
Student Number

Barker College

2023 TRIAL HIGHER SCHOOL CERTIFICATE EXAMINATION

Mathematics Standard 2

Staff Involved:

- AHP
- RAS
- GDH
- RJW
- JZT
- ESP
- DOB
- BHC*

DATE: Friday 4th August

155 copies

General Instructions:

- Write your Student Number on all answer pages
- Reading time - 10 minutes
- Working time – 2 hours and 30 minutes
- Write using black pen
- Calculators approved by NESA may be used
- A separate reference sheet is provided
- For questions in Section II, show relevant mathematical reasoning and / or calculations

Total marks:
100

Section I – 15 marks (pages 2 - 7)

- Attempt Questions 1 – 15
- Allow about 25 minutes for this section

Section II – 85 marks (pages 9 - 28)

- Attempt Questions 16 - 33
- Allow about 2 hours and 5 minutes for this section

Section I

15 marks
Attempt Questions 1 – 15
Allow about 25 minutes for this section

Use the multiple-choice answer sheet for Questions 1– 15.

Choose the best response and fill in the corresponding response oval completely.

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1 The number of significant figures in 210.8 is

(A) 1

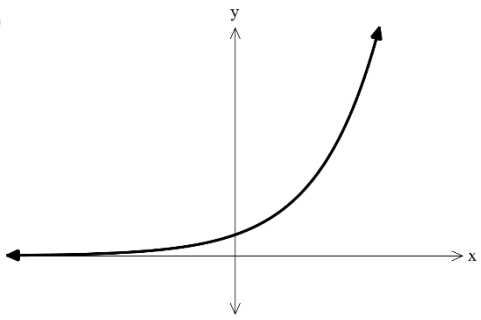
(B) 2

(C) 3

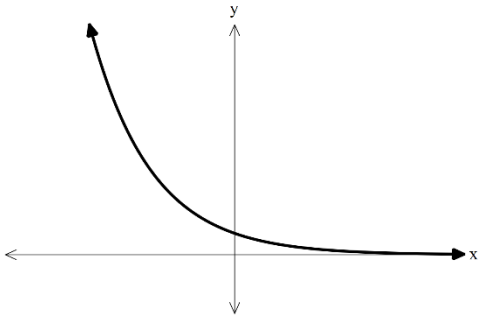
(D) 4

2 Which of the following could represent the graph of $y = 2^{-x}$?

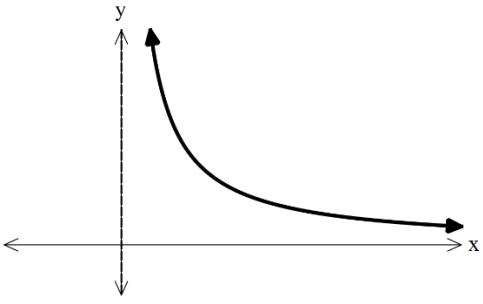
(A)



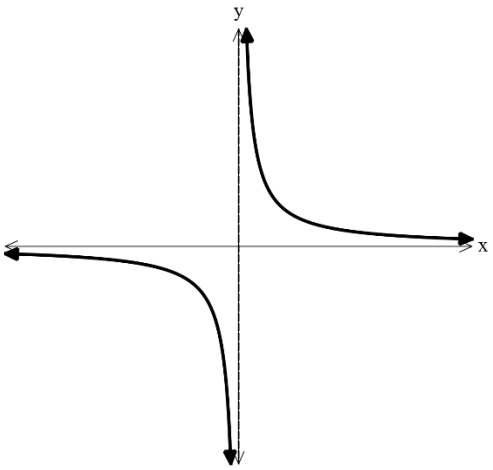
(B)



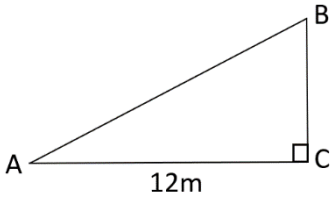
(C)



(D)



3 Given that AC = 12m and $\angle BAC = 32°$ in the triangle below,



which of these expressions would correctly give the length of the hypotenuse, AB?

(A) $12 \times \cos 32°$

(B) $\dfrac{12}{\cos 58°}$

(C) $\dfrac{12}{\sin 58°}$

(D) $12 \times \sin 32°$

4 The table shows the age and the number of texts sent in a day by 6 students.

Age (years)	15	18	16	16	17	15
Number of Texts	12	20	14	19	18	16

The value of Pearson's correlation coefficient (r) (to 3 dec. pl.) is:

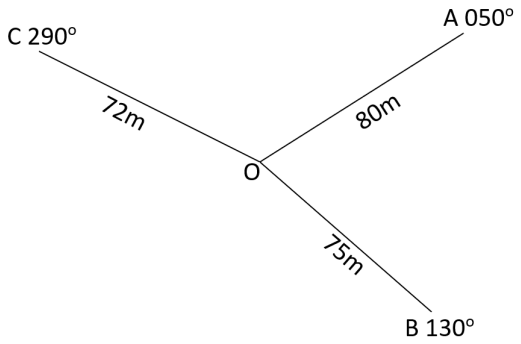
(A) 0.748

(B) 0.749

(C) 0.750

(D) 0.751

5 The following radial survey of a property was done.



What is the area of ΔAOC to the nearest square metre?

(A) 1440 m^2

(B) 2206 m^2

(C) 2494 m^2

(D) 2954 m^2

6 Calculate the annual cost of running a 450 Watt appliance for 6 hours every day if the average rate for electricity is 19 cents/kWh.

(A) $187.25

(B) $1 872

(C) $18 725

(D) $187 245

7 An object weighed 8.24 grams.
What is the approximate percentage error in this measurement?

(A) 0.000607%

(B) 0.001214%

(C) 0.0607%

(D) 0.1214%

8 The following cumulative frequency table shows the results of a test out of 30.

Score (x)	Frequency (f)	Cumulative Frequency
20	4	4
23	5	9
25	6	15
27	4	19
28	5	24
29	6	30
30	1	31

What is the interquartile range (IQR)?

