

Review Packet—Linear Equations and the old stuff (Approximation, Error, Significant Figures and Number Sets)

1. At Jumbo's Burger Bar, Jumbo burgers cost $\pounds J$ each and regular cokes cost $\pounds C$ each. Two Jumbo burgers and three regular cokes cost $\pounds 5.95$.
- (a) Write an equation to show this.
- (b) If one Jumbo Burger costs $\pounds 2.15$, what is the cost, in pence, of one regular coke?

Working:

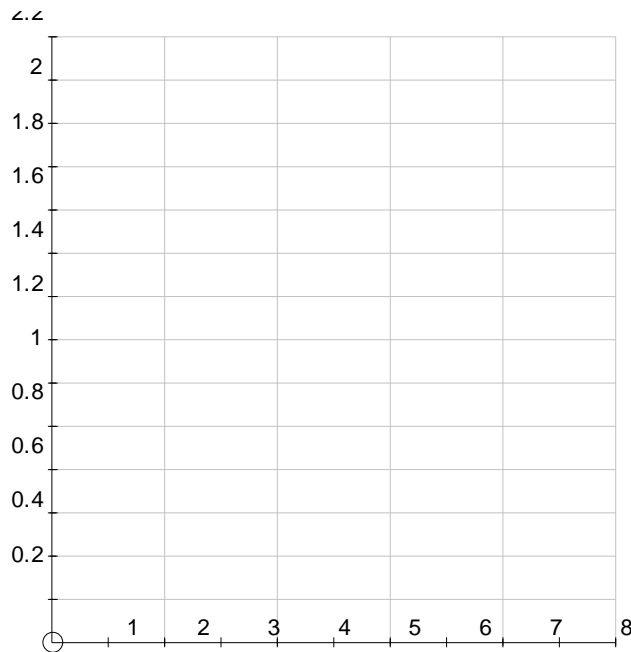
Answers:

(a)

(b)

(Total 4 marks)

2. The costs charged by two taxi services are represented by the two parallel lines on the following graph. The *Speedy Taxi Service* charges \$1.80, plus 8 cents for each kilometre.



- (a) Write an equation for the cost, c , in \$, of using the *Economic Taxi Service* for any number of kilometres, k .
- (b) Bruce uses the *Economic Taxi Service*.
- (i) How much will he pay for travelling 7 km?
- (ii) How far can he travel for \$2.40?

Working:

Answers:

- (a)
- (b) (i)
- (ii)

(Total 4 marks)

3. Let $m = 6.0 \times 10^3$ and $n = 2.4 \times 10^{-5}$.

Express each of the following in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(a) mn ;

(b) $\frac{m}{n}$.

Working:

Answers:

(a)

(b)

(Total 4 marks)

4. A rectangle has length 2.6×10^4 and width 1.9×10^4 . Find each of the following, giving your answer in the form $a \times 10^k$, where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(a) The area of the rectangle;

(b) The perimeter of the rectangle.

Working:

Answers:

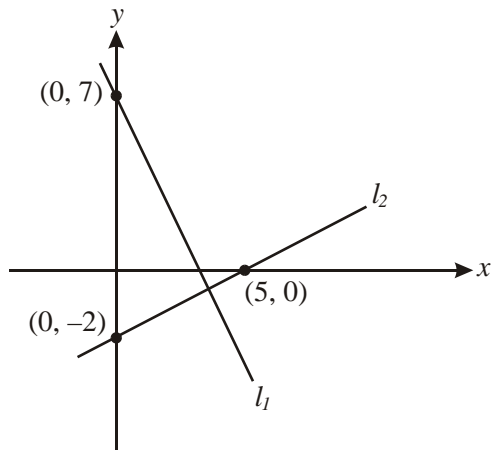
(a)

(b)

(Total 8 marks)

5. The following diagram shows the lines l_1 and l_2 , which are perpendicular to each other.

Diagram not to scale



- (a) Calculate the gradient of line l_1 .
- (b) Write the equation of line l_1 in the form $ax + by + d = 0$ where a , b and d are integers, and $a > 0$.

