O Level Math Paper 1 Ans Key

Answer all the questions

The total number of marks for this paper is 80.

1 (a) 6.571
1 (b) 2.93 x 100% = 293 %

2. Kilo = $10^3$

$$ q = 7.056 \times 10^{-3} \text{ or } 0.007056 $$

3. 

4. (a) Total mass of four boys = $4 \times 66.3 = 265.2$ kg

Mass of fourth boy = $265.2 - 68 - 68 - 69 = 60.2$ kg

69 kg, 68 kg, 68 kg, 60.2 kg

(b) total mass of five boys = $5 \times 68.7 = 343.5$ kg

Mass of fifth boy = $343.5 - 265.2 = 78.3$ kg
5. After 6 years, amount in

Plan A : amount to be repaid = $25000\left(1 + \frac{1.5}{100}\right)^6 = $27336

Plan B : interest = \frac{25000 \times 4 \times 6}{100} = 6000

Amount to be repaid = 25000 + 6000 = $31000

Plan B because she will receive more for her investment compared to Plan A.

6. (a) $315 = 3^2 \times 5 \times 7$

(bi) $315 = 3^2 \times 5 \times 7$

$90 = 2 \times 3^2 \times 5$

$HCF = 3^2 \times 5 = 45$

(bii) $90 \div 45 = 2$ flags

7. (a) Cross sectional area of prism = \(\frac{42^\circ}{360^\circ} \times \pi \times 8^2\)

Volume of prism = \(\frac{42^\circ}{360^\circ} \times \pi \times 8^2 \times h\)

\[
100 = \frac{42^\circ}{360^\circ} \times \pi \times 8^2 \times h
\]

\[
h = \frac{100 \times 360}{42 \times \pi \times 8^2}
\]

\[
h = 4.26308
\]

\(h = 4.26\) cm (2 decimal places)

(b) Arc length = \(\frac{42^\circ}{360^\circ} \times 2\pi \times 8 = 5.86431\) cm

Curved surface area = \(5.86431 \times 4.26308 = 25.00002267\) cm²

Total surface area
= \(2 \times \frac{42^\circ}{360^\circ} \times \pi \times 8^2 + (2 \times 8 \times 4.26308) + 25.00002267\) cm²
= 140.1238 cm²
= \(140\) cm² (3 sf)
8. 
(a) \(-57 - 36 = -93^\circ C\)

(b) New melting point = \(-93 - x\)
New boiling point = \(-57 + y\)

Temperature difference = \((-57 + y) - (-93 - x)\)
\[= -57 + y + 93 + x\]
\[= 36 + x + y\]

9. (a) \(\left(\frac{h_r}{h_s}\right)^3 = \frac{216}{512} = \frac{27}{64}\)
\[\frac{h_r}{h_s} = \frac{3}{4}\]

\[\text{3:4}\]

(b) height of \(X = \frac{3h}{4}\)
Radius of \(X = 3r\)
Volume of \(X = \frac{3}{5} (3r)^2 \left(\frac{3h}{4}\right) = \frac{81}{20} r^2 h\)

(c) \(\frac{3}{5} r^2 h : \frac{81}{20} r^2 h\)
\[\frac{3}{5} : \frac{81}{20}\]
\[12 : 81\]

\[\text{4: 27}\]

10. (a) 
\[5 \text{ cm}^2 : 125 \text{ km}^2\]
\[1 \text{ cm}^2 : 25 \text{ km}^2\]
\[1 \text{ cm} : 5 \text{ km} = 5000 \text{ m} = 500000 \text{ cm}\]

\textbf{Scale 1: 500 000}

(b) 
1 cm : 5 km
? cm : 7.86 km

Length of track on map = \textbf{1.572 cm}

(c) 
1 cm\(^2\) : 25 km\(^2\)
1.2 cm\(^2\) : \textbf{30 km\(^2\)}
11. Price per square foot in New York = \( \frac{370000}{700} = USD \, 528.57 \)

USD 528.57 = 3435.705 CNY

100 m\(^2\) = 1075.26882 square feet

Price per square foot in Shanghai = \( \frac{850000}{1075.26882} = 490 \) CNY

3435.705 > 490,

**The apartment in Shanghai is cheaper.**

12. 