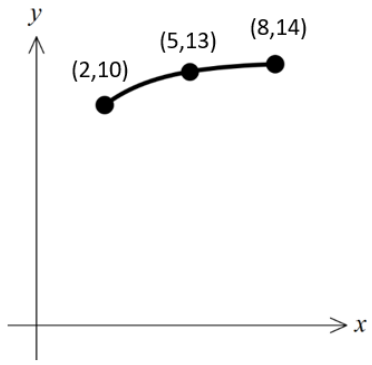
(A) 4

(B) 5

(C) 6

(D) 7

9 Part of a curve is sketched on the number plane below and various points on the curve have been found.



Using two applications of the Trapezoidal Rule, estimate the area between the curve and the x axis, between the lines $x = 2$ and $x = 8$.

(A) 72 u^2

(B) 75 u^2

(C) 78 u^2

(D) 150 u^2

10 Budi bought 480 shares in SUP Industries for a total cost of \$1344. The dividend yield was 11.5%. What was the value of the dividend per share?

(A) \$0.03

(B) \$0.32

(C) \$3.12

(D) \$31.20

11 Dini bought a machine for \$400 000 and sold it 10 years later. It depreciated using the declining balance method at a rate of 8% p.a.
By how much had the car depreciated when she sold the machine?

(A) \$17 375.54

(B) \$22 624.46

(C) \$173 755.38

(D) \$226 244.62

12 Four students A, B, C and D sat the same Maths and English exams. Their scores are given in the table below. Use your calculator to find the equation of the least squares regression line, and then use that to estimate the Maths score for another student who scored 70 for English.

Student	A	B	C	D
Maths (x)	60	75	42	53
English (y)	80	85	60	64

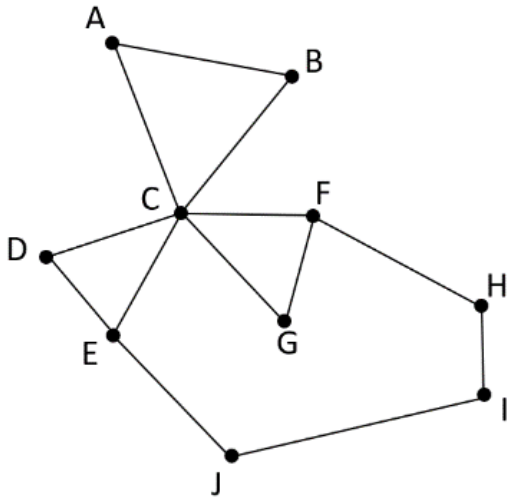
(A) 51

(B) 55

(C) 59

(D) 82.5

13 Below is a network diagram of the main roads connecting the suburbs in a shire. The local council needs to find a route through the network so the council workers can fill potholes on the roads, without travelling on any road more than once.



Which suburb(s) must the council workers start their route at if they are to complete the route without travelling on any road more than once?

(A) C

(B) E or F

(C) A, B, D, E, F or G

(D) any suburb, as it does not matter.

14 Blood alcohol for a female can be estimated using the following BAC formula,

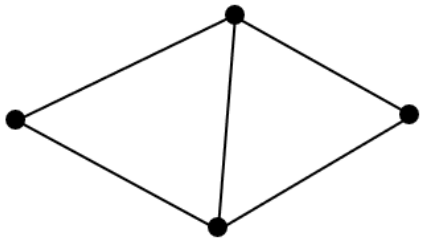
$$\text{BAC}_{Female} = \frac{10N - 7.5H}{5.5M}$$

Where N is the number of standard drinks consumed,
H is the number of hours since they started drinking and
M is the person's mass in kilograms.

Chloe weighs 68kg and had a BAC of 0.08 after drinking for 3 hours.
How many standard drinks did she consume during that time period?

(A) Between 5 and 6
(B) Between 6 and 7
(C) Between 7 and 8
(D) Between 8 and 9

15 How many different spanning trees are in the following graph?



(A) 6
(B) 7
(C) 8
(D) 9

End of Section I

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Student Number

Barker College

Mathematics Standard 2

Section II Answer Booklet

85 marks
Attempt Questions 16-33
Allow about 2 hours and 5 minutes for this section

Instructions:

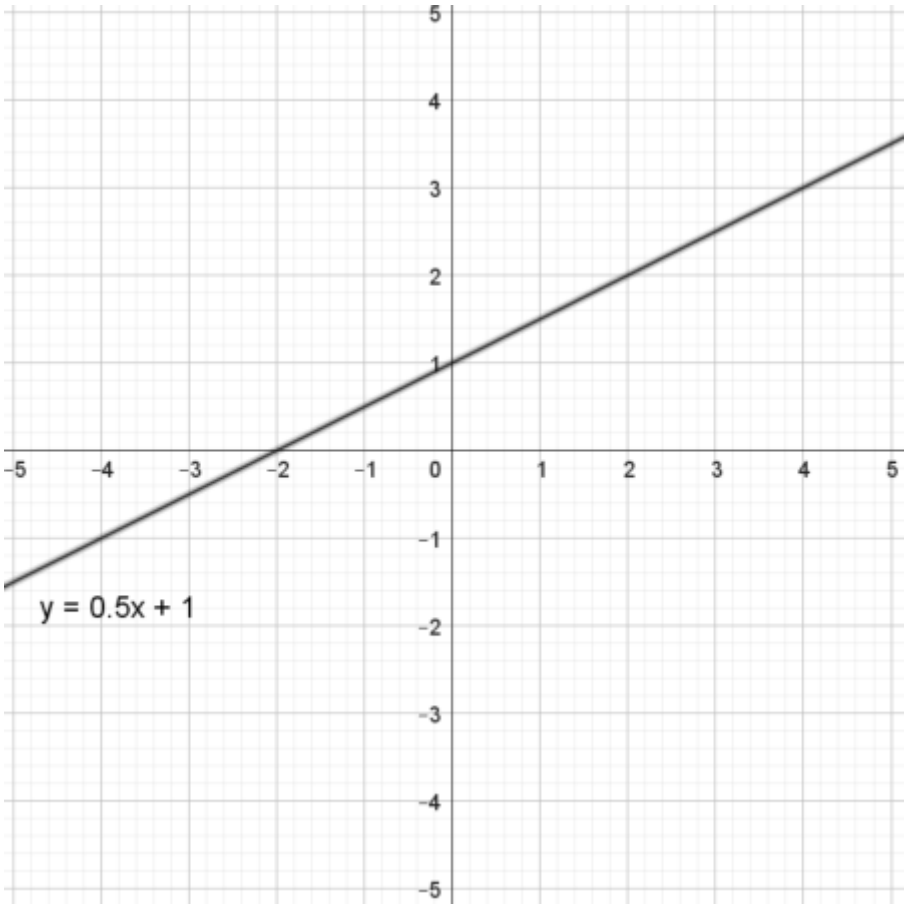
- Write your Student Number at the top of the page where indicated.
- Answer the questions in the spaces provided. These spaces provide guidance for the expected length of response.
- Your responses should include relevant mathematical reasoning and/or calculations.