Working:

Answers:

- (a)
- (b)

(Total 8 marks)

6. The conversion formula for temperature from the Fahrenheit (F) to the Celsius (C) scale is given by $C = \frac{5(F - 32)}{9}$.

(a) What is the temperature in degrees Celsius when it is 50° Fahrenheit?

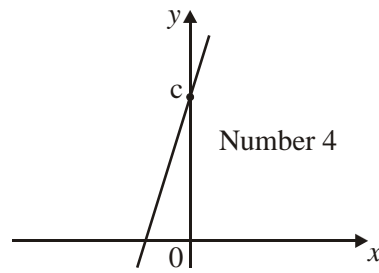
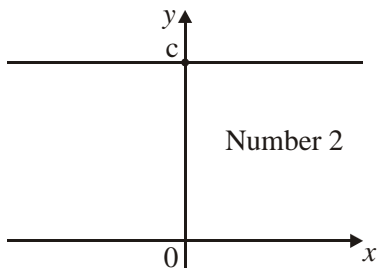
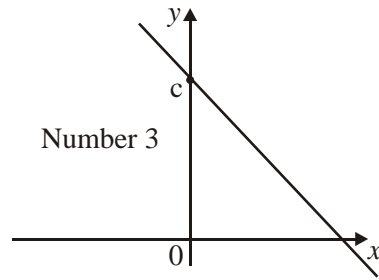
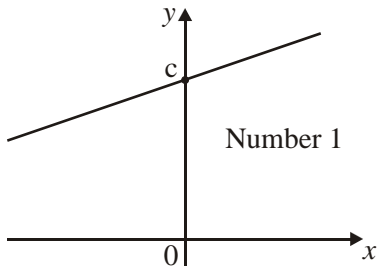
There is another temperature scale called the Kelvin (K) scale.
The temperature in degrees Kelvin is given by $K = C + 273$.

(b) What is the temperature in **Fahrenheit** when it is zero degrees on the Kelvin scale?

<p><i>Working:</i></p>	<p><i>Answers:</i></p> <p>(a)</p> <p>(b)</p>
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(Total 8 marks)

7. The four diagrams below show the graphs of four different straight lines, all drawn to the same scale. Each diagram is numbered and c is a positive constant.



In the table below, write the number of the diagram whose straight line corresponds to the equation in the table.

Equation	Diagram number
$y = c$	
$y = -x + c$	
$y = 3x + c$	
$y = \frac{1}{3}x + c$	

(Total 8 marks)

8. Let $x = 6.4 \times 10^7$ and $y = 1.6 \times 10^8$.

Find

(a) $\frac{x}{y}$

(b) $y - 2x$,

giving your answers in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

Working:

Answers:

(a)

(b)

(Total 8 marks)

9. Let $U = \{-4, -\frac{2}{3}, 1, \pi, 13, 26.7, 69, 10^{33}\}$.

A is the set of all the integers in U .

B is the set of all the rational numbers in U .

- (a) List all the prime numbers contained in U .
- (b) List all the members of A .
- (c) List all the members of B .
- (d) List all the members of the set $A \cap B$.

Working:

Answers:

- (a)
- (b)
- (c)
- (d)

(Total 8 marks)

10. (a) Given $x = 2.6 \times 10^4$ and $y = 5.0 \times 10^{-8}$, calculate the value of $w = x \times y$. Give your answer in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$.

(b) Which **two** of the following statements about the nature of x , y and w above are **incorrect**?

