SOLUTIONS MATHEMATICS IGCSE P1 V1

Q. No. 1:

i) The order from smallest to largest is:

1. $\frac{1}{2}$
2. $\frac{5}{12}$
3. $\frac{17}{24}$
4. $\frac{3}{4}$

ii) a) 4c + 5 = 11

4c = 6

$c = \frac{3}{2}$

b) 5(c + 7) = 20

5c + 35 = 20

5c = − 15

c = -3

c)

$$(c^3)^2 = c^{3\times 2}$$

$$= c^6$$

iii)

a) 3m – m – m + 3m
= 3m − 2m + 3m
= 4m + 3m
= 7m

b) 2 × n × p × 4
= 2 × 4 × n × p
= 8 × n × p
= 8np

Q. No. 2:

i) Area = $81\text{cm}^2 = \sqrt{81} = 9 \text{ cm}$

Perimeter = 4 × side length = 4 × 9 = 36cm

ii)

a) No, Victoria is not correct. The probability of getting a 3 on a fair 6-sided dice is $\frac{1}{6}$, and the probability of getting a 6 is also $\frac{1}{6}$.

b) No, Andy is not correct. When throwing a fair 6-sided dice twice, the probability of getting a 6 on each throw is $\frac{1}{6}$ for each throw. The probability of both events happening (getting a 6 on both throws) is the product of the individual probabilities. So, the correct probability of getting a 6 on both throws is:

$$\frac{1}{6} \times \frac{1}{6} = \frac{1}{36}$$

c)

1. 1, Heads
2. 1, Tails
3. 2, Heads
4. 2, Tails
5. 3, Heads
6. 3, Tails
7. 4, Heads
8. 4, Tails
9. 5, Heads
10. 5, Tails
11. 6, Heads
12. 6, Tails

iii)

$$\frac{75}{1000} = \frac{75 \div 25}{1000 \div 25} = \frac{3}{40}$$

Q. No. 3:

a) Banana

b)

$$\frac{2}{10} \times 100 = \frac{2 \times 100}{10} = \frac{200}{10} = 20$$

c) Rachel's survey results show that 5 out of 10 people preferred bananas, 3 preferred oranges, and 2 preferred apples.

Pete's survey results, represented by a pie chart, do not provide exact numbers but show relative proportions for apples, bananas, and oranges.

ii) a) 3(y − 2) + 5(2y + 1)

Distribute the coefficients:

= 3y – 6 + 10y + 5

= 3y + 10y – 6 + 5

= 13y – 1

b) Multiply the coefficients:

5 × 7 = 35

Multiply the variables:

$$u^2 \times u = u^{2+1} = u^3$$
$$w^4 \times w^3 = w^{4+3} = w^7$$

Combine the results:

= $35u^3w^7$

Q. No. 4:

i)

$$\text{Sum of interior angles} = (n-2) \times 180°$$

where n is the number of sides of the polygon.

For a regular octagon ($n = 8$):
$$\text{Sum of interior angles for octagon} = (8-2) \times 180° = 6 \times 180° = 1080°$$

Since the octagon is regular, all angles are equal, so each angle is:
$$\text{Each angle in octagon} = \frac{1080°}{8} = 135°$$

For a regular hexagon ($n = 6$):
$$\text{Sum of interior angles for hexagon} = (6-2) \times 180° = 4 \times 180° = 720°$$

Each angle in the hexagon is:
$$\text{Each angle in hexagon} = \frac{720°}{6} = 120°$$

The angle marked x is where one side of the hexagon and one side of the octagon meet. Since both polygons are regular, the angle x is the sum of one angle from the octagon and one angle from the hexagon:

$$x = 135° + 120° = 255°$$

Therefore, the size of the angle marked x is $255°$.

ii) Given:

- In triangle ABD, AB = AD and angle ABD = 72°.
- In triangle ABC, BA = BC and angle BAC = angle BCA.

Proof:

- In triangle ABD, angle ADB = angle BAD = 72°.
- In triangle ABC, angle BCA = angle BAC = 72°.
- In triangle BCD, angles BCD and BDC together form angle BCA.
- Since angle BCA = 72°, angle BCD + angle BDC = 72°.
- Let angle BCD = angle BDC = x.
- Therefore, 2x = 72°, so x = 36°.
- Thus, BC = CD.