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Student Number

Question 16 (2 marks)

The line $y = \frac{1}{2}x + 1$ is shown on the axes below.



(a) Draw the line $x - y = 1$ on the same axis above **1**

x	-1	0	1	2
y				

(b) What are the coordinates of the point of intersection of $x - y = 1$ and $y = \frac{1}{2}x + 1$? **1**

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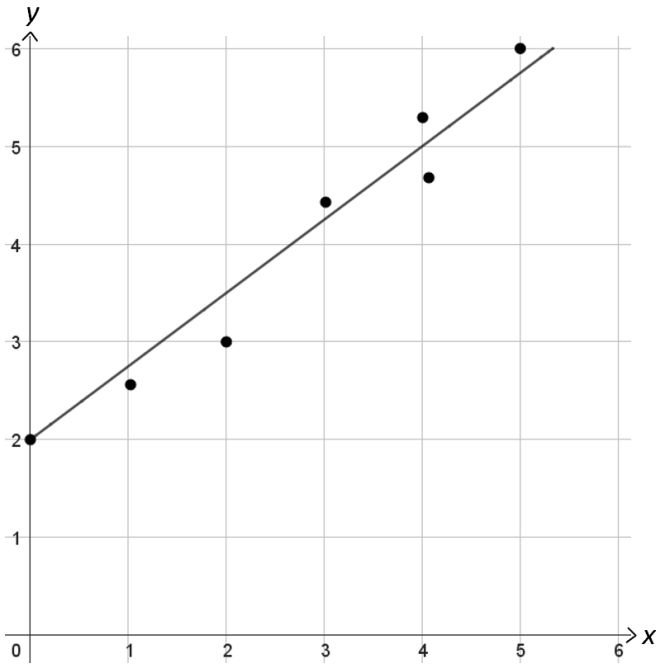
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Question 17 (3 marks)

Consider the bivariate data shown in the scatterplot below



(a) Describe the strength of the relationship between x and y as strong, moderate or weak. **1**

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(b) Find the equation of the line of best fit that is drawn on the scatterplot. **2**

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Question 18 (3 marks)

The Magical Muffin Shop has a fixed cost ($C) of $160 per day and a variable cost of $4 per muffin produced. The selling price of each muffin is $6. The maximum daily production is 100 muffins.

A table for the cost of producing n muffins is given:

n	0	10	20	30	40	50	60	70	80	90	100
$C	160	200	240	280	320	360	400	440	480	520	560

(a) Write down the equation for $C in terms of n. **2**

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A table for the Income ($I) generated by selling n muffins is given:

n	10	20	30	40	50	60	70	80	90
$I	60	120	180	240	300	360	420	480	540

(b) What is the break-even Income? **1**

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Question 19 (7 marks)

Laura earns $45 000 as a sales representative. She also earns $3 400 from interest gained from her bank account. Her allowable tax deductions total $7 200.

(a) What is Laura's taxable income? **1**

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Taxable Income	Tax Payable
$0 - $6 000	Nil
$6 001 - $20 000	17c for each $1 over $6 000
$20 001 - $50 000	$2 380 plus 30c for each $1 over $20 000
$50 001 - $60 000	$11 380 plus 42c for each $1 over $50 000
Over $60 000	$15 580 plus 47c for each $1 over $60 000

(b) Using the above table, find her tax payable. **2**

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(c) If her employer is deducting $160 per week for tax, will she receive a refund at the end of the financial year or will she have to pay extra tax?
Show calculations in your answer (Assume a 52 week year). **2**

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(d) Laura earns $79 000 in the follow year. She pays $19 000 in tax.
What amount did Laura claim as tax deductions? **2**

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Question 20 (6 marks)

Two standard dice have faces numbered 1 to 6.
The faces of one die are painted red while the faces on the other die are painted green.
The two dice are rolled and a score is recorded by doubling the number on the uppermost face of the red die and adding it to the number on the uppermost face of the green die.

(a) Complete the below sample space diagram, according to the above conditions. **2**

Green die

Red die	1	2	3	4	5	6
1						
2						
3						
4						
5						
6						

(b) What is the lowest possible recorded score? **1**

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(c) Find the probability that the score is 17. **1**

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(d) List all scores that occur least often. **1**

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(e) Find the probability that the score is less than 7. **1**

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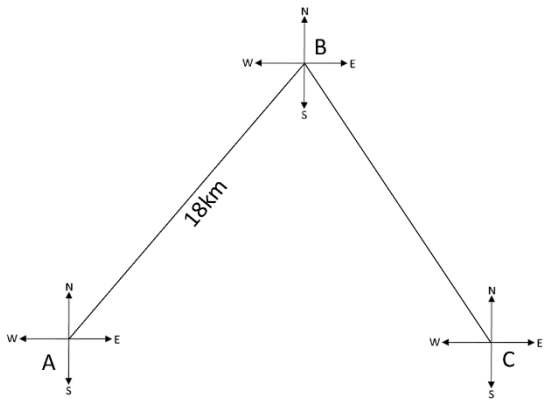
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Question 21 (7 marks)

The bearing of town B from town A is 028ºT and the bearing of town B from town C is 340ºT. The distance AB is 18km. Town C is due east of town A.



