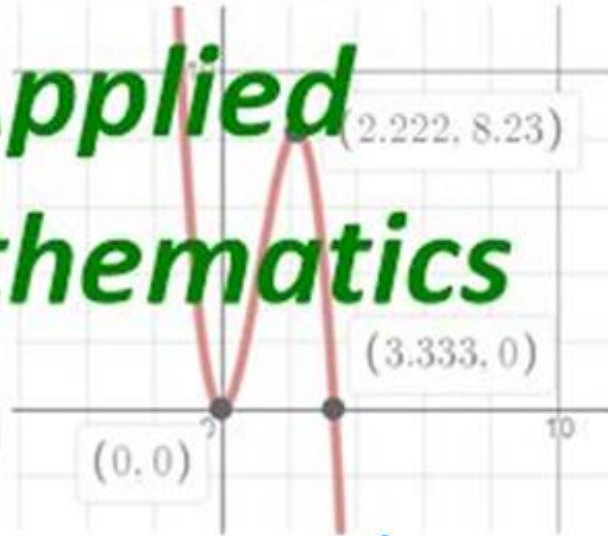


Grade 12

Applied

Mathematics



21 March

2nd day of
Review

Exam is
Thursday AM
MORNING!
09:00

Day 2 Review

Start with questions

8, 10, 14, 20, 22, 25,

30, 33, 35, 37,

40, 41, 43, 48

I am here tomorrow if you need me
but no official math class

3. You have a Canada Savings Bond (CSB) for \$500. It pays 6% simple interest. You have had it for 15 years, how much is it worth now?

"A"

$$\underline{I} = P \cdot r \cdot t$$

$$\underline{I} = 500 \cdot \frac{6}{100} \cdot 15 \text{ yr} = 450$$

$$A = P + \underline{I}$$

$$A = 500 + 450 = \textcircled{950}$$

5. You had an investment that earned \$240 interest on a principal of \$800 after 5 years.

What was the interest rate if the interest was simple interest?

$$\underline{I} = P \cdot r \cdot t$$

$$240 = 800 \cdot r \cdot 5 \text{ yr}$$

$$240 = 4,000 \cdot r$$

$$r = \frac{240}{4000} = 0.06 = \textcircled{6\%}$$

6. Manitoba License plates are generally three letters followed by digits. How many license plates can be made if the third letter must be an E and the three digit number must be greater than 300? [A toughy?]

$$\underline{26} \cdot \underline{26} \cdot \underline{1} \cdot \underline{7} \cdot \underline{10} \cdot \underline{10} = 473,200$$

↑
must
be
E

↑
must
be
3, 4, 5, 6, 7, 8, or 9

but that include

— — — "300"

So can't count "300"

So 473,199

7. For several hundred years, astronomers have kept track of the sinusoidal nature of the sun's solar flares, or sunspots, which occur on the surface of the sun. The number of sunspots counted in a given year varies from a minimum of 10 per year to maximum 110 per year. 23 complete cycles of this activity have occurred from 1732 to 2008. When the maximums occur we tend to have power blackouts, satellite signal disruptions, and increased dangerous radiation.

OMIT

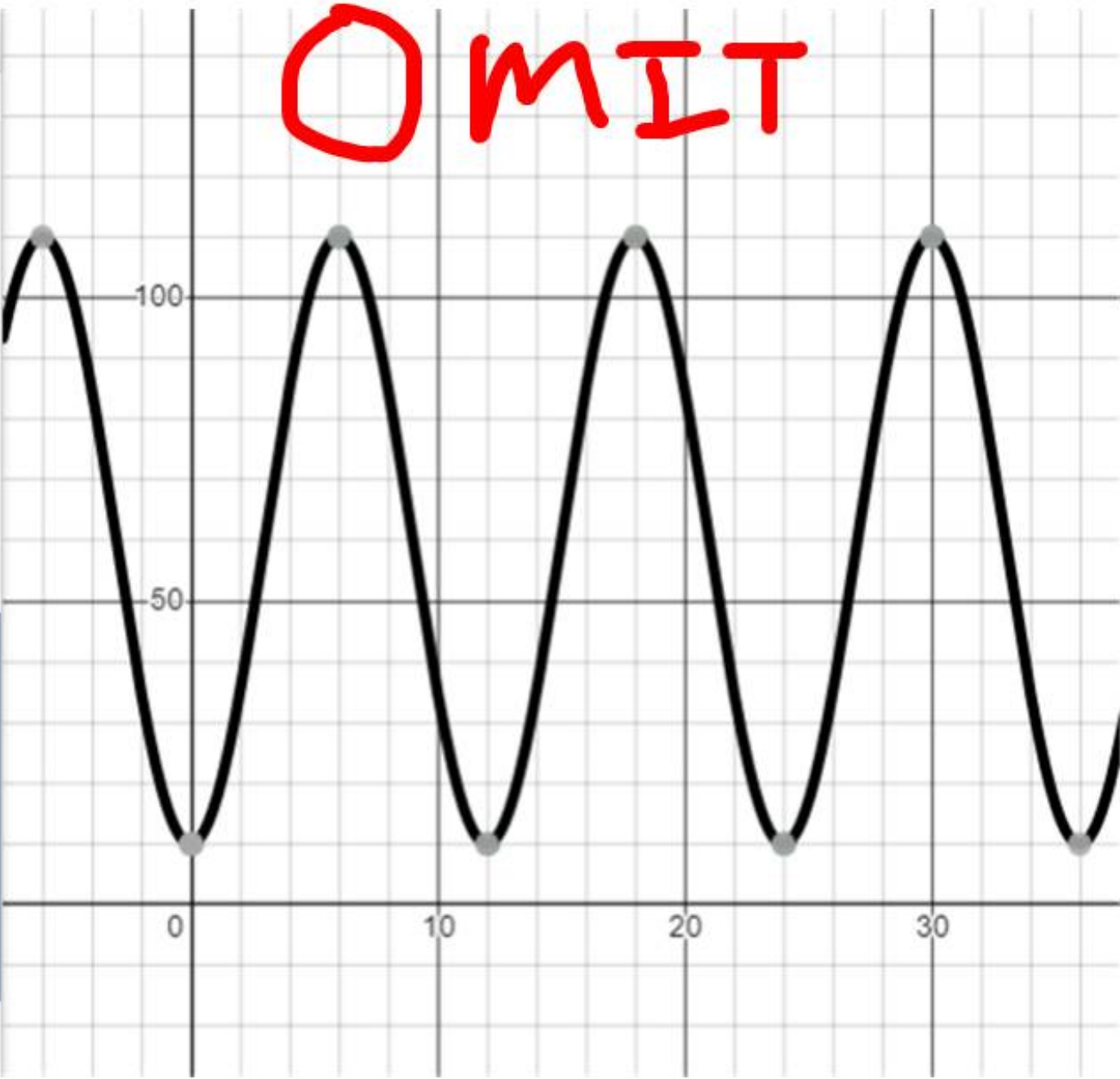
- a. what is the period of one solar sunspot cycle? $276/23$
= every 12 years
- b. calculate a sinusoidal equation that represents this solar activity

omit \Rightarrow

- c. when will the next solar flare maximum occur ?

OMIT

x_1	y_1
0	10
6	110
12	10
18	110
24	10
30	110



$$y_1 \sim a \sin(b \cdot (x_1 + c)) + d$$

STATISTICS

$R^2 = 1$

RESIDUALS

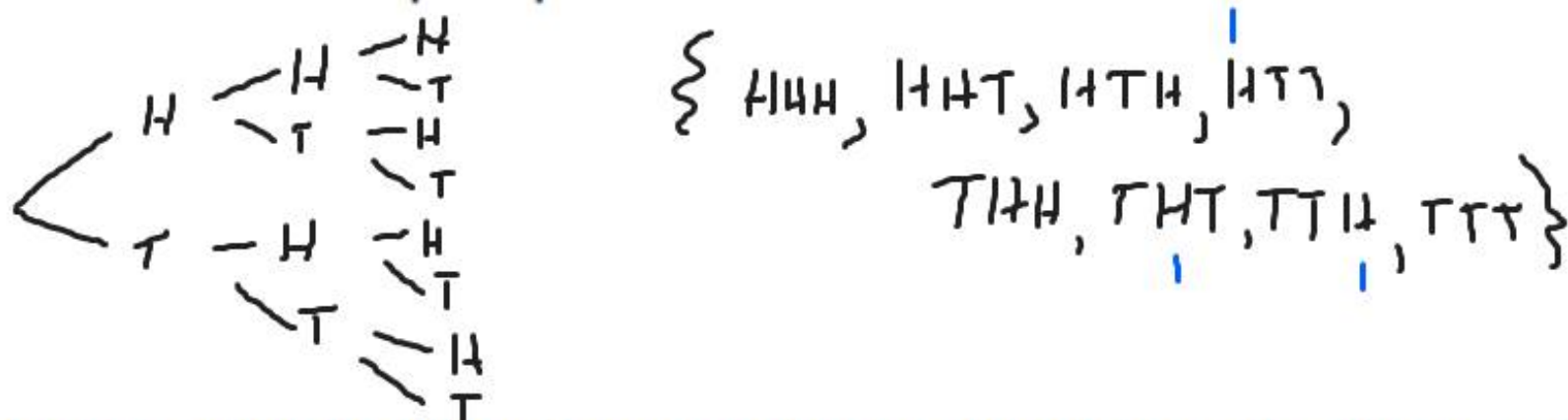
e_1

PARAMETERS

$a = 50.0128$
 $b = 0.523599$
 $c = -2.95684$
 $d = 60$

8. A person tosses a fair coin three times.

a. Create the sample space to show this.



