

2021 YEAR 9 MATHEMATICS

Written examination

Reading time: 15 minutes

Writing time: 3 hours

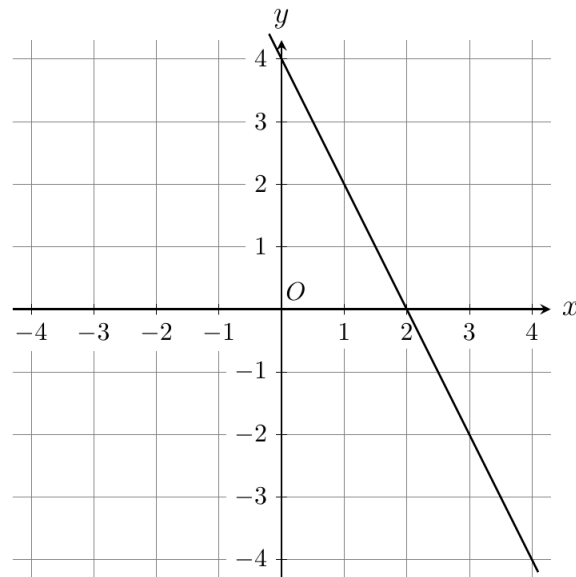
2021 version 1

QUESTION BOOK

Structure of book

<i>Section</i>	<i>Number of questions</i>	<i>Number of questions to be answered</i>	<i>Number of marks</i>
A	20	20	20
B	10	10	50
C	3	3	30
			Total 100

The following information relates to Questions 7 – 9.



Question 7

The gradient of the line shown above is

- A. -4
- B. -2
- C. 1
- D. 2
- E. 4

Question 8

The coordinates of some points are given below.

$(2, 3)$	$(2, 0)$	$\left(\frac{3}{2}, 1\right)$	$(4, 0)$
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The number of these points that the line passes through is

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

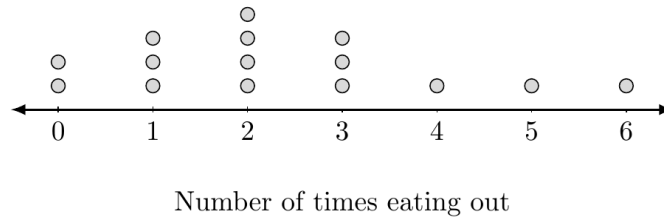
Question 9

The coordinates of the midpoint of the line segment joining the axis intercepts are

- A. $(1, 2)$
- B. $(0, 4)$
- C. $(2, 4)$
- D. $(2, 0)$
- E. $(0.5, 1)$

The following information relates to Questions 17 – 18

The following dot plot shows the number of times 15 families ate out last week.



Question 17

The modal number of times that the families ate out last week is

- A. 1
- B. 2
- C. 2.3
- D. 4
- E. 6

Question 18

The distribution shown by the dot plot is

- A. symmetric
- B. bimodal
- C. negatively skewed
- D. positively skewed
- E. uniform

Question 2 (5 marks)

Ben works as an actuary and earns an annual salary of \$98,000.

Richard works as a salesman and earns \$49.50 per hour.

Both Ben and Richard work 38 hours per week.

a. Find Richard's weekly earnings.

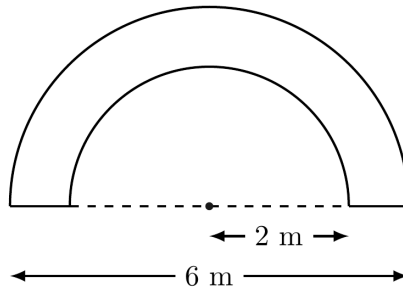
2 marks

b. Determine who earns more per fortnight and by how much.

3 marks

Question 8 (5 marks)

Consider the shape shown below.



- a. The area of the shape is $k\pi \text{ m}^2$, where k is a positive constant.
Find the value of k .

3 marks

- b. Find the perimeter of the shape.
Round your answer to one decimal place.

2 marks

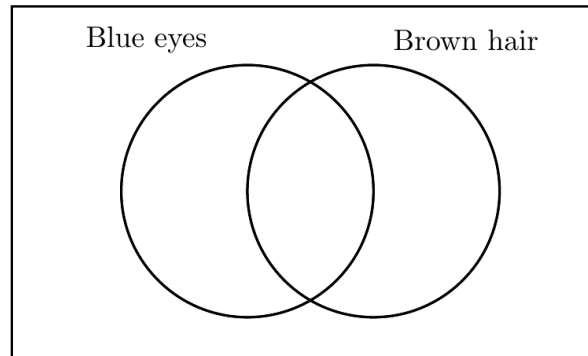
Question 9 (5 marks)

A class consists of 36 students.

12 have blue eyes, 13 have brown hair, and 6 have both blue eyes and brown hair.

a. Represent this information on the Venn diagram below.

2 marks



A student from the class is randomly selected.

b. What is the probability that the student has neither blue eyes nor brown hair?

1 mark

c. What is the probability that the student has blue eyes, but not brown hair?
Express your answer as a fraction in its simplest form.

2 marks

SECTION C**Instructions for Section C**

Answer **all** questions.