(a) Find the size of $\angle ACB$. **1**

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(b) Use the Sine Rule to find the distance BC (to 3 decimal places). **2**

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(c) Use the Cosine Rule to find the distance AC (to 3 decimal places). **3**

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(d) What is the bearing of C from B? **1**

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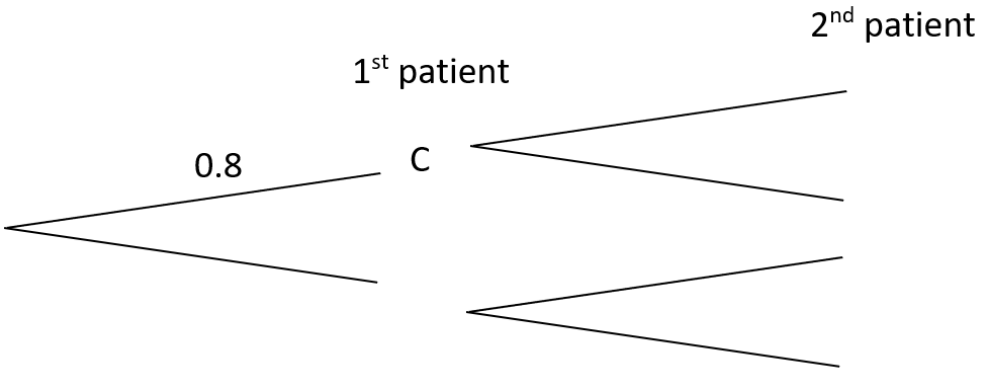
Student Number

Question 22 (4 marks)

The probability that a person infected with a particular virus will be cured when treated with a certain antiviral is 0.8.

Suppose that two patients who are infected with this virus are both treated with this antiviral.

(a) A tree diagram has been started below. Complete the labelling of each branch, C (for cured) or I (for still infected) and place the relevant probability along each branch. **2**



(b) Hence, find the probability that neither patient will be cured. **1**

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(c) What is the probability that only one of the patients will be cured? **1**

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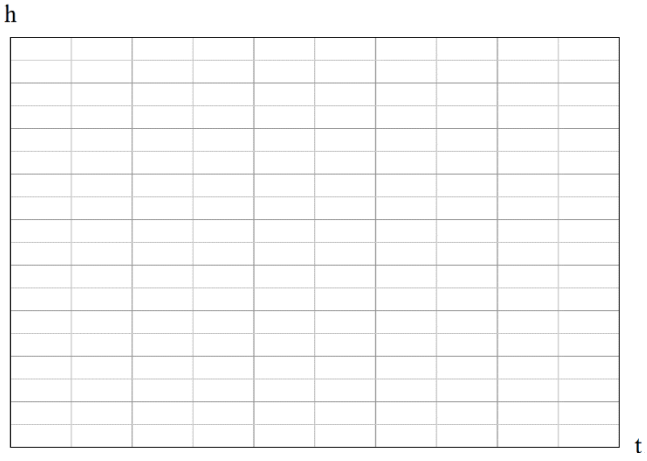
Question 23 (8 marks)

A ball is thrown vertically upwards in the air. The height of the ball, h metres, is given by the quadratic equation $h = -t^2 + 4t + 5$, where t is the time in seconds.

(a) Complete the table of values. **2**

t	0	1	2	3	4	5
h						

(b) Sketch the graph of the quadratic equation.
Place the t values on the horizontal axis. **2**



(c) What is the exact height of the ball after 1.5 seconds? **1**

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(d) How far did the ball travel in the first second? **1**

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(e) Through what total distance did the ball travel, if it stops at 5 seconds? **1**

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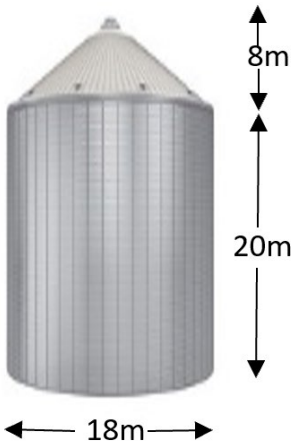
(f) When did the maximum height occur? **1**

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Question 24 (5 marks)

A grain silo consist of a cylindrical base and a conical top.



Volume of a cone

$$V = \frac{1}{3}Ah$$

where A is area of circle

(a) Find the volume of the silo, rounding your answer to 4 significant figures. **2**

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(b) What is the depth of grain in the silo (to 2 dec. pl.) when it is 25% full. **3**

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Question 25 (7 marks)

Future value of $1 invested

Period	Interest rate per period									
	2%	2.5%	3%	3.5%	4%	4.5%	5%	5.5%	6%	8%
1	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
2	2.0200	2.0250	2.0300	2.0350	2.0400	2.0450	2.0500	2.0550	2.0600	2.0800
3	3.0604	3.0756	3.0909	3.1062	3.1216	3.1370	3.1525	3.1680	3.1836	3.2464
4	4.1216	4.1525	4.1836	4.2149	4.2465	4.2782	4.3101	4.3423	4.3746	4.5061
5	5.2040	5.2563	5.3091	5.3625	5.4163	5.4707	5.5256	5.5811	5.6371	5.8666
6	6.3081	6.3877	6.4684	6.5502	6.6330	6.7169	6.8019	6.8881	6.9753	7.3359
7	7.4343	7.5474	7.6625	7.7794	7.8983	8.0192	8.1420	8.2669	8.3938	8.9228
8	8.5830	8.7361	8.8923	9.0517	9.2142	9.3800	9.5491	9.7216	9.8975	10.6366
9	9.7546	9.9545	10.1591	10.3685	10.5828	10.8021	11.0266	11.2563	11.4913	12.4876
10	10.9497	11.2034	11.4639	11.7314	12.0061	12.2882	12.5779	12.8754	13.1808	14.4866
11	12.1687	12.4835	12.8078	13.1420	13.4864	13.8412	14.2068	14.5835	14.9716	16.6455
12	13.4121	13.7956	14.1920	14.6020	15.0258	15.4640	15.9171	16.3856	16.8699	18.9771

(a) By using the table above, calculate the future value of an annuity if $6000 is invested at the end of each year for 5 years at 6% p.a. **2**

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Question 25 continues on page 21

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Question 25 (continued)

Present value of an annuity of $1

Period	Interest rate per period									
	2%	2.5%	3%	3.5%	4%	4.5%	5%	5.5%	6%	8%
2	1.9416	1.9274	1.9135	1.8997	1.8861	1.8727	1.8594	1.8463	1.8334	1.7833
3	2.8839	2.8560	2.8286	2.8016	2.7751	2.7490	2.7232	2.6979	2.6730	2.5771
4	3.8077	3.7620	3.7171	3.6731	3.6299	3.5875	3.5460	3.5052	3.4651	3.3121
5	4.7135	4.6458	4.5797	4.5151	4.4518	4.3900	4.3295	4.2703	4.2124	3.9927
6	5.6014	5.5081	5.4172	5.3286	5.2421	5.1579	5.0757	4.9955	4.9173	4.6229
7	6.4720	6.3494	6.2303	6.1145	6.0021	5.8927	5.7864	5.6830	5.5824	5.2064
8	7.3255	7.1701	7.0197	6.8740	6.7327	6.5959	6.4632	6.3346	6.2098	5.7466
9	8.1622	7.9709	7.7861	7.6077	7.4353	7.2688	7.1078	6.9522	6.8017	6.2469
10	8.9826	8.7521	8.5302	8.3166	8.1109	7.9127	7.7217	7.5376	7.3601	6.7101
20	16.3514	15.5892	14.8775	14.2124	13.5903	13.0079	12.4622	11.9504	11.4699	9.8181