b. Let Event A be throwing exactly one head from the three coin tosses. What is the probability of event A [ie: $Prob(A)$]

$$\frac{3}{8}$$

$H \subseteq \{ \phi, \phi, \phi \} \Rightarrow T$

$S = \{ \phi, \phi, \phi, \phi \}$
↑ ↑ ↑ ↑
3H 2H 1H 0H

c. What is the probability of the complement of Event A (ie: $Prob(\bar{A})$)?

$$1 - \frac{3}{8} = \frac{5}{8}$$

Prob of NOT flipping just one head

9. How many ways can you arrange all the letters of the word 'HOWDY'?

$$5! = 120$$

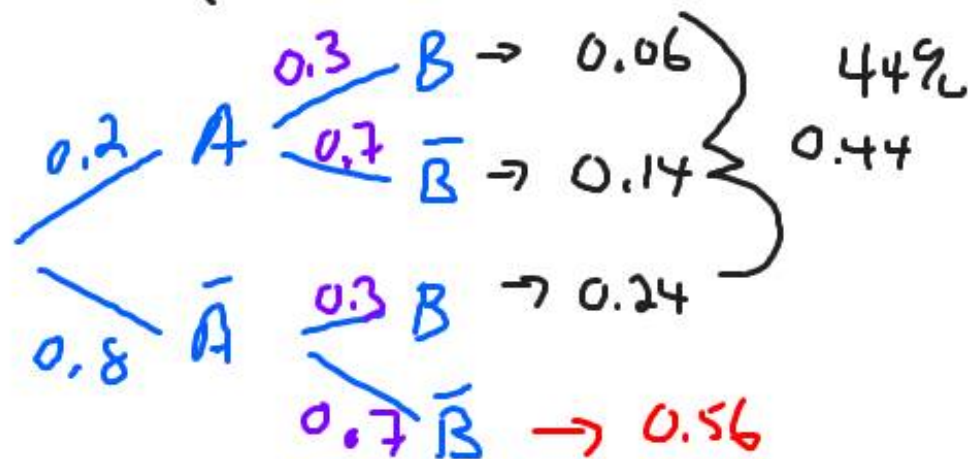
10. Two swimmers, Ann and Betty, are attempting to swim around Hecla Island. Event A is the a success for Ann; event B is a success for Betty. Their probabilities of success are $P(A) = 0.2$ and $P(B) = 0.3$.

a. what is the probability that both swimmers succeed? *Independent*

b. A certain student calculates that the probability of at least one of the swimmers succeeding is: $P(\text{At least one success}) = P(A) + P(B) = 0.5$. Explain why this is incorrect and calculate the correct answer.

$$a) P(A \text{ and } B) = P(A) \cdot P(B) = 0.2 \cdot 0.3 = 6\%$$

$$b) P(\text{at least one succeeds}) = 1 - P(\text{none succeed})$$

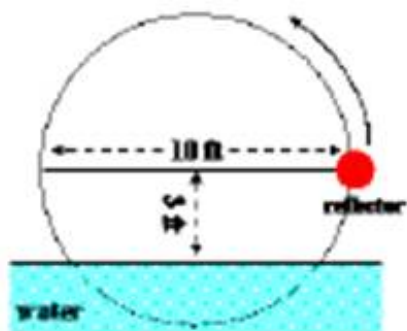


$$= 1 - 0.8 = 0.2$$

$$= 1 - 0.56$$

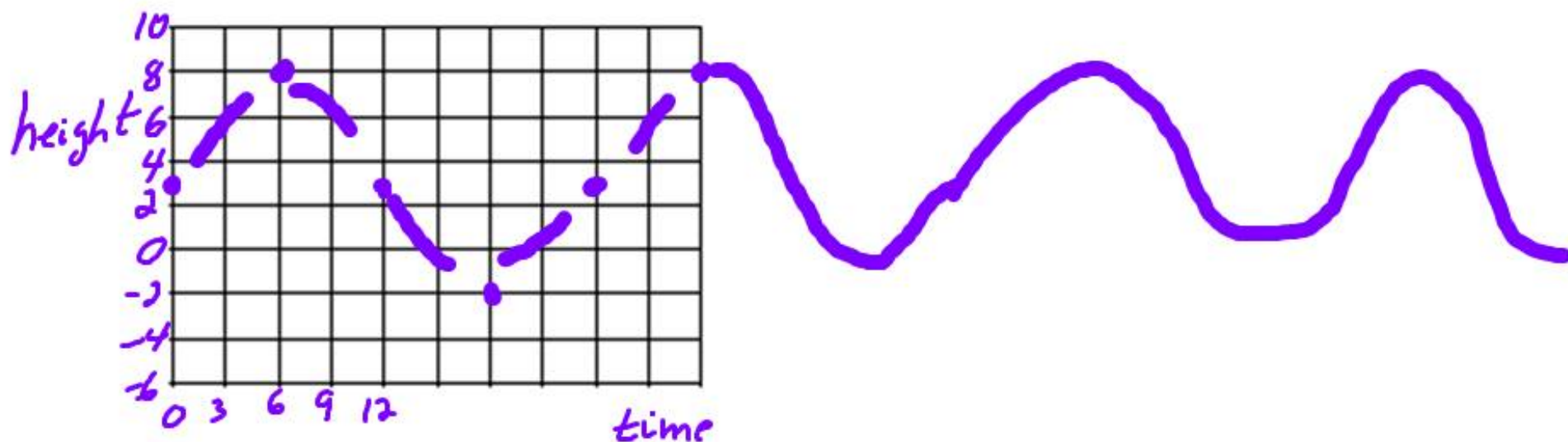
$$= 44\%$$

11. **Sinusoidal Functions.** You notice that a paddlewheel boat has a reflector on the circumference of the wheel as shown in the diagram. Three seconds later the reflector reaches its maximum height. The height of the reflector, h , in feet varies sinusoidally with time, t , in seconds and completes a cycle every 12 seconds.



OMIT

a. draw a graph below of the height of the reflector as a function of time for at least one complete cycle. Completely label the graph neatly and correctly.



b. determine an equation for the sinusoidal function in the general form $y = a \sin(bx + c) + d$. [Work in silly earthling degrees]

12. The teacher has three prize coupons for his class of ten. One is for a burger, one is for a drink, and one is for fries. The teacher awards the coupons to three separate students randomly by drawing names from a hat.

a. In how many ways can teacher award the prizes.

$$\frac{10}{B} \cdot \frac{9}{D} \cdot \frac{8}{FF} = 720$$

10 Students

$$\text{or } {}_{10}P_3 = 720$$

b. Kelly is one of the students, he loves his fries! What is the probability he will get a French fry coupon.

$$\frac{9}{B} \cdot \frac{1}{D} \cdot \frac{8}{FF} = 72$$

$$\frac{72}{720} = 10\%$$

c. If the teacher had thrown names back in the hat after drawing for each coupon instead, what is the probability that just one particular student, Cassandra wins all three prizes.

$$\frac{1 \cdot 1 \cdot 1}{10 \cdot 10 \cdot 10} = \left(\frac{1}{1000} \right)$$

$$\text{or } \frac{1}{10} \cdot \frac{1}{10} \cdot \frac{1}{10} = \frac{1}{1000}$$

13. In a five card poker hand from a single deck of cards:

a. how many ways can you make 4 of a kind?

b. what is the probability you will be dealt a four of a kind?

a) Let's say 4 Aces
 $4^C_4 \cdot 48^C_1 = 48$ ways to get 4 Aces

4 Aces	48 Other
-----------	-------------

so $48 \cdot 13 = 624$ WAYS to get any 4 of a kind

b) $P(\text{dealt 4 of a kind}) = \frac{624}{52^C_5} = 0.00024004$
 $\approx 0.02\%$

$(= 1/4165)$

14. Selecting two marbles from a jar *without replacement*. There are four green marbles and one red marble.

a. What is the probability you draw a green marble on the first draw then a red marble on the second?

