

O Level Math Paper 1 Ans Key

Answer all the questions

The total number of marks for this paper is 80.

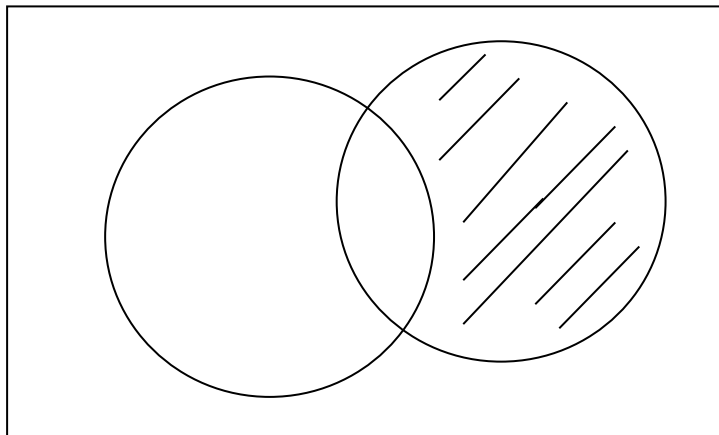
1 (a) 6.571

1 (b) $2.93 \times 100\% = 293\%$

2. Kilo = 10^3

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

$$\text{Plan A : amount to be repaid} = 25000 \left(1 + \frac{1.5}{100} \right)^6 = \$27\,336$$

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

$$\text{Amount to be repaid} = 25000 + 6000 = \$31\,000$$

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

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

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

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

$$\text{HCF} = 3^2 \times 5 = 45$$

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

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

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

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

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

$$= 4.26308$$

$$\mathbf{h = 4.26 \text{ cm}} \text{ (2 decimal places)}$$

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

$$\text{Curved surface area} = 5.86431 \times 4.26308 = 25.00002267 \text{ cm}^2$$

Total surface area

$$= 2 \times \frac{42^\circ}{360^\circ} \times \pi \times 8^2 + (2 \times 8 \times 4.26308) + 25.00002267 \text{ cm}^2$$

$$= 140.1238 \text{ cm}^2$$

$$= \mathbf{140 \text{ cm}^2} \text{ (3 sf)}$$

8.

(a) $-57 - 36 = -93^{\circ}\text{C}$

(b) New melting point = $-93 - x$

New boiling point = $-57 + y$

$$\begin{aligned}\text{Temperature difference} &= (-57 + y) - (-93 - x) \\ &= -57 + y + 93 + x \\ &= \mathbf{36 + x + y}\end{aligned}$$

9. (a) $\left(\frac{h_R}{h_s}\right)^3 = \frac{216}{512} = \frac{27}{64}$

$$\frac{h_R}{h_s} = \frac{3}{4}$$

3:4

(b) height of $X = \frac{3h}{4}$

Radius of $X = 3r$

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

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

$$\frac{3}{5} : \frac{81}{20}$$

$$12 : 81$$

$$\mathbf{4 : 27}$$

10. (a)

$$5 \text{ cm}^2 : 125 \text{ km}^2$$

$$1 \text{ cm}^2 : 25 \text{ km}^2$$

$$1 \text{ cm} : 5 \text{ km} = 5000 \text{ m} = 500000 \text{ cm}$$

Scale 1: 500 000

(b) $1 \text{ cm} : 5 \text{ km}$

$? \text{ cm} : 7.86 \text{ km}$

Length of track on map = **1.572 cm**

(c) $1 \text{ cm}^2 : 25 \text{ km}^2$

$1.2 \text{ cm}^2 : \mathbf{30 \text{ km}^2}$

11. Price per square foot in New York = $\frac{370000}{700} = \text{USD } 528.57$

USD 528.57 = 3435.705 CNY

$100 \text{ m}^2 = 1075.26882$ 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 = 2.5km

$$11 \text{ units} = \frac{2.5}{5} \times 11 = \mathbf{5.5km}$$

(b)

$$\text{Time for half charge} = \frac{45}{2} = 22.5 \text{ min}$$

$$60 \text{ min} \rightarrow \$1.50$$

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

15.