(b) An annuity of $3000 is deposited at the end of each quarter for 5 years. The interest rate is 8% p.a. Find the present value of the annuity. **2**

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(c) Find the amount of money that should be invested each quarter at 8% p.a. to produce $250 000 at the end of 5 years. **3**

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Question 26 (4 marks)

A patient in hospital is given an antibiotic solution intravenously at the rate of 90*mL/h*.

(a) How much antibiotic solution will the patient receive in 6 hours and 20 minutes? **1**

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(b) How many times would 199mL containers of the antibiotic solution need to be changed during that patient's treatment assuming she initially started with a full container? **1**

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(c) If 1mL of this solution contains 16 drops, calculate the rate at which the patient receives the antibiotic in drops/minute (the drip rate). **2**

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Question 27 (4 marks)

The time taken to complete a task is inversely proportional to the number of workers doing the task.

(a) If it takes 4 days for 30 workers to complete the task, write an equation to model the relationship between the time taken to complete the task and the number of workers doing the task. **2**

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(b) How long would it take 13 workers to complete the task. Give your answer in days and hours (to the nearest hour). **2**

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Question 28 (5 marks)

Emily has a credit card with an interest rate of 21.9% p.a, where interest is compounded daily on the balance owing. Both the purchase date and the payment date must be included in calculations. There is no interest-free period on any purchases.

She received the following statement for April.

April Statement		
Date	Details	Amount ($)
1 April	Opening balance	40
8 April	Purchase	60
17 April	Purchase	30
23 April	Payment	-100

(a) What is the daily percentage rate of interest charged on this account?p **1**

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(b) Calculate how much is owed at the end of 7th April, to the nearest cent. **1**

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(c) Calculate how much is owed at the end of 16th April, to the nearest cent. **1**

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(d) Hence, calculate the balance on this credit card at the end of April, correct to the nearest cent. **2**

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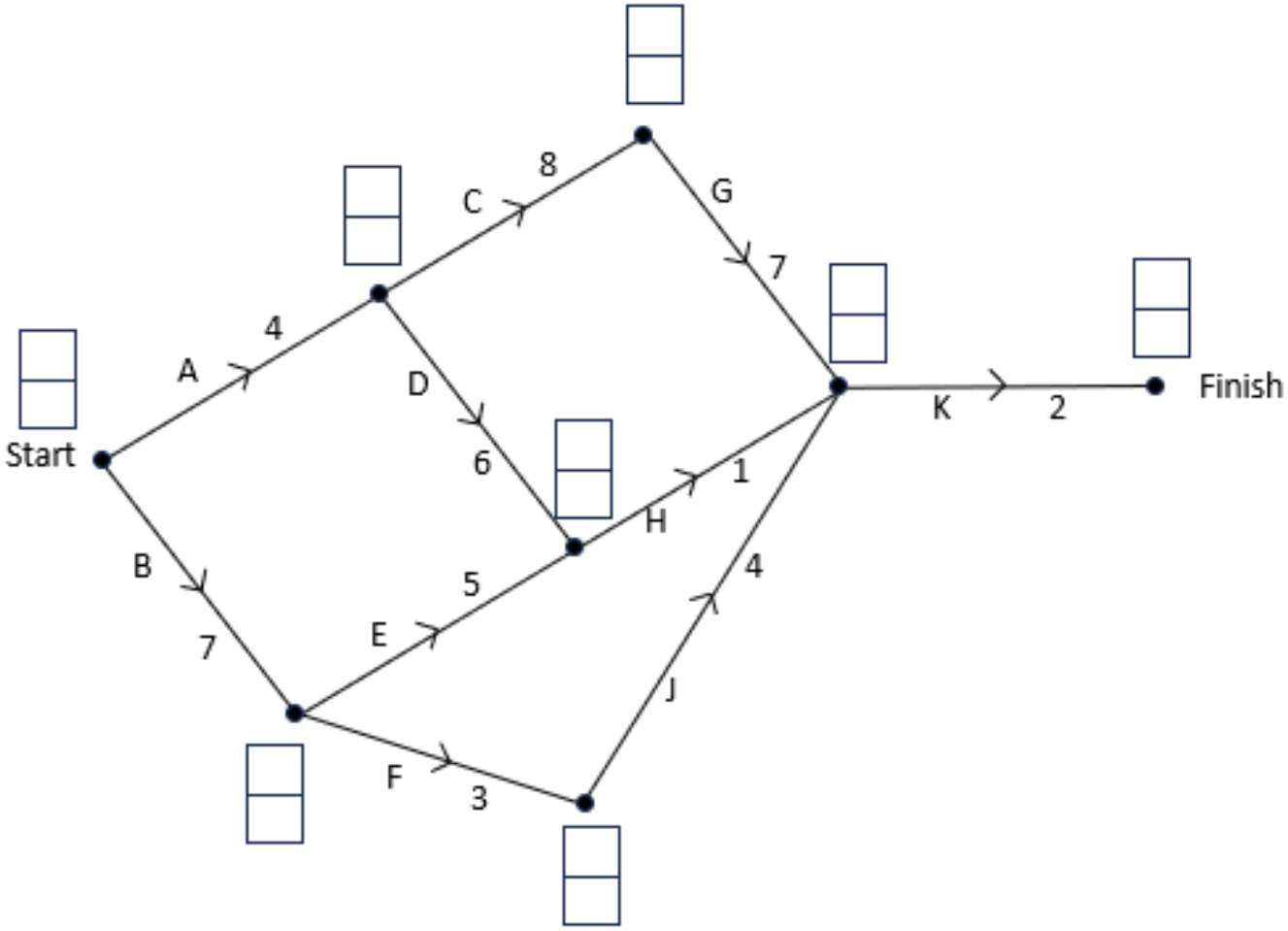
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Question 29 (5 marks)

The network below shows the various activities required to complete a task. The time for each subtask is shown in hours.