Hence, triangle BCD is isosceles.

iii) a) Cylinder **b)** Rectangle

Q. No. 5:

i) a) An even number is an integer that is exactly divisible by 2, leaving no remainder.

b) The factors of 25 are 1, 5, and 25.

c) The prime number between 10 and 20 is 11, 13, 17 and 19.

d) A cube number is a number that is the result of multiplying a number by itself twice.

ii) Prime factorization of 35:

$35 = 5 \times 7$

Prime factorization of 91:

$91 = 7 \times 13$

The common factor between 35 and 91 is 7.

iii)

$$v = 8\,\mathrm{m/s} + (3\,\mathrm{m/s}^2 \times 5\,\mathrm{s})$$

$$v = 8\,\mathrm{m/s} + 15\,\mathrm{m/s}$$

$$v = 23\,\mathrm{m/s}$$

Q. No. 6:

i)

Given the side lengths of the pentagon:

- $5x + 3$
- $9x - 10$
- $7x + 4$
- $2x + 3$
- $5x + 8$

The perimeter of the pentagon (P) is:

$$P = (5x + 3) + (9x - 10) + (7x + 4) + (2x + 3) + (5x + 8)$$

The perimeter of the square (S) with one side of length s is:

$$S = 4s$$

According to the problem, $P = S$. Let's calculate the perimeter of the pentagon and then find the expression for one side of the square in terms of x.

The expression for the side length of the square in terms of x is 7x + 2.

ii) First, let's calculate James's earnings for Thursday and Friday:

James works from 2 pm until 8.30 pm on both Thursday and Friday, which is a total of 6.5 hours per day. James is paid £12 per hour.

So, for Thursday and Friday:

- Total hours = 6.5 hours/day × 2 days = 13 hours
- Hourly rate = £12/hour
- Total earnings = Total hours × Hourly rate
- Total earnings = 13 hours × £12/hour = £156

Next, let's calculate James's earnings for Saturday:

James is paid 11/2 times his hourly pay for Saturday. He works for 5 hours on Saturday.

So, for Saturday:

- Hourly rate = £12/hour
- 11/2 times hourly rate = 11/2 × £12 = £18/hour
- Total hours = 5 hours
- Total earnings = Total hours × Hourly rate
- Total earnings = 5 hours × £18/hour = £90

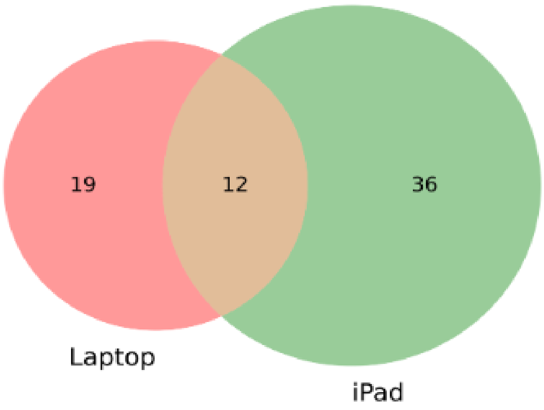
Now, let's calculate James's total earnings for the three days:

- Total earnings = Earnings for Thursday and Friday + Earnings for Saturday

- Total earnings = £156 + £90
- Total earnings = £246

Therefore, James earns a total of £246 for these three days.

iii) a)



b)

$$\text{Probability} = \frac{\text{Number of favorable outcomes}}{\text{Total number of outcomes}}$$

In this case, the number of children who have an iPad but not a laptop is 48 (total iPad owners) - 12 (who have both) = 36.

$$\text{Probability} = \frac{36}{31+36+12+5}$$

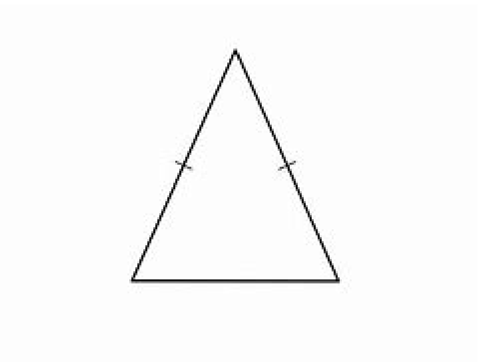
$$\text{Probability} = \frac{36}{31+36+12+5}$$