$$P(G_1, R_2) = \frac{4}{5} \cdot \frac{1}{4} = \frac{1}{5}$$

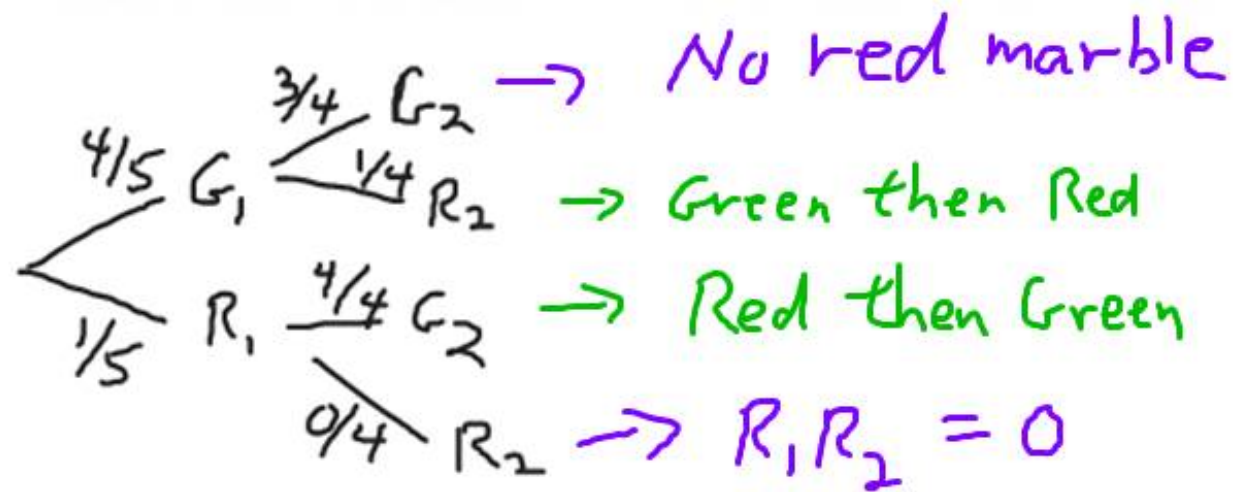
b. what is the probability of drawing a green and red marble (in any order).

$$\begin{aligned} P(G_1, R_2 \text{ or } R_1, G_2) \\ &= \frac{4}{5} \cdot \frac{1}{4} + \frac{1}{5} \cdot \frac{4}{4} \\ &= \frac{1}{5} + \frac{1}{5} = \frac{2}{5} \end{aligned}$$

$$\left(\begin{array}{l} \frac{4}{5} G_1 \\ \frac{1}{5} R_1 \end{array} \right) \left(\begin{array}{l} \frac{3}{4} G_2 \\ \frac{1}{4} R_2 \end{array} \right) \left(\begin{array}{l} \frac{1}{5} \\ \text{or} \\ \frac{1}{5} \end{array} \right) = \frac{2}{5}$$



14. Selecting two marbles from a jar *without replacement*. There are four green marbles and one red marble.



c. What is the probability of selecting two red marbles? $\bar{Z} \bar{E} R_0$

d. What is the probability of drawing no red marble in either draw.

So in other words both green $\left(\frac{3}{5}\right)$

15. How many distinguishable ways can you arrange all the letters of the words:

a. CASSANDRA

$$\frac{9!}{(3!2!)} \leftarrow \text{Careful}$$

b. SHYNIA

$$6!$$

c. TIANNA

$$6! / 2!$$

d. HARRY

$$5! / 2!$$

16. How many distinguishable ways can you arrange all of the letters in the word "MATHEMATICS" if the S must be first?

11 letters $\frac{1}{s} \left(\begin{array}{c} \text{The} \\ \text{rest} \end{array} \right)$

$$\frac{1}{s} \cdot \frac{10!}{(2! \cdot 2! \cdot 2!)} =$$

17. What is the probability in one draw from a deck of cards of selecting a Red Queen?

2 Red Queens

$$\frac{2}{52} = \frac{1}{26}$$

18. What is the probability of selecting a Queen or a Heart from a single deck of cards in one draw?

$$\frac{2}{52} + \frac{13}{52} - \frac{1}{52} = \frac{14}{52} = \left(\frac{7}{26} \right)$$

19. At the races. A wonderful day out a Assiniboia Downs!

a. How many different outcomes can occur for first, second and third place in a horse race if there are eight horses racing.

$$8P_3 \quad \text{or} \quad \begin{array}{ccc} \underline{8} & \underline{7} & \underline{6} \\ \text{1st} & \text{2nd} & \text{3rd} \end{array} = 336$$

b. What is the probability that you will select the correct three horses that place in the same winning order 1st, 2nd, third if you only make one bet (this is called a 'trifecta' at the race track). (assume all the outcomes are equally likely, each horse is equally likely to win)

$$\frac{1}{336}$$

c. What is the probability that when you select two horses only that they will come in 1st place and second place (in either order)? (this is called a *Quinella* at the race track, assume each horse is equally likely to win still)

$$8 \cdot 7 = 56 \text{ ways}$$

2 of them are
winners for you

$$\text{So } \frac{2}{56} = \frac{1}{28}$$

20. Lisa would like to deposit her income tax refund in an account earning **4.6%** annual interest compounded monthly. She will withdraw her money at the end of **5 months**. If her income tax return was **\$398.00**, what will her balance be in the account at that time? (*Hint: 5 months = 5/12ths of a year*)

$$398 \cdot \left(1 + \frac{0.046}{12}\right)^{\left(\frac{5}{12} \cdot 12\right)}$$
$$= \$405.69$$

OR =>

Present Value	<input type="text" value="-398"/>
Payments	<input type="text" value="0"/>
Future Value	<input type="text" value="405.69"/>
Annual Rate (%)	<input type="text" value="4.6"/>
Periods	<input type="text" value="5"/>
Compounding	<input type="text" value="Monthly"/>

21. A grand-parent of a new born child decided to invest **\$5,000** in a GIC for the child that pays interest at the rate of **6% APR** compounded semi-annually. The GIC was bought the day the child was born. What compound amount will the child have at age 21 on his 21st birthday?

$$5,000 \cdot \left(1 + \frac{0.06}{2}\right)^{(21 \cdot 2)} = 17,303.48$$

OR \Rightarrow

out of your pocket \rightarrow *deposit is negative*

Present Value

Payments

Future Value

Annual Rate (%)

Periods

Compounding

get back \rightarrow *is positive*

22. How much money would have to be invested now ('PRESENT VALUE') in order to amount to **\$6000** in three years if invested at **5 3/4** percent compounded monthly?

Present Value	-5,051.43
Payments	0
Future Value	6,000
Annual Rate (%)	5.75
Periods	36
Compounding	Monthly

Test? Back solve?

$$5051.43 \cdot \left(1 + \frac{0.0575}{12}\right)^{36}$$

$$= 5999.9999$$

$$= 6000$$

✓ Checks

$$\text{OR } 6K = P \left(1 + \frac{0.0575}{12}\right)^{36}$$

$$6K = P \cdot \underline{1.187782394}$$

$$\underline{1.187782394} \quad \underline{1.187782394}$$

$$5.05143K = P$$

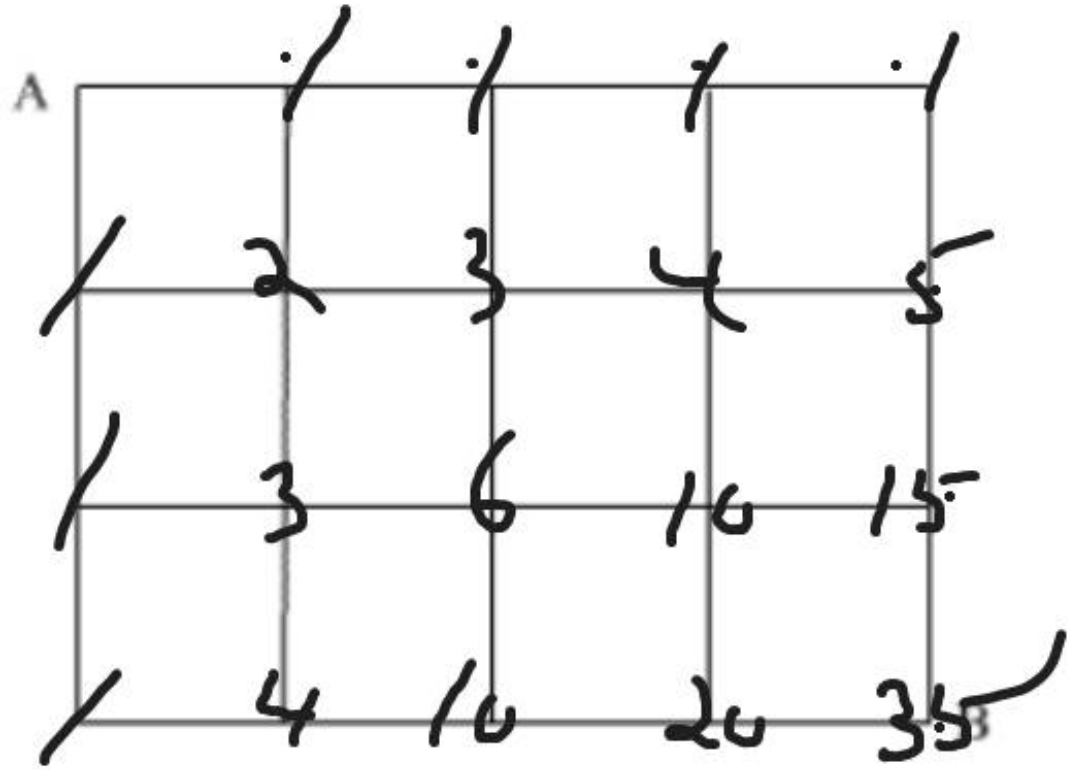
23. How long will it take **\$4500** to double if invested at **8 ½ percent** compounded annually?

