and makes it worse, you took 2.5 inches off the bottom and 1.5 inches from the side. I'm thinking 10-15 per cent less in size!

Presentation can be downloaded by going to
<https://tinyurl.com/RL20190910TI>