(a) Complete both forward and backward scans for this network, showing times in hours. **2**

(b) What is the float time for task E? **1**

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(c) If there is a delay of 6 hours between the completion of task F and the start of task J, what effect will it have on the critical path? Justify your answer. **2**

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Question 30 (2 marks)

On a map of NSW, two towns are 130mm apart.
The scale of the map is 1:10 000 000.
What is the actual distance between these two towns in kilometres? **2**

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Question 31 (3 marks)

A doctor used Young's formula to calculate the required medication dosage for a child.

Young's formula is:

$$Child's\ Dosage = \frac{Age\ of\ Child\ (years) \times Adult\ Dose}{Age\ of\ Child\ (years) + 12}$$

The doctor found that the child's dose was one quarter of the adult dose, regardless of the amount of the adult dose.

How old is the child? **3**

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Question 32 (6 marks)

This activity chart lists the steps involved when Annabel makes her famous slice for our Connect Group.

Code	Activity	Time (mins)	Prerequisite
A	Preheat oven	12	-
B	Melt Butter	5	-
C	Sift dry ingredients	3	-
D	Mix ingredients	2	B, C
E	Grease tin	2	-
F	Press ingredients into tin	1	D, E
G	Bake slice	25	A, F
H	Prepare topping	10	-
I	Cool slice	5	G
J	Add topping	3	H, I

(a) Draw a weighted, directed network for this activity chart. **3**

(b) For which activity is preparing the topping a prerequisite? **1**

……

(c) What is the critical path? **1**

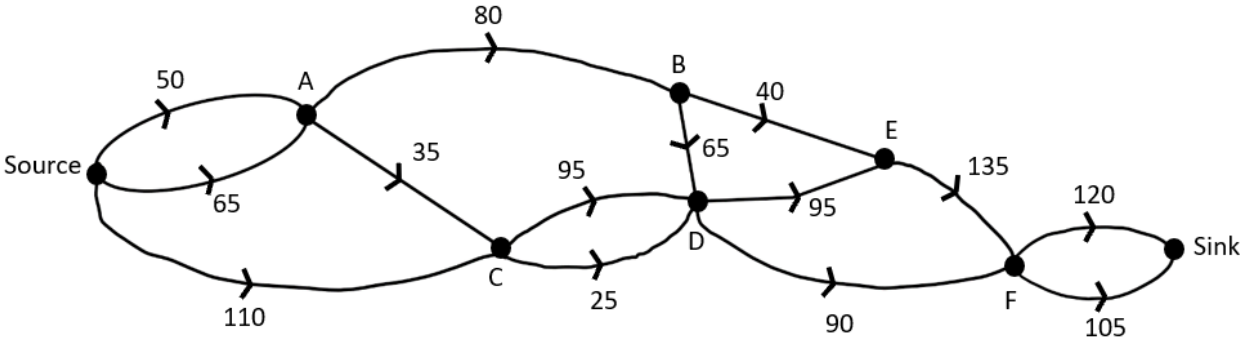
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(d) What is the minimum time required to make this slice? **1**

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Question 33 (4 marks)

Water flows from the source to the sink through a network of pipes. The flow diagram below shows the litres of water per minute flowing from the source through each pipe. The vertices represent pumps.



(a) What is the maximum flow of water through the network? **2**

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(b) The network capacity is to be increased to 225 L/min.
One new pipe is to be constructed between two of the existing pumps, such that all pipes are flowing at full capacity.
Between which two pumps should the pipe be constructed so all pipes are flowing at full capacity and what would be the capacity of the new pipe? **2**

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End of Paper

Student Solutions for 4/8/23 Standard Mathematics Trial

Section 1: Multiple Choice

Q1// D.

Q2// B.

Q3// $\angle ABC = 58°$

$\sin 58° = \frac{12}{AB}$

$AB = \frac{12}{\sin 58°}$

C.

Q4// B.

Q5// Area $= \frac{1}{2} \times 80 \times 72 \times \sin 120°$

$= 2494\ m^2$ C.

Q6// $450\ W = 0.45\ KW$

Annual cost $= 0.45 \times 6 \times 365 \times \$0.19$

$= \$187.245$ A.

Q7// precision $= 0.01\ g$

absolute error $= 0.005\ g$

% error $= \frac{0.005}{8.24} = 0.060679\%$ C.

Q8// There are 31 scores.

The 16th score is $Q_2 = 27$

The 8th score is $Q_1 = 23$

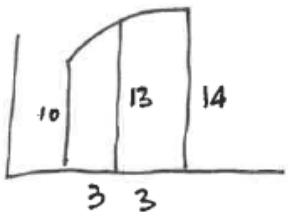
The 24th score is $Q_3 = 28$

Hence IQR $= Q_3 - Q_1$

$= 28 - 23$

$= 5$ B.

Q9//



Area $= \frac{1}{2} \times 3 \times (10 + 13)$

$= 34.5$

Area $= \frac{1}{2} \times 3 \times (13 + 14)$

$= 40.5$

Total area $= 75\ units^2$

B.

Q10// One share costs

$\frac{\$1344}{480} = \$2.80$

$0.115 \times \$2.80 = \$0.32$

B.

Q11// $400000(1 - 0.08)^{10}$

$= \$173,755.38$

∴ Depreciated by

$\$400000 - \$173\,755.38$

$= \$226\,244.62$ D.

Q12// By calculator,

$A = 25.136$

$B = 0.819$

$\therefore y = 25.136 + 0.819x$

when $y = 70$,

$70 = 25.136 + 0.819x$

$\frac{44.864}{0.819} = x$

$x = 54.78$

$x \approx 55$ B.

Q13// All the vertices are of even degree except the 2 odd vertices E and F.

Hence (B).