≈ 8.5 years rule of 72

TVM

Present Value	<input type="text" value="-4,500"/>	} Double
Payments	<input type="text" value="0"/>	
Future Value	<input type="text" value="9,000"/>	
Annual Rate (%)	<input type="text" value="8.5"/>	
Periods	<input type="text" value="8.5"/>	}
Compounding	<input type="text" value="Annually"/>	

24. How many ways are there to go from A to B if you may go only right or down?



$$\frac{7!}{4!3!} = \frac{7 \cdot \cancel{6} \cdot 5 \cdot \cancel{4} \cdot \cancel{3} \cdot 2 \cdot 1}{\cancel{4} \cdot \cancel{3} \cdot 2 \cdot 1 \cdot \cancel{3} \cdot 2 \cdot 1} = 35$$

25. An experiment consists of drawing a single card from an ordinary deck of 52 cards. Give the following probabilities: [each of these are separate trials where the card has been replaced]

a) P(drawing an ace) $\frac{4}{52} = \frac{1}{13}$

b) P(drawing a heart) $\frac{13}{52} = \frac{1}{4}$

c) P(drawing a heart **or** a spade) $\frac{26}{52} = \frac{13}{52} + \frac{13}{52}$

d) P(drawing the king of hearts) $\frac{1}{52}$

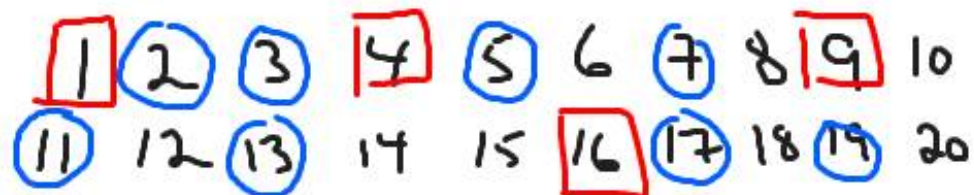
e) P(drawing a heart **or** a king) $\frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13}$

f) P(**not** drawing a king) $1 - \frac{4}{52} = \frac{48}{52}$

$$\frac{48}{52} \text{ NOT KING}$$

26. A number is chosen at random from the first 20 positive integers.

What is the probability that:



a) it is prime or a perfect square

$$a) \frac{8}{20} + \frac{4}{20} = \frac{12}{20} = \frac{3}{5} = 60\%$$

b) it is even and a perfect square

$$\frac{10}{20} \cdot \frac{2}{10} = \frac{1}{10} = 10\%$$

and = multiply

○ Prime

□ Square

c) it is prime and a perfect square

$$\frac{8}{20} \cdot \frac{0}{8} = 0\% \quad \text{and = multiply} \quad P(\text{Prime}) \cdot P(\text{square} | \text{prime})$$

d) it is odd and a perfect square

$$P(\text{odd AND square}) = P(\text{odd}) \cdot P(\text{square} | \text{odd}) = \frac{10}{20} \cdot \frac{2}{10} = \frac{1}{10}$$

e) it is odd OR a perfect square

$$\begin{aligned} P(\text{odd OR square}) &= P(\text{odd}) + P(\text{square}) - P(\text{odd and square}) \\ &= \frac{10}{20} + \frac{4}{20} - \frac{2}{20} = \frac{14}{20} = \frac{7}{10} \\ &= 70\% \end{aligned}$$

27. A ball is dropped into the top of the PLINKO game. Each time it strikes a pin (triangle), it is **equally likely** to go to the left or right. The ball will continue downwards until it stops in one of the slots A to E.

- a. What is the probability that the ball will come to rest in slot A?

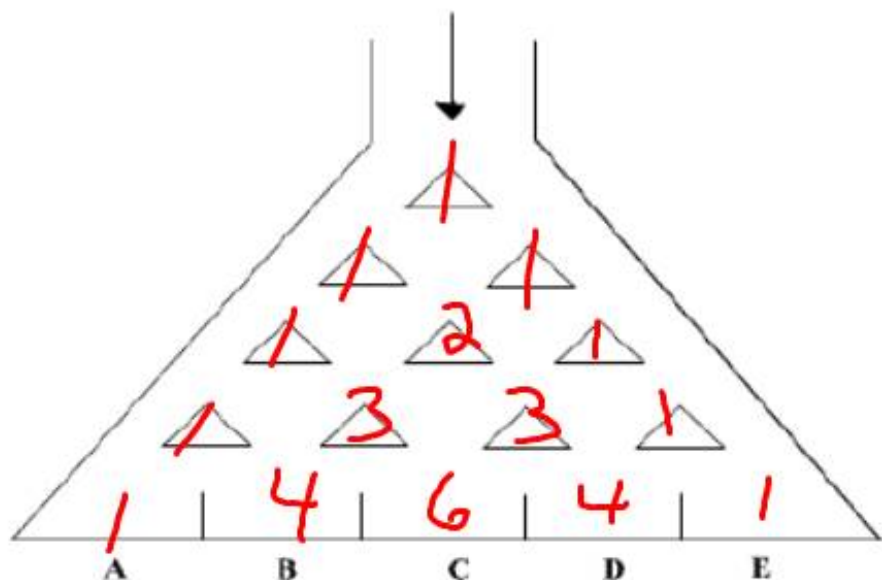
$$1/16$$

- b. What is the probability that the ball will come to rest in slot B?

$$4/16 = 1/4$$

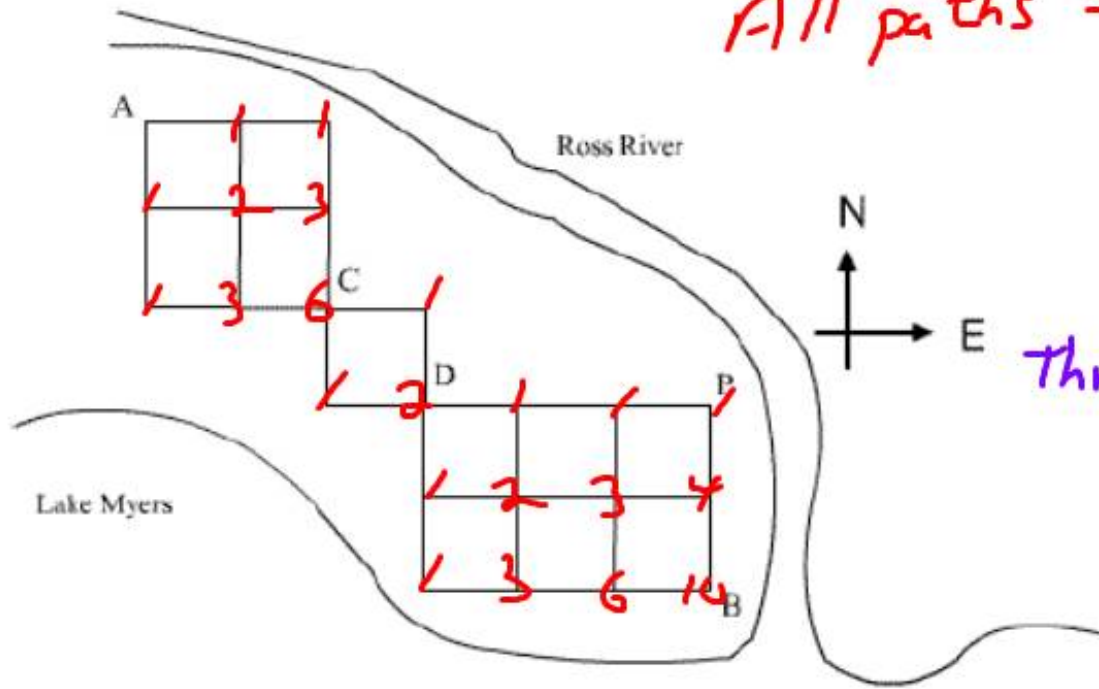
- c. What is the probability that the ball will come to rest in slot E?

$$1/16$$



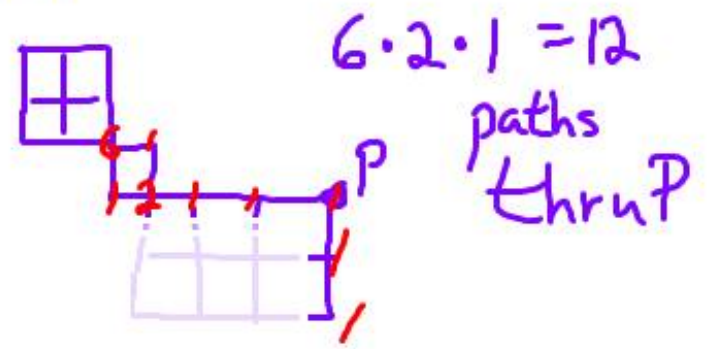
= 16 paths to bins

29. The diagram shows a road grid in the town of Esker. The roads are restricted by a river on one side and a lake on the other. Anson lives at point **A** and his friend Bettina lives at point **B**. Anson visits Bettina frequently, and likes to take a different route each time.