(a) When $x = 0$, $y = 3$.

$$3 = ka^n$$

$$\mathbf{k = 3}$$

$$y = 3a^x$$

$$96 = 3a^{-5}$$

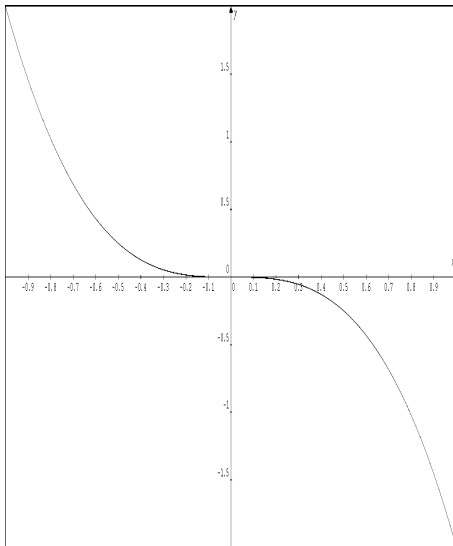
$$32 = a^{-5}$$

$$2^5 = a^{-5}$$

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

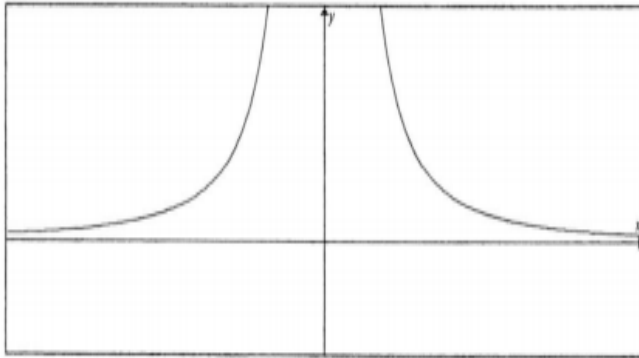
$$\mathbf{a = \frac{1}{2}}$$

(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 or less.

17 (a) 1.74×10^4 kg

(b) density = $\frac{\text{mass}}{\text{volume}}$
$$= \frac{1.74 \times 10^7}{1.2 \times 10^4}$$
$$= 1450 \text{ g / cm}^3 = 1.45 \times 10^3 \text{ g / cm}^3$$

(c) 1000 cm^3 weighs $1450 \times 1000 = 1450\ 000$ grams

Remaining mass = $1.74 \times 10^7 - 1450\ 000 = 15\ 950$ kg

18 (a) $5 - x < 4x - 1$, $4x - 1 \leq 3x + 1$
 $-5x < -6$ $x \leq 2$
 $x > \frac{6}{5}$
 $x > 1.2$

$$1.2 < x \leq 2$$

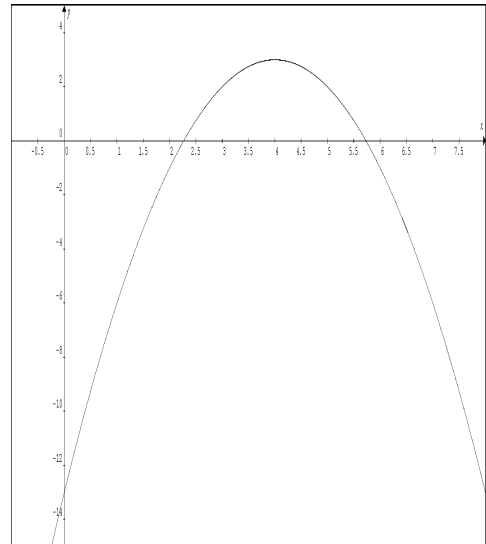


(b) **2**

19 (a) $\frac{2a^{-1}b}{4b} = \frac{1}{2a}$

(b) $4^{3h} = \frac{4^3}{4^{2a}}$
 $3h = 3 - 2a$
 $h = \frac{3 - 2a}{3}$

20 (a) $-(x - 4)^2 + 3 = 0$
 $x - 4 = \pm\sqrt{3}$
x intercepts: 2.27 or 5.73 (3 sf)
y intercepts : -13



(b) turning point **(4, 3)**

(c) **x = 4**

21 (a) $\vec{AB} = \vec{AO} + \vec{OB}$
 $= \begin{pmatrix} -9 \\ -12 \end{pmatrix} + \begin{pmatrix} -4 \\ 1 \end{pmatrix} = \begin{pmatrix} -13 \\ -11 \end{pmatrix}$

(b) $\sqrt{(-13)^2 + (-11)^2} = 17.0$ units

- 22 (a) exterior angle = $180 - 156 = 24^\circ$
(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