Q14// $0.08 = \frac{10N - 7.5(3)}{5.5 \times 68}$

$0.08 \times 374 = 10N - 22.5$

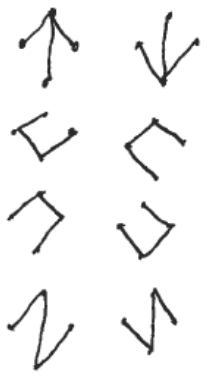
$29.92 = 10N - 22.5$

$10N = 52.42$

$N = 5.242$

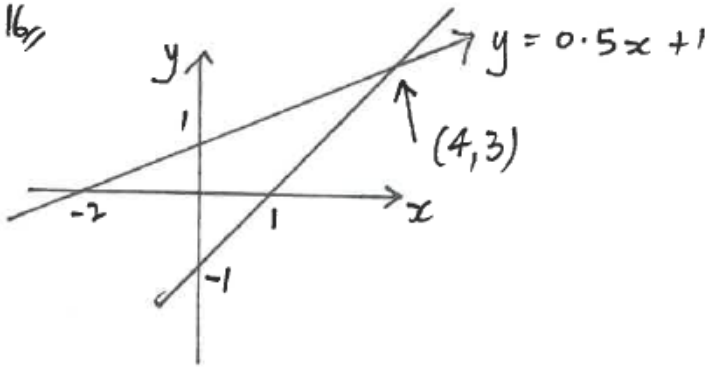
∴ A.

Q15//



8 altogether C.

Q16//



(a)

x	-1	0	1	2
y	-2	-1	0	1

(b) (4,3)

Q17// (a) strong

(b) Using the points on the diagram (0,2) and (4,5), the gradient is $\frac{3}{4}$ and the y-intercept is 2.

Hence the equation is $y = \frac{3}{4}x + 2$

Q18// (a) $C = 160 + 4n$

(b) $480

Q19// (a) Taxable income

= $45000 + $3400 - $7200

= $41 200

(b) Tax payable

= $2380 + 0·30 × ($41 200 - $20 000)

= $2380 + $6360

= $8740

(c) Tax already paid

= $160 × 52

= $8320

But $8320 < $8740, so she must pay more tax.

(d) $19000 = $15 580 × 0·47x ($79000 - x - $60 000)

$19000 = $15 580 + $8930 - 0·47x

0·47x = $5510

x = $11 723·40

Q20//

(a)

Red die \ Green die	1	2	3	4	5	6
1	3	4	5	6	7	8
2	5	6	7	8	9	10
3	7	8	9	10	11	12
4	9	10	11	12	13	14
5	11	12	13	14	15	16
6	13	14	15	16	17	18

(b) 3 (c) $\frac{1}{36}$ (d) 3, 4, 17, 18

(e) $\frac{6}{36} = \frac{1}{6}$

Q21// (a) 70°

(b) $\frac{BC}{\sin 62°} = \frac{18}{\sin 70°}$

$BC = 16.913$ Km

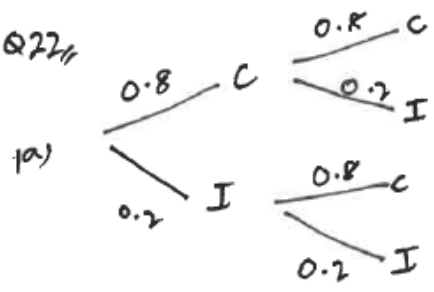
(c) $AC^2 = 18^2 + 16.913^2 - 2 \times 18 \times 16.913 \times \cos 48°$

$AC^2 = 202.637355$

$AC = 14.235$ Km

(d) $90° + 70° = 160°$

Q22//



(b) $P(I, I) = 0.2 \times 0.2 = 0.04$

or 4%

(c) $P(IC \text{ OR } CI) = (0.2 \times 0.8) + (0.8 \times 0.2)$

$= 0.16 + 0.16$

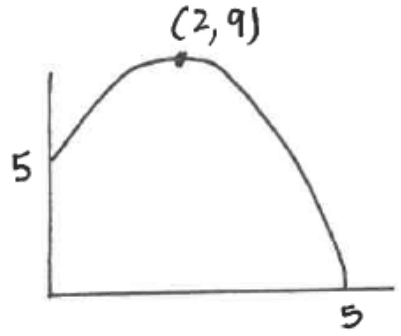
$= 0.32$

or 32%

Q23// (a)

t	0	1	2	3	4	5
h	5	8	9	8	5	0

(b)



(c) when $t = 1.5$,

$h = -(1.5)^2 + 4(1.5) + 5$

$h = -2.25 + 6 + 5$

$h = 8.75$ m

(d) 3m (e) 4 up then 9 down = 13m

(f) $t = 2$ seconds

Q24// (a) $V = \pi r^2 h$ (cylinder) + $\frac{1}{3}\pi r^2 h$ (cone)

$V = \pi \times 9^2 \times 20 + \frac{1}{3} \times \pi \times 9^2 \times 8$

$= 5768$ (4 sig fig)

(b) $\frac{1}{4} \times 5768 = 1442$ m^3

Solve $1442 = \pi \times 9^2 \times h$

$h = \frac{1442}{81\pi} \approx 5.67$ m

(2 dec. places)

Q25// (a) $6000 × 5.6371

= $33 822.60

(b) 8% pa = 2% per quarter

PV = $3000 × 16.3514

= $49 054.20

(c) $250 000 is the FV and

$FV = PV \times 1.02^n$ so

$250\,000 = PV \times 1.02^{20}$

$\therefore PV = \$168\,242.83$

Annuity instalment × table = PV

Annuity instalment × 16.3514 = $168 242.83

$\therefore$ Annuity instalment = $10 289.20

Q26// (a) 6 hours and 20 mins = $6\frac{1}{3}$ hours

Patient receives exactly $6\frac{1}{3} \times 90\,mL = 570\,mL$

(b) $\frac{570}{199} = 2.86$ Therefore twice.