All paths = $6 \cdot 2 \cdot 10 = 120$ paths
Done this before

Thru P



Anson stays on the roads and travels only south and east. How many routes are there from:

a. A to B? 120 paths

b. A to B if he must go through point P?
 12 paths

c. What is the **probability** that Anson will have gone through point P if all routes are randomly chosen?

$$\frac{12}{120} = \frac{1}{10} = 10\%$$

30. Your room is 14 ft **by** 12 ft and the walls are 8 feet high. You have a single window that is 4 feet high and 80 inches wide and a door that is 4 feet wide by 7 feet tall. . You need to paint the walls with two coats of paint.

walls only! Don't paint windows or doors!

a. How much surface area do you need to paint?

Big walls:

$$2 \cdot (14 \text{ ft} \cdot 12 \text{ ft}) = \frac{196}{336} \text{ ft}^2$$

Small walls

$$2 \cdot (12 \text{ ft} \cdot 7 \text{ ft}) = 168 \text{ ft}^2$$

$$= 364 \text{ ft}^2$$

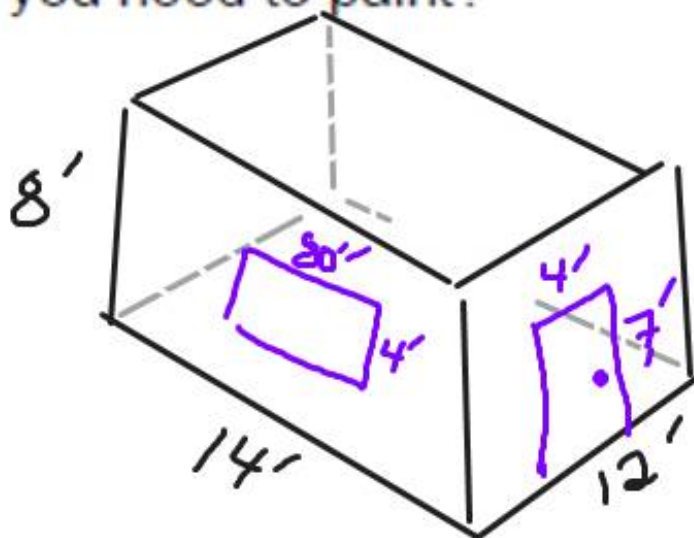
Less window

$$8 \text{ doors } \text{door } 7 \cdot 12 = -84 \text{ ft}^2$$

Window

$$4 \text{ ft} \cdot 6.67 \text{ ft} = -6.67^2$$

$$= 273.33 \text{ ft}^2 \text{ to paint}$$



* Similar to exam

$$80 \text{ in} \cdot \frac{1 \text{ ft}}{12 \text{ in}} = 6.67 \text{ ft}$$

30. Your room is 14 ft **by** 12 ft and the walls are 8 feet high. You have a single window that is 4 feet high and 80 inches wide and a door that is 4 feet wide by 7 feet tall. . You need to paint the walls with two coats of paint.

walls only! Don't paint windows or doors!

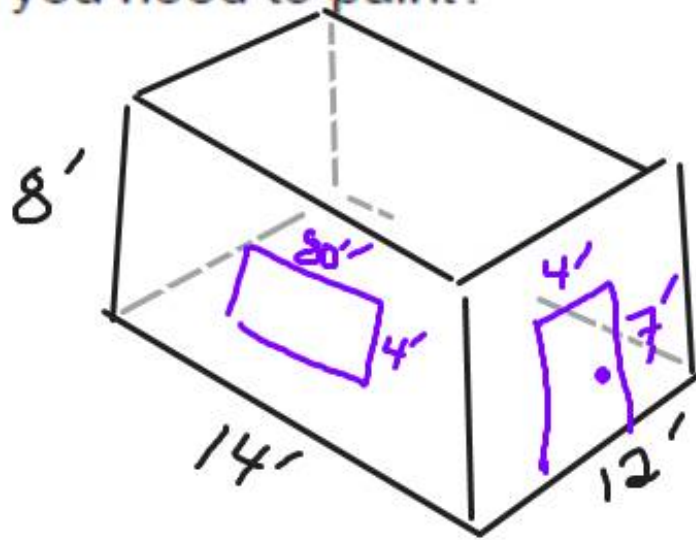
a. How much surface area do you need to paint?

Big walls: $2 \cdot (14 \text{ ft} \cdot 8 \text{ ft}) = 224 \text{ ft}^2$
 ~~$2 \cdot (14 \text{ ft} \cdot 12 \text{ ft}) = 336 \text{ ft}^2$~~

Small walls: $2 \cdot (12 \text{ ft} \cdot 8 \text{ ft}) = 192 \text{ ft}^2$

Less window
 8 doors door $7 \cdot 4 = 28 \text{ ft}^2$
 ~~364 ft^2~~
 $= 336 \text{ ft}^2$

Window $4 \text{ ft} \cdot 6.67 \text{ ft} = 26.68 \text{ ft}^2$
 $= 309.32 \text{ ft}^2$ to paint
 361.32 ft^2



* Similar to exam

$$80 \text{ in} \cdot \frac{1 \text{ ft}}{12 \text{ in}} = 6.67 \text{ ft}$$

30. Your room is 14 ft **by** 12 ft and the walls are 8 feet high. You have a single window that is 4 feet high and 80 inches wide and a door that is 4 feet wide by 7 feet tall. . You need to paint the walls with two coats of paint.

a. How much surface area do you need to paint?

$$\begin{array}{r}
 \underline{361.32} \text{ ft}^2 \text{ to paint!} \\
 \times 2 \\
 \hline
 722.64 \text{ ft}^2 \text{ 2 coats}
 \end{array}$$

*
Similar
to
exam

b. if a one litre can of paint covers 12 square metres, how many cans of paint do you need? oh poo!

$$\begin{array}{r}
 \underline{722.64} \text{ ft}^2 \\
 \cancel{546.66} \text{ ft}^2 \cdot \frac{1 \text{ can}}{129.1 \text{ ft}^2} \\
 = 5.6 \text{ cans} = \cancel{6} \text{ whole cans}
 \end{array}$$

$$\begin{array}{l}
 12 \text{ m}^2 = 129.1 \text{ ft}^2 \\
 12 \text{ m}^2 \cdot \left(\frac{3.28 \text{ ft}}{1 \text{ m}} \right)^2
 \end{array}$$

c. how much will you spend on paint if paint costs \$7.85 a can and you have GST of 5% and PST of 8%?

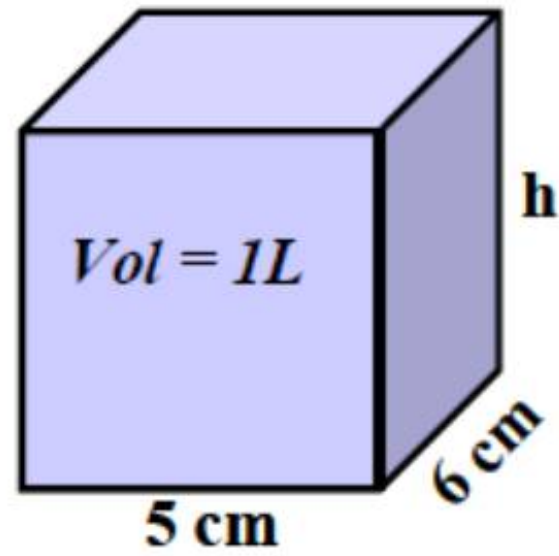
$$\cancel{6} \text{ cans} \cdot (\$7.85 \cdot 1.13) / \cancel{\text{can}} = \textcircled{\$53.22}$$