$$\text{Probability} = \frac{36}{84}$$

$$\text{Probability} = \frac{3}{7}$$

Q. No. 7:

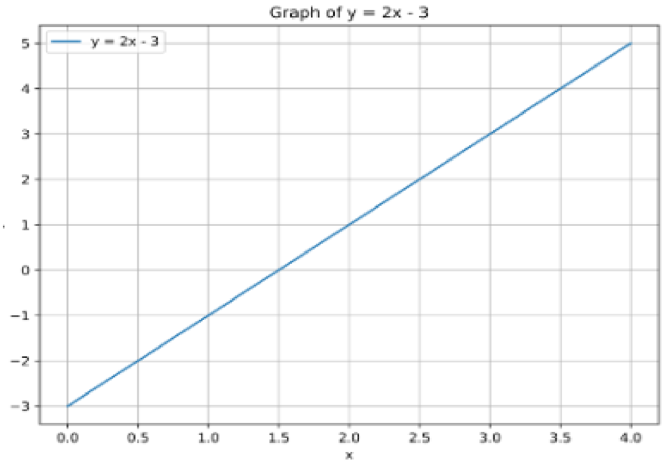
i)



ii) y = 2x − 3

x	y
0	$2 \times 0 - 3 = -3$
1	$2 \times 1 - 3 = -1$
2	$2 \times 2 - 3 = 1$
3	$2 \times 3 - 3 = 3$
4	$2 \times 4 - 3 = 5$

iii)



iv)

Given equation: $3r = 2(5k^2 - 2r)$

Expand the right side: $3r = 2(5k^2 - 4r)$

Distribute the 2: $3r = 10k^2 - 8r$

Add 8r to both sides: $3r + 8r = 10k^2$

Combine like terms: $11r = 10k^2$

Divide by 10: $\frac{11r}{10} = k^2$

Take the square root of both sides: $k = \sqrt{\frac{11r}{10}}$

Since $\frac{11}{10}$ simplifies to $\frac{7}{10}$, we have: $k = \sqrt{\frac{7r}{10}}$

Q. No. 8:

$$AC = \sqrt{AB^2 + BC^2}$$

Where:

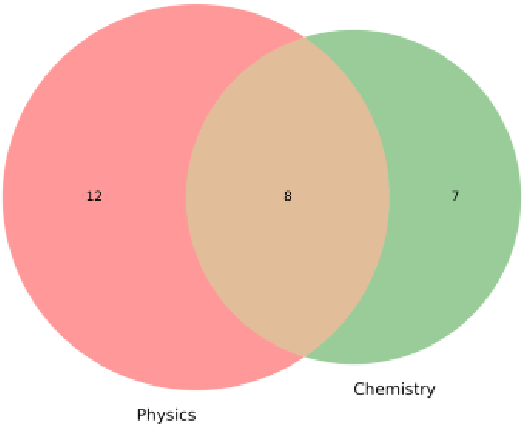
- AB is the length of the rectangle (40m)
- BC is the width of the rectangle (60m)

Let's calculate the diagonal AC.

The shortest distance from point A to point C across the park, following the paths shown and using the diagonal of the rectangle, is approximately 72.11102550927978 meters.

Q. No. 9:

i)



(ii) The number of students who study both Physics and Chemistry is 8.

(iii) The probability that a student chosen at random studies Physics but not Chemistry is the number of students who study only Physics divided by the total number of students:
$\frac{12}{30} = \frac{2}{5}$

(iv) The probability that a student who studies Physics does not study Chemistry, given they study Physics, is the number of students who study only Physics divided by the total number of students who study Physics:
$\frac{12}{20} = \frac{3}{5}$

ii) The number of students who study both Physics and Chemistry is 8.

iii)

$$\text{Probability} = \frac{\text{Students in } P - \text{Students in } B}{\text{Total students}}$$

$$\text{Probability} = \frac{20-8}{30}$$

$$\text{Probability} = \frac{12}{30}$$

$$\text{Probability} = \frac{2}{5}$$

iv)

$$\text{Probability} = \frac{\text{Students in } P - \text{Students in } B}{\text{Total students}}$$

$$\text{Probability} = \frac{20-8}{30}$$

$$\text{Probability} = \frac{12}{30}$$

$$\text{Probability} = \frac{2}{5}$$

ii) x km/h = y mph

Given that 8km/h = 5mph, we can set up a proportion:

$$\frac{8}{5} = \frac{x}{y}$$

8y = 5x

$$y = \frac{5}{8}x$$