(c) Number of drops required is

$570 \times 16 = 9120$ drops

$6\frac{1}{3}$ hours = 380 mins

Required drip rate is $\frac{9120}{380} = 24$ drips/min

Q27// (a) $T = \frac{k}{N}$

$4 = \frac{k}{30}$

$k = 120$

$\therefore T = \frac{120}{N}$

(b) $T = \frac{120}{13}$

$= 9.230769231\ldots$

= 9 days and 5.538h

$\approx$ 9 days and 6 hrs

Q28//

(a) Daily rate of interest is

$\frac{0.219}{365} = 0.0006$

(b) From 1st to 7th

$\$40(1.0006)^7 = \$40.17$

(c) $(40.17 + \$60) \times 1.0006^9$

= $100.71

(d) From 17th to 22nd is 6 days, so

$(\$100.71 + \$30) \times 1.0006^6$

= $131.18

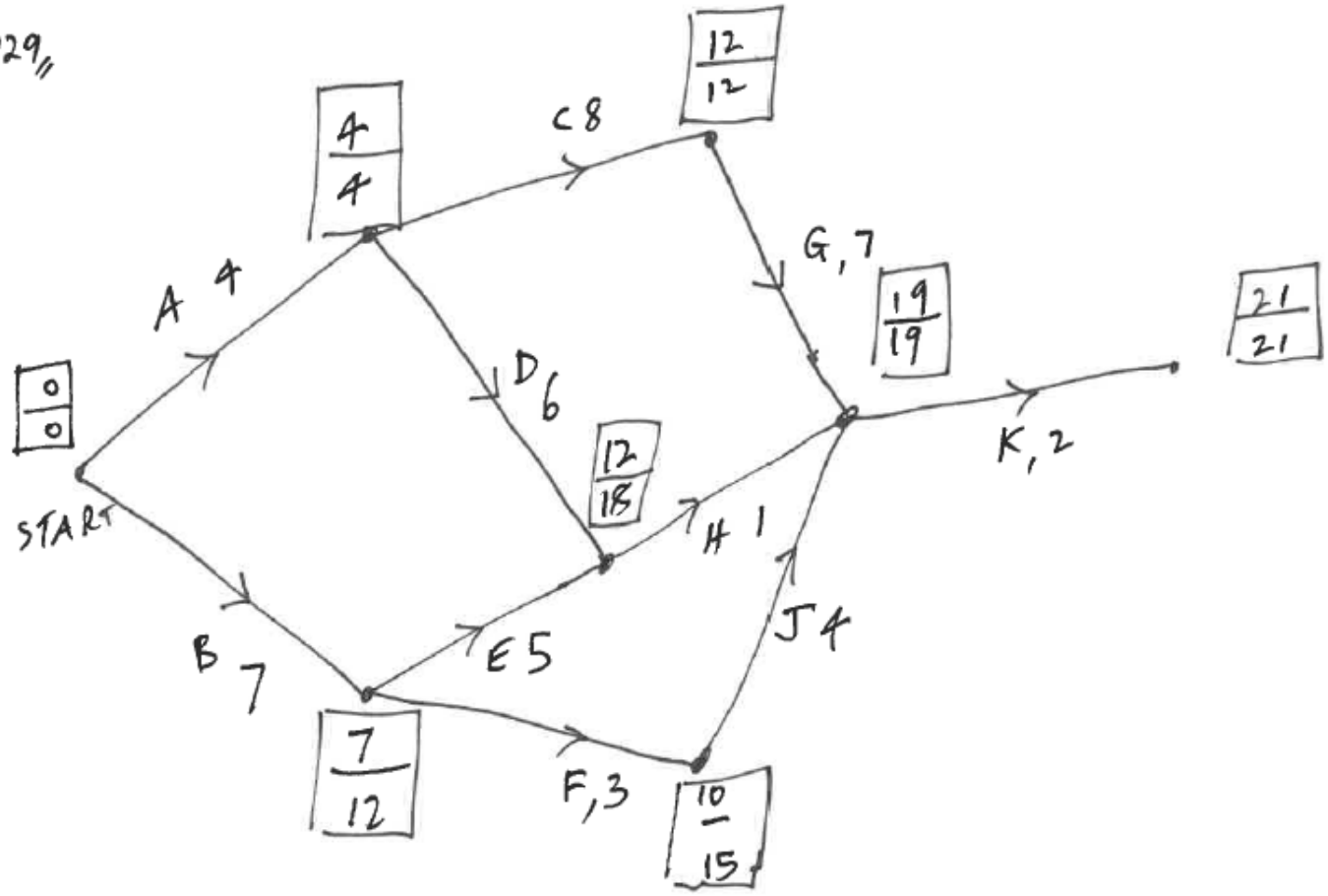
Then the payment of $100 on 23rd makes the balance $31.18

From 23rd to 30th is 8 days

$\therefore$ Balance $= \$31.18 \times 1.0006^8$

= $31.33

Q29



(a) above

(b) 18-7-5 = 6 hrs

(c) The old critical time was 21 hours.
Activity J has a float time of 5 hours,
so a delay of 6 hours will increase the
critical time by 1 hour. The new critical time
will increase to 22 hours and the new
critical path is B F J K.

Q30// 130 mm on the map

Represents $130 \times 10\,000\,000$ mm in reality.

$1\,300\,000\,000$ mm

$= 1\,300\,000$ m

$= 1300$ Km in reality

Q31// Suppose adult dose is 8 and child's is 2, then

$$2 = \frac{x \times 8}{x + 12}$$

$$2(x+12) = 8x$$

$$2x + 24 = 8x$$

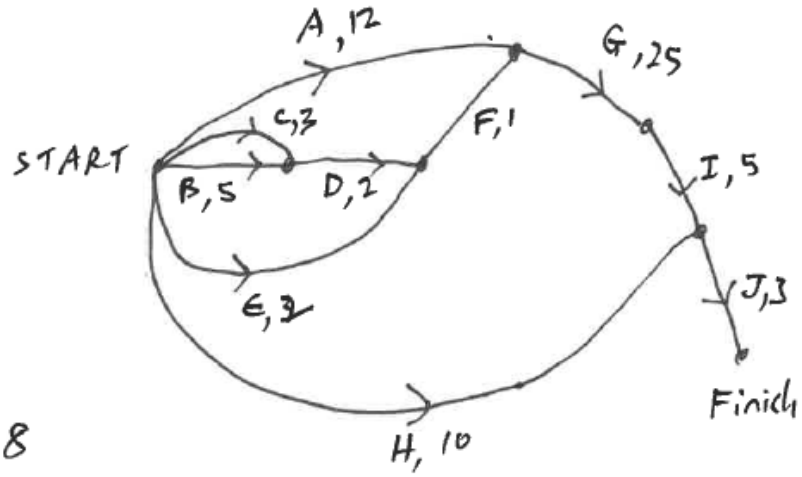
$$24 = 6x$$

$$x = 4$$

The child is 4 years old.

Q32//

(a)



(b) Adding the topping

(c) A G I J

(d) minimum time

$= (12 + 25 + 5 + 3)$

$= 45$ mins.

Q33// (a) The maximum flow is 200L.

(b) A pipe with capacity 25L/min from C to B will increase the flow capacity to 225L/min.