$$\leftarrow 1 \cdot 7.85 + 7.85 \cdot 0.13$$

$$7.85 \cdot (1 + 0.13)$$

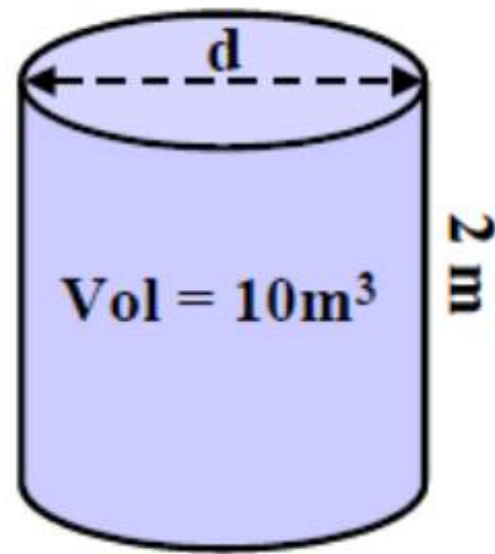
$$7.85 \cdot 1.13$$

31. What is the height, h , of this rectangular prism (ie: box)?



$$Vol_{Prism} = l * w * h$$

32. What is the diameter of this cylinder?



$$\text{Vol}_{\text{cyl}} = \pi * r^2 * h$$

$$10 = \pi * r^2 * 2$$

$$\frac{10}{(2\pi)} = r^2 = 1.59$$

$$r = \sqrt{1.59} = 1.26 \text{ m}$$

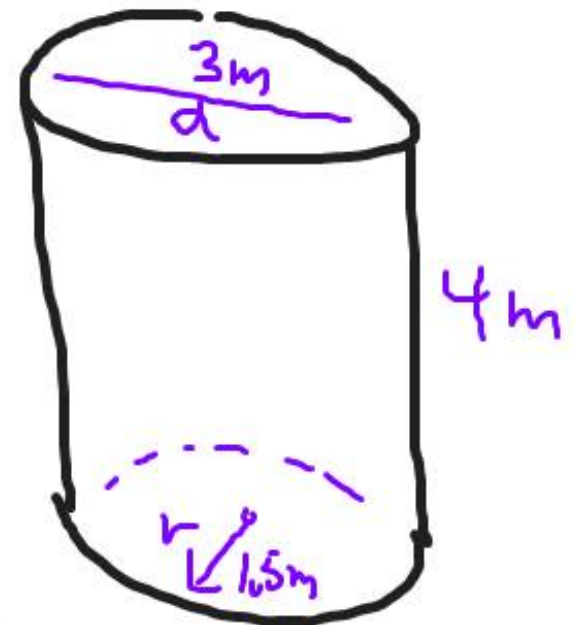
$$\text{So } d = 2.52 \text{ m}$$

33. You have to paint a fuel tank! It is an upright cylinder. It is **4m** high and has a diameter of **3m**. It takes two coats of paint. You do not paint the bottom. One can of paint covers **12m²**. How many cans of paint do you need?

$$SA = \pi \cdot 1.5^2 + 2 \cdot \pi \cdot 1.5 \cdot 4$$

$$= 44.7 \text{ m}^2$$

So need to do 2 coats
 89.4 m^2



↓

$$SA_{\text{cyl}} = 2\pi r^2 + 2\pi rh$$

$$= \cancel{1} \pi r^2 + \cancel{2} \pi r h$$

not painting bottom



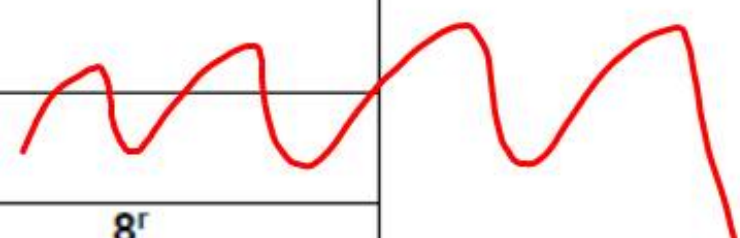
$$\cancel{89.4 \text{ m}^2} \cdot \frac{1 \text{ can}}{\cancel{12 \text{ m}^2}} = 7.45 \text{ cans}$$

Round up **8 whole cans**

Something like this
 on exam!

34. Complete the empty white table blanks:

Degrees	Exact Radians	Decimal radians (three decimal places)
30°	OMIT	
120°		
		3 ^r
	$\frac{3\pi}{2}$	
109°		
		8 ^r
	$\frac{7\pi^r}{9}$	
	$\frac{\pi^r}{18}$	
360°		
245°		
	$\frac{5\pi^r}{4}$	



35. Ron and Deb are planning on buying a house. They think they can afford \$1,200 per month for the mortgage. They have saved up \$20,000 for a down payment. They will likely finance the mortgage at 3.5%, compounded monthly, for 25 years. What price house will they be able to afford. Disregard taxes, it is a pre-owned house and pre-owned homes are not taxed.

Ans: ~\$259,700 (don't forget they have the down payment too!)

* PV ?
 PMT -\$1,200
 FV \emptyset
 % 3.5
 Pds 300 $\leftarrow 25 \cdot 12$
 Compounding: monthly

Mode End Begin

* Present Value

Payments

Future Value

Annual Rate (%)

Periods

Compounding

Loan +
 20K d.p
 = \$259,700
 house

[Print](#)

929 Sherburn Street

Roll Number: 13020831000

Neighbourhood Area: Sargent Park

Market Region 4, Inner City

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37. Given the following data determine a best fit cubic equation in the general form:

$$y = ax^3 + bx^2 + cx + d:$$

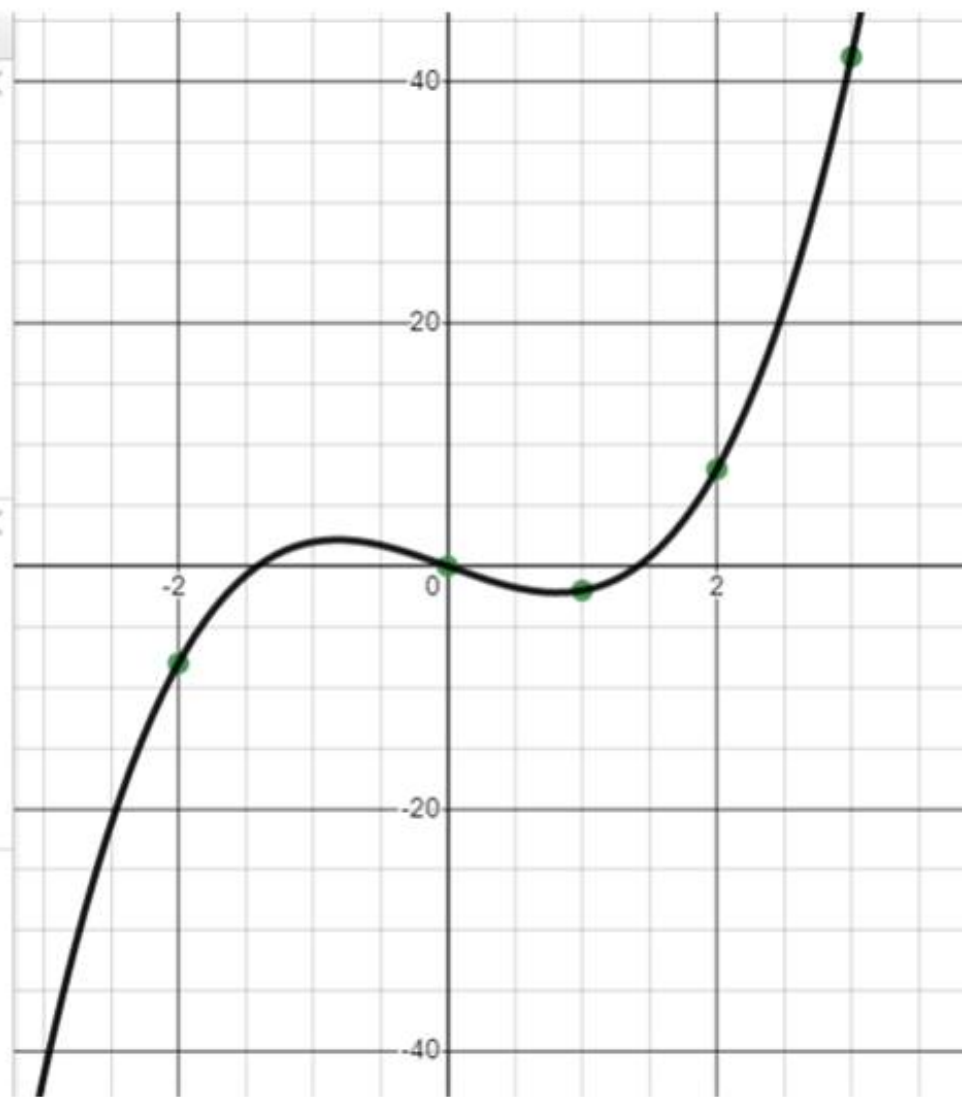
x_1	-2	0	1	2	3
y_1	-8	0	-2	8	42

Ans: $y = 2x^3 - 4x$

$y = 2x^3 + 0x^2 - 4x + 0$
 $= 2x^3 - 4x$
 perfect 100% fit

x_1 | y_1
 -2 | -8
 0 | 0
 1 | -2
 2 | 8
 3 | 42

$y_1 \sim ax_1^3 + bx_1^2 + cx_1 + d$
 $R^2 = 1$
 PARAMETERS
 $a = 2$
 $b = 0$
 $c = -4$
 $d = 0$



39. Teacher sends Daryl to the store for 20 donuts with \$45. Maple and/or Chocolate donuts. Maple Donuts cost \$3 each, chocolate cost \$2 each. Daryl has to spend all the money, how many of each donut will he get?

Ans: 5 Maple, 15 Chocolate

40. Mike shoots an arrow into the air. The height is given by the function $h(t) = -5t^2 + 70t + 2$; where height, h , is measured in metres and time, t , in seconds.

$$y = -5x^2 + 70x + 2$$

- determine the time at which the arrow reaches its maximum height
- determine the maximum height the arrow reaches
- determine at what time the arrow hits the ground.
- determine the time(s) that the arrow is 100m above the ground.