(a) Acceleration = \( \frac{50 - 0}{20 - 0} = 2.5 \text{ m/s}^2 \)

(b) Distance from \( t = 0 \) to \( t = 20 \),

\[
\frac{1}{2} \times 20 \times 50 = 500 \text{m}
\]

Distance from \( t = 20 \) to \( t = 40 \),

\( 50 \times 20 = 1000 \text{ m} \)

Total distance = 1500 m > 1200 m, therefore time, \( T \) is within 20 to 40 s.

Remaining distance,

\( 1200 - 500 = 700 \text{m} \)

Let the time be \( T \)

\( (T - 20) \times 50 = 700 \)

\( 50T - 1000 = 700 \)

\( 50T = 1700 \)

\( T = \frac{1700}{50} = 34 \text{s} \)

13. 

(a) \( 5y - 2x + 6y - 2 = 11y - 2x - 2 \)

(b) \( 3p^2 - pq - 4q^2 = (3p - 4q)(p + q) \)

14. 

(a) \( 10 \text{ min} = \frac{1}{6} \text{ hr} \)

Distance \( A \) to \( B = 15 \times \frac{1}{6} = 2.5 \text{ km} \)

5 units = 2.5 km
11 units = \( \frac{2.5}{5} \times 11 = 5.5 \text{km} \)

(b)

Time for half charge = \( \frac{45}{2} \) = 22.5 min

60 min \( \rightarrow \) $1.50

22.5 min \( \rightarrow \) \( \frac{1.50}{60} \times 22.5 \) = $0.5625 = $0.56 (2 dp)

15.
(a) When \( x = 0 \), \( y = 3 \).

\( 3 = ka^n \)

\( k = 3 \)

\( y = 3a^x \)

96 = 3\( a^{-5} \)

32 = \( a^{-5} \)

\( 2^5 = a^{-5} \)

\( \left( \frac{1}{2} \right)^{-5} = a^{-5} \)

\( a = \frac{1}{2} \)

(b)(i)

No line of symmetry
(b)(ii)

Line of symmetry: \( x = 0 \)

16. (a) \( \frac{75}{100} \times 40 = 30 \) students

(b) Agree. The median of Class A is higher than the median of Class B.
Agree. The 25 percent of Class A scored 70 marks or less whereas 50% of
Class B scored 70 marks of less.

17 (a) \( 1.74 \times 10^4 \) kg

(b) \[
\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{1.74 \times 10^7}{1.2 \times 10^4} = \frac{1450 \text{ g/cm}^3}{1.45 \times 10^3 \text{ g/cm}^3} = 1000 \text{ cm}^3 \text{ weighs } 1450 \times 1000 = 1450000 \text{ grams}
\]

(c) Remaining mass = \( 1.74 \times 10^7 - 1450000 = 15950 \) kg

18 (a) \[
\begin{align*}
5 - x &< 4x - 1, \quad 4x - 1 \leq 3x + 1 \\
-5x &< -6 \quad x \leq 2 \\
x &> \frac{6}{5} \\
x &> 1.2
\end{align*}
\]
\[
1.2 < x \leq 2
\]
19
(a) \( \frac{2a^{-1}b}{4b} = \frac{1}{2a} \)
(b) \( 4^{3b} = \frac{4^3}{4^{2a}} \)
\[ 3h = 3 - 2a \]
\[ h = \frac{3 - 2a}{3} \]

20
(a) \(- (x - 4)^2 + 3 = 0 \)
\[ x - 4 = \pm\sqrt{3} \]
\[ x \text{ intercepts: } 2.27 \text{ or } 5.73 \text{ (3 sf)} \]
\[ y \text{ intercepts: } -13 \]
(b) turning point \((4, 3)\)
(c) \(x = 4\)

21
(a) \( \overline{AB} = \overline{AO} + \overline{OB} \)
\[ = \left\langle \begin{array}{c} -9 \\ -12 \end{array} \right\rangle + \left\langle \begin{array}{c} -4 \\ 1 \end{array} \right\rangle = \left\langle \begin{array}{c} -13 \\ -11 \end{array} \right\rangle \]
(b) \( \sqrt{(-13)^2 + (-11)^2} = 17.0 \text{ units} \)
22. (a) exterior angle = 180 – 156 = 24°

(b) number of sides = 360 / 24 = 15

23. (a) \( \frac{1}{\sqrt{2}} \)

(b) \[
\cos \angle RTU = -\cos \angle RTS \\
= -\frac{1}{\sqrt{2}}
\]

Legend for question paper:
(Level of difficulty)
[s] – Simple
[m] – Moderate
[c] – Challenging