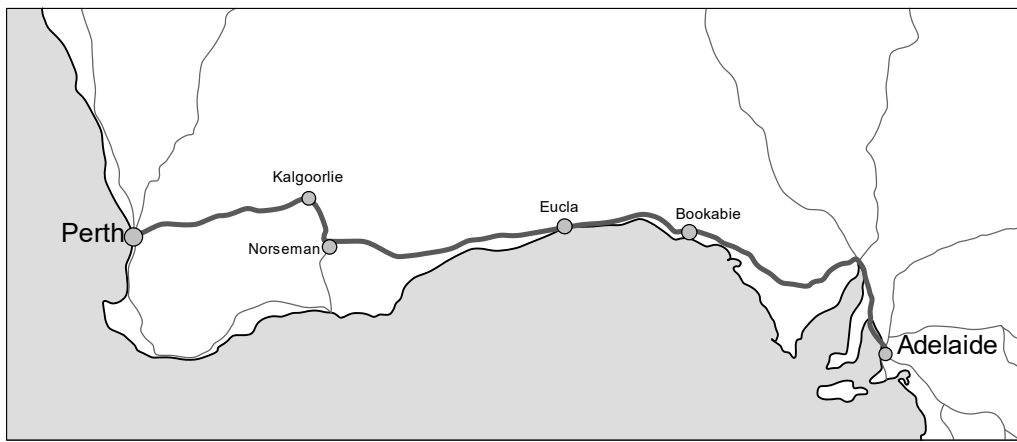
In all questions where a numerical answer is required, an **exact** value must be given unless otherwise specified.

In questions where more than one mark is available, appropriate working **must** be shown.

Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

Question 1 (10 marks)

The distance between Adelaide and Perth is approximately 2,696 km.



- a.** Find the distance between Adelaide and Perth in metres.
Show your working.

2 marks

- b.** Express your answer to part **a** in scientific notation.

1 mark

- c.** A traveller is driving from Adelaide to Perth.
Kalgoorlie is 80.16% of the way to Perth from Adelaide.
What is the distance between Kalgoorlie and Perth?
Round your answer to the nearest kilometre.

2 marks

Question 3 (10 marks)

Two pharmacies (Downtown and Midtown) both sell a particular brand of sunscreen ahead of summer. The number of bottles of sunscreen sold at these two pharmacies over a 13-day period are compared in the following back-to-back stem-and-leaf plot.

Downtown						Midtown				
				9	0	2	5	6		
		8	6	5	1	1	1	3	5	7 8
	8	7	4	4	2	3	5	5	9	
9	8	5	4	2	3					

0|2 means 2 bottles

- a.** What type of variable is the number of bottles sold? 1 mark

- b.** Show that the range of bottles sold for Midtown pharmacy is 27. 1 mark

- c.** Which shop has a greater spread of the number of bottles sold? 2 marks
Support your answer with a relevant measure.

- d.** On what percentage of days did Downtown pharmacy sell more than 18 bottles? 2 marks
Round your answer to one decimal place.

SOLUTIONS**SECTION A**

Question	Answer
1	A
2	D
3	C
4	E
5	D
6	C
7	B
8	C
9	A
10	D
11	E
12	D
13	B
14	C
15	B
16	A
17	B
18	D
19	A
20	E

Question 1

$$\begin{aligned}\frac{4}{3} \div 2\frac{1}{3} &= \frac{4}{3} \div \frac{7}{3} \\ &= \frac{4}{3} \times \frac{3}{7} \\ &= \frac{4}{7}\end{aligned}$$

Answer is **A**.

Question 2

$$\$8.60 \times (1 - 0.2) = \$6.88$$

Answer is **D**.

Question 17

2 is the most frequently occurring number of times that the families ate out last week.

Answer is **B**.

Question 18

The distribution of the dot plot is positively skewed.

Answer is **D**.

Question 19

$$\frac{30+18+17}{30+18+25+17}$$
$$= \frac{13}{18}$$

Answer is **A**.

Question 20

Every Year 9 student either wishes to pursue tertiary study or work.
This means that statement **E** is true.

Answer is **E**.

SECTION B**Question 1 (5 marks)**

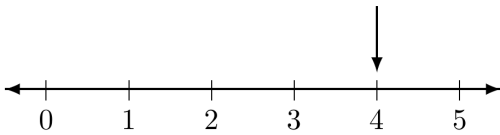
a. 1 mark
 $8 - 17 = -9.$ (A1)

b. 2 marks
 $\frac{11}{43} = 0.2558\dots$
 $23.5\% = 0.235$

• Decimal value of $\frac{11}{43}$ is written down. (A1)

Therefore, the numbers in ascending order are 23.5%, 0.25 and $\frac{11}{43}$. (A1)

c. 2 marks
 $2 \times \left(1 + \frac{100}{100}\right) = 4$ (A1)



- The number 4 is clearly indicated on the number line. (A1)
- A cross (X) or a circle (●) is acceptable.

Question 2 (5 marks)

a. 2 marks
 $\$49.50 \times 38$ (A1)
 $= \$1881$ (A1)

b. 3 marks
 Ben's fortnightly earnings are $\frac{\$98000}{26} = \$3769.2307\dots$ (A1)

Richard's fortnightly earnings are $\$49.50 \times 38 \times 2 = \3762 (A1)

Therefore, Ben earns $\$3769.2307\dots - \$3762 \approx \$7.23$ more than Richard per fortnight. (A1)

Question 3 (10 marks)

- a.** Numerical/discrete (A1) 1 mark
- b.** $29 - 2 = 27$ (A1) 1 mark
- c.** Downtown pharmacy. (A1) 2 marks
The range for Downtown pharmacy (30) is greater than that for Midtown pharmacy (27). (A1)
- Also accept the stem-and-leaf plot shows that the data values for Downtown pharmacy are more spread out.
- d.** $\frac{9}{13} \times 100$ (A1) 2 marks
 $\approx 69.2\%$ (A1)
- e.** skewed (A1) 2 marks
symmetric (A1)
- f.**
- i.** 40 bottles sold is significantly more than the rest of the daily sales for Midtown pharmacy. (A1) 1 mark
- ii.** Any two of: (A1) 1 mark
- mean
 - median
 - range
 - maximum value