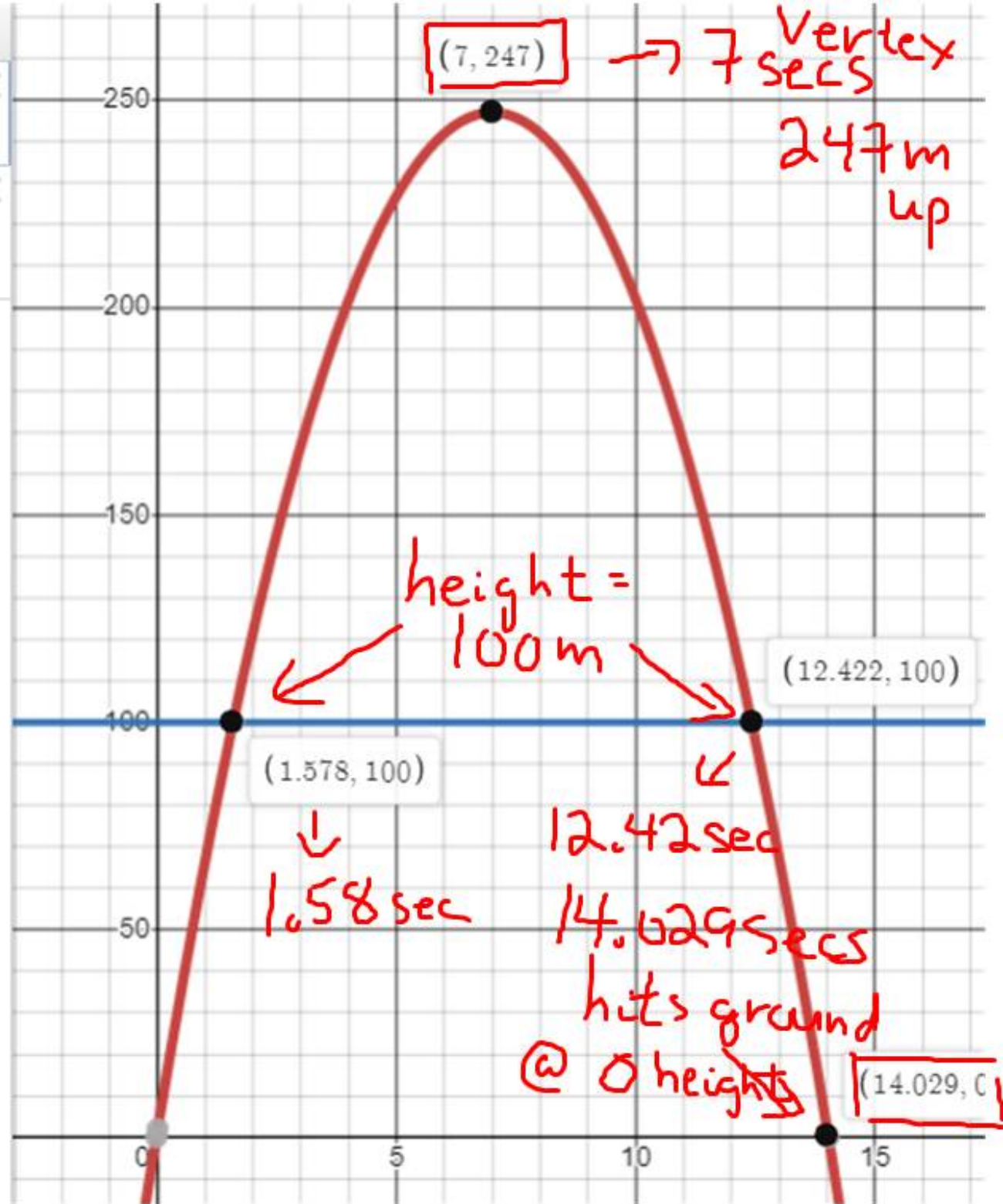
ANS: a. 7 secs

b. 247 metres up

c. 14.03 seconds

d. 1.58 seconds, 12.42 seconds

$y = -5 \cdot x^2 + 70 \cdot x + 2$
 $y = 100$
 -10 100



41. Determine the mean, median, mode, and range of the following data:

{2, 5, 6, 6, 7, 8, 9, 4, 6, 3, 9}

$$\bar{x} = \frac{\sum x}{n} = \frac{65}{11} = 5.91$$

Ans: Mean: 5.91; Median: 6; mode: 6; range: 7

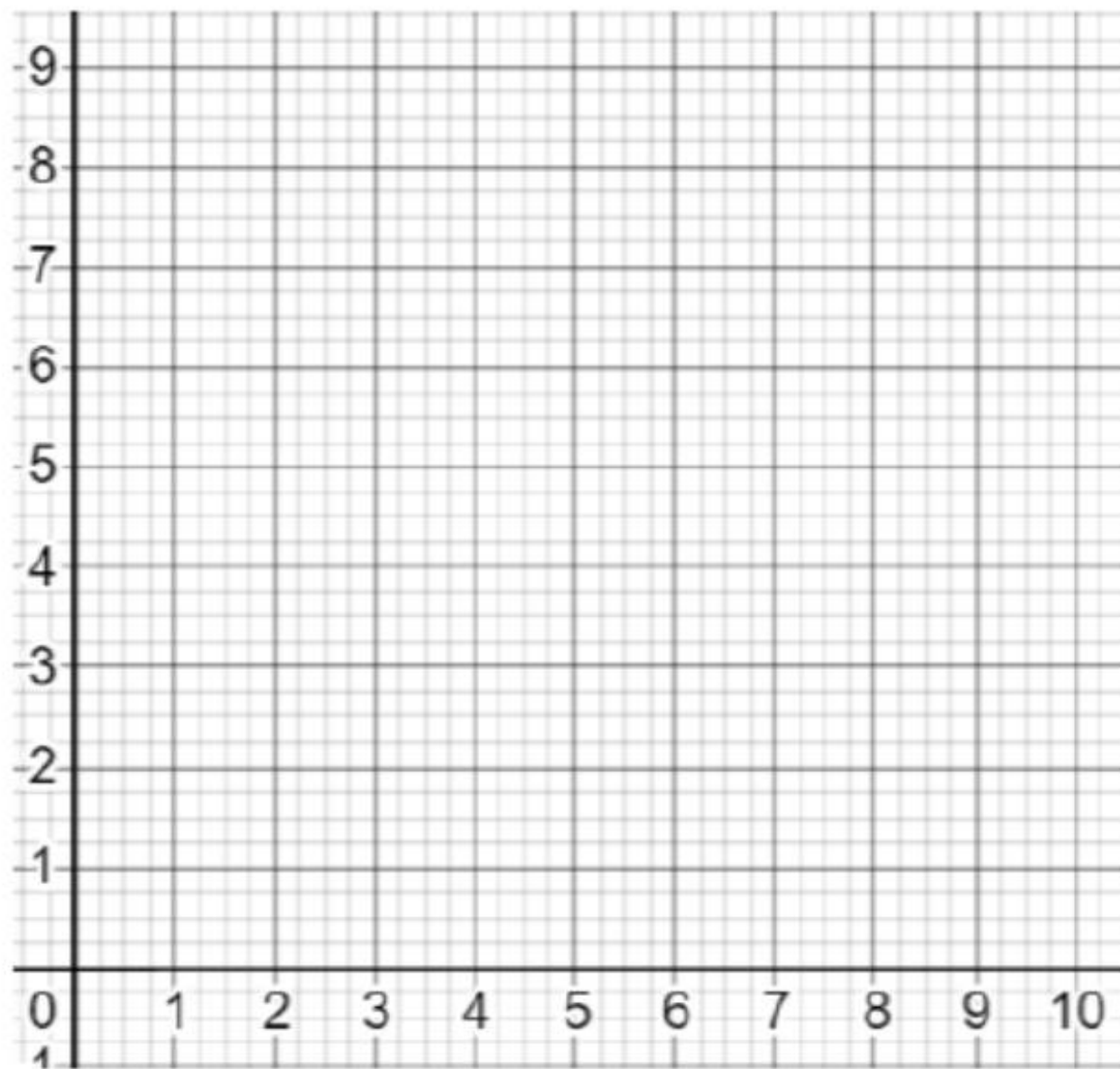
$$\tilde{x} = 6$$

Find the 6th place
 $\left(\frac{11+1}{2}\right)$

~~2~~, ~~3~~, ~~4~~, ~~5~~, 6, 6, ~~6~~, ~~7~~, ~~8~~, ~~9~~

mode: "6" happens the most often!

42. Make a histogram of the data: {2, 5, 6, 6, 7, 8, 9, 4, 6, 3, 9}



43. If Kirk gets a 75% mean on his entire math course his mom will take him to Fun Mountain! Presently Kirk has test marks of 65%, 80%, 90%, and 55% and there is one more test remaining. All the test marks on the course are equally weighted. What mark does Kirk need on his final (fifth) test to get to Fun Mountain?

$$\bar{X} = \frac{\sum x}{n}$$

$$75 = \frac{65 + 80 + 90 + 55 + x}{5}$$

$$5 \cdot 75 = \frac{290 + x}{\cancel{5}} \cdot \cancel{5} \quad \text{undivide the 5}$$

$$375 = \cancel{290} + x \quad \cancel{-290}$$

$$85 = x$$

Kirk needs an 85% on his last test!