(i) $x \in \mathbb{N}$

(ii) $y \in \mathbb{Z}$

(iii) $y \in \mathbb{Q}$

(iv) $w < y$

(v) $x + y \in \mathbb{R}$

(vi) $\frac{1}{w} < x$

<p><i>Working:</i></p>	<p><i>Answers:</i></p> <p>(a)</p> <p>(b)</p>
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(Total 8 marks)

11. A problem has an **exact** answer of $x = 0.1265$.

- (a) Write down the **exact** value of x in the form $a \times 10^k$ where k is an integer and $1 \leq a \leq 10$.
- (b) State the value of x given correct to **two** significant figures.
- (c) Calculate the percentage error if x is given correct to **two** significant figures.

Working:

Answers:

(a)

(b)

(c)

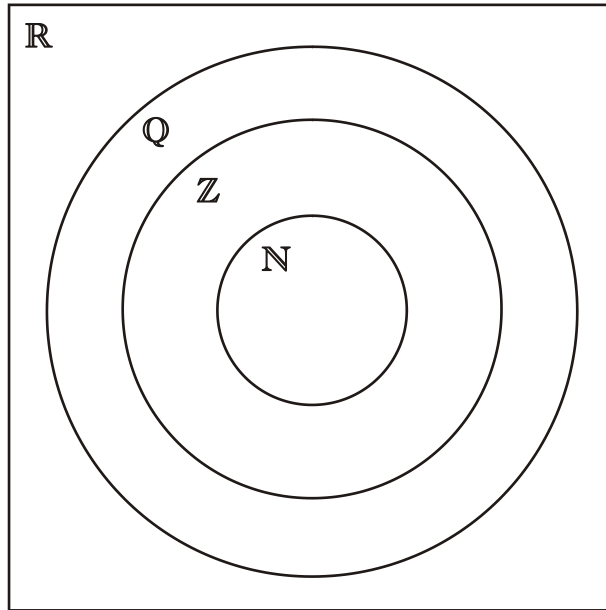
(Total 6 marks)

12. The Venn diagram below shows the universal set of real numbers \mathbb{R} and some of its important subsets:

\mathbb{Q} : the rational numbers,
 \mathbb{Z} : the integers,
 \mathbb{N} : the natural numbers.

Write the following numbers in the correct position in the diagram.

$$-1, 1, \pi, \frac{7}{16}, 3.333\dot{3}, \sqrt{3}.$$



Working:

(Total 6 marks)

13. Consider the numbers $\sqrt{3}$, 6 , $2\frac{1}{2}$, π , -5 , and the sets \mathbb{N} , \mathbb{Z} , and \mathbb{Q} . Complete the following table by placing a tick in the appropriate box if the number is an element of the set.

	$\sqrt{3}$	6	$2\frac{1}{2}$	π	-5
\mathbb{N}					
\mathbb{Z}					
\mathbb{Q}					

Working:

(Total 6 marks)

14. (a) Calculate exactly $\frac{(3 \times 2.1)^3}{7 \times 1.2}$. (1)
- (b) Write the answer to part (a) correct to 2 significant figures. (1)
- (c) Calculate the percentage error when the answer to part (a) is written correct to 2 significant figures. (2)
- (d) Write your answer to **part (c)** in the form $a \times 10^k$ where $1 \leq a < 10$ and $k \in \mathbb{Z}$. (2)

Working:

Answers:

- (a)
- (b)
- (c)
- (d)

(Total 6 marks)

15. Mal is shopping for a school trip. He buys 50 tins of beans and 20 packets of cereal. The total cost is 260 Australian dollars (AUD).

- (a) Write down an equation showing this information, taking b to be the cost of one tin of beans and c to be the cost of one packet of cereal in AUD.

(1)

Stephen thinks that Mal has not bought enough so he buys 12 more tins of beans and 6 more packets of cereal. He pays 66 AUD.

- (b) Write down another equation to represent this information.

(1)

- (c) Find the cost of one tin of beans.

(2)

- (d) (i) Sketch the graphs of these two equations.

- (ii) Write down the coordinates of the point of intersection of the two graphs.

(4)

(Total 8 marks)