44. In Jody's English course there are five tests and a final exam. For course assessment the final exam has a weight factor of twice that of the tests. On her tests Jody got [%]: 70, 67, 70, 75, and 80. On her final exam she only got a 52.

a. what is Jody's mark for the course using the assessment weightings?

b. what was Jodie's mean mark before the exam?

Double weight!
↓

$$\bar{X}_{\text{weighted}} = \frac{70 \cdot 1 + 60 \cdot 1 + 70 \cdot 1 + 75 \cdot 1 + 80 \cdot 1 + 52 \cdot 2}{1 + 1 + 1 + 1 + 1 + 2}$$

$$\bar{X} = \frac{459}{7} = 65.57$$

She threw it under the bus

before the exam she had: $\frac{355}{5} = 71\%$

45. Problem Solving (Guess and Check, Work Backwards, Use Logic).
Five years ago my mom was twice as old as me. I am 24 now. How old is my mom now?

Mom Now	Mom Five yrs ago	me Five years ago	me Now
40?	35	17.5	22.5
39	34	17	22
45	40	20	25
<u>43</u>	38	19	<u>24</u>

→ mom is 43 years old

$$(x-5) = 2(24-5)$$

$$x-5 = 38$$

$$\underline{x = 43}$$

47. Lance is on a hockey team. The coach measures the height of all 26 members of the team. Lance and two others have a height of 165 cm. Seven team members are taller.

OMIT

- a. What is Lance's percentile rank?
- b. What percentage of the team is shorter than Lance.

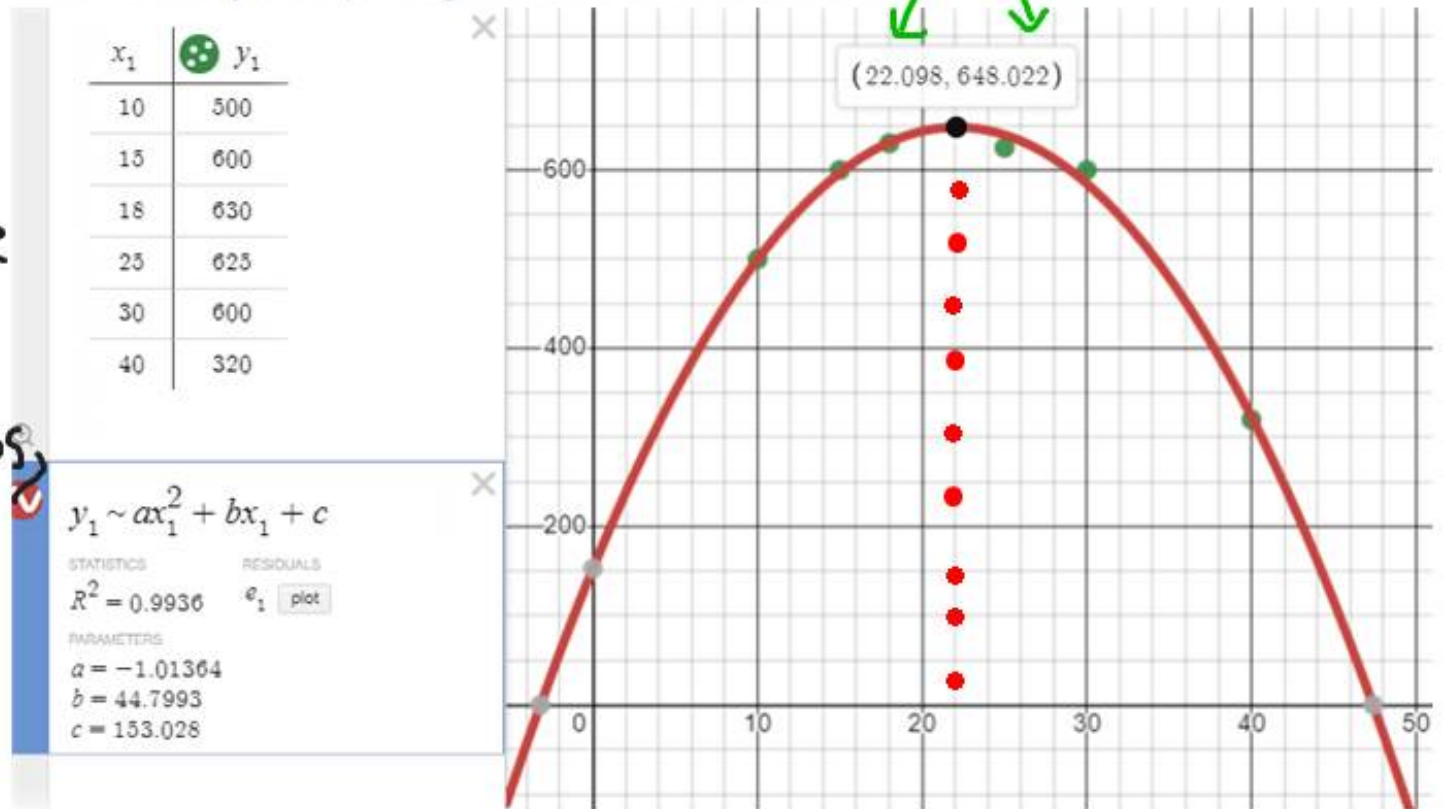
48. A tour boat experiments with their pricing during their last 6 day cruises. The results are in the table below:

x	Price (\$)	10	15	18	25	30	40
	# Tickets Sold	50	40	35	25	20	8
y	Revenue	500	600	630	625	600	320

Did this one already

- a) Fill in the revenue portion of the table. ✓
- b) Using the Price and the Revenue, find the quadratic regression equation. $y = -1.01x^2 + 44.80x + 153.03$ ←
- c) What price maximizes the revenue? What is the maximum revenue? $\$22.10$ gets max revenue $\$648.02$ optimum
- d) What factors, other than price, may affect ticket sales?

Very few things are a function of just one variable
 What about weather, advertising & promos, economy, ...
 COVID



49. A cannon shoots a cannonball! The cannonball's height after being shot is given by the following formula:

$$h = -4.9t^2 + 100t + 50$$

where **h** represents height in metres and **t** represents the number of seconds.

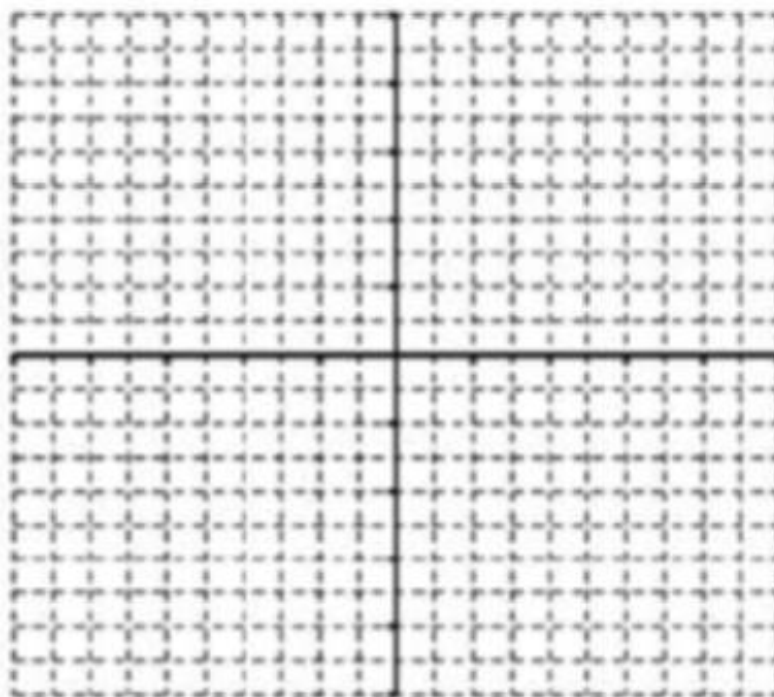
- a) From what initial height is the cannonball fired?
- b) **When** does the cannonball reach a maximum height? **What** is the maximum height?
- c) How many seconds is the cannonball above a height of 300 m?
- d) How long is the cannonball in the air?

50. Consider the cubic function

$$y = 2x^3 + 8x^2 - 22x - 60.$$

- What are the coordinates of the relative maximum and minimum points?
- What are the coordinates of the x -intercepts?
- What are the coordinates of the y -intercept?
- Discuss the end behavior.
- Graph the function. Label all key points found in a) – c).

(you will need to re-scale the y -axis for it all to fit)



51. Your nephew, when he was born, weighed 2.4 kg. The hospital has been kept track of the weight of the last 256 babies and there were 30 babies smaller than your nephew; five others were the same weight.

a. What percentile rank is your nephew?

OMIT

b. How many newborns, of the 256, are heavier than your nephew?