

SOLUTIONS MATHEMATICS IGCSE P2 V1

Q. No. 1:

Given probabilities:

$$P(A) = 1 - P(\text{wakes up early}) = 1 - 4/5 = 1/5$$

$$P(B) = P(\text{wakes up early}) \times P(\text{crosses safely before 7:00 am}) = 4/5 \times 9/10 = 36/50 = 18/25$$

$$P(C) = P(\text{wakes up late}) \times P(\text{crosses safely after 7:00 am}) = 1/5 \times 1/4 = 1/20$$

$$P(D) = P(\text{wakes up early}) \times P(\text{is run over after 7:00 am}) = 4/5 \times 1/4 = 1/5$$

$$P(E) = P(B) + P(C) = 18/25 + 1/20 = 36/50 + 5/100 = 73/100$$

So, the probabilities are:

a) $P(A) = 1/5$

b) $P(B) = 18/25$

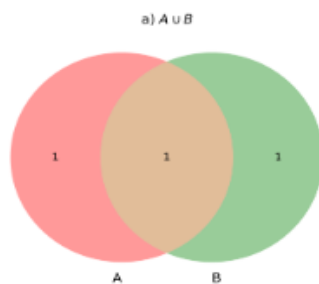
c) $P(C) = 1/20$

d) $P(D) = 1/5$

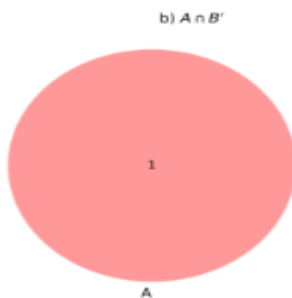
e) $P(E) = 73/100$

Q. No. 2:

a)

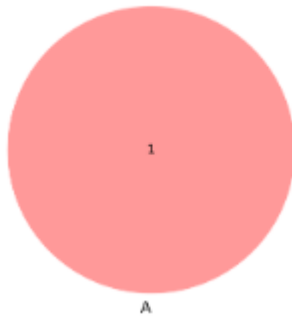


b)



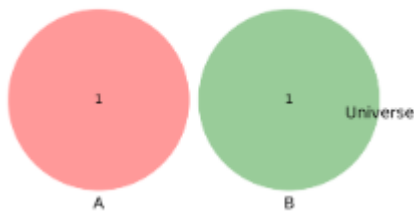
c)

c) AB'



d)

d) $(A \cap B)'$



Q. No .3:

a) The length of the minor arc XY can be calculated using the formula for the circumference of a circle. Since the angle subtended by the arc is 80° out of the total 360° , the length of the arc is given by:

$$\begin{aligned}\text{Arc Length} &= \frac{\text{Angle}}{360^\circ} \times 2\pi r \\ &= \frac{32\pi}{9} \text{ cm}\end{aligned}$$

b) The length of the chord XY can be calculated using the law of cosines in triangle XOY, where O is the centre of the circle. The chord length is given by:

$$\begin{aligned}\text{Chord Length} &= 2r \times \sin\left(\frac{\text{Angle}}{2}\right) \\ &\approx 10.285 \text{ cm}\end{aligned}$$

c) The area of the sector XOY is given by the formula:

$$\begin{aligned}\text{Sector Area} &= \frac{\text{Angle}}{360^\circ} \times \pi r^2 \\ &= \frac{128}{9} \pi \text{ cm}^2\end{aligned}$$

d) The area of triangle XOY can be calculated using the formula for the area of a triangle given two sides and the included angle:

$$\begin{aligned}\text{Triangle Area} &= \frac{1}{2} \times r^2 \times \sin(\text{Angle}) \\ &= 31.5136\text{cm}^2\end{aligned}$$

e) The area of the minor segment of the circle cut off by XY can be calculated by subtracting the area of triangle XOY from the sector area XOY:

$$\text{Segment Area} = \text{Sector Area} - \text{Triangle Area}$$

$$= \frac{128\pi - 285}{9} \text{cm}^2$$

Q. No. 4:

a) $2\pi rh = 72$

$$h = \frac{9}{3.14} = 2.87\text{cm}$$

b) $4\pi r^2 = 192$

$$r = 3.91\text{cm}$$

c) $4\pi l = 60$

$$l = 4.78\text{cm}$$

d) $4\pi r^2 = 0.48$

$$r = 0.195\text{m}$$

e) $2\pi r(r + h) = 330$

$$h = 10.51\text{cm}$$

f) $\pi rl = 225$

$$l = 11.94\text{cm}$$

g) $2\pi r(r + h) = 108$

$$h = 6.60\text{m}$$

Q. No. 5:

1) $180^\circ = 20^\circ + 2a$

$$160^\circ = 2a$$

$$80^\circ = a$$

2) $180^\circ - 65^\circ - 65^\circ = c$

$$50^\circ = c$$

$$360^\circ - 50^\circ = b$$

$$310^\circ = b$$

3) $180^\circ - 52^\circ - 32^\circ = c$

$$96^\circ = c$$

4) $d = 60^\circ$ (equilateral triangle)

$e = 90^\circ$ (rectangular angle)

5) $180^\circ - 100^\circ = a$

$$80^\circ = a$$

$$180^\circ - 70^\circ - 80^\circ = f$$

$$30^\circ = f$$

$$180^\circ - 30^\circ - 80^\circ = g$$

$$70^\circ = g$$

6) $a = 70^\circ$

$b = 70^\circ$ (opposite angles)

$$180^\circ - 45^\circ - 70^\circ = c$$

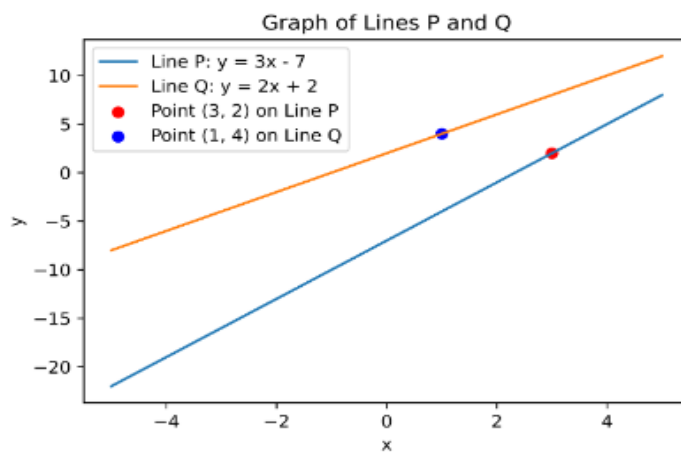
$$65^\circ = c$$

$$180^\circ - 65^\circ = h$$

$$115^\circ = h$$

Q. No. 6:

a)



b) For line P:

$$m = 3 \text{ and } (x_1, y_1) = (3, 2)$$

$$y = 3x - 7$$

For line Q:

$$m = 2 \text{ and } (x_1, y_1) = (1, 4)$$

$$y = 2x + 2$$

c) To find the point of intersection R of lines P and Q, we set their equations equal to each other and solve for x:

$$3x - 7 = 2x + 2$$

$$x = 9$$

Then, we substitute $x = 9$ back into either equation to find y:

$$y = 3(9) - 7$$

$$y = 20$$

So, the coordinates of point R are (9, 20).

d) To show that point R lies on the line $y = -4x$, we substitute the coordinates of R into the equation:

$$20 = -4(9)$$

$$20 = -36$$

Since the equation is not true, point R does not lie on the line $y = -4x$.

Q. No. 7:

a) $3(2x - 5) - 2(2x + 3)$

$$= 6x - 15 - 4x - 6$$

$$= 2x - 21$$

b) $2a - 4ax - 3b + 6bx$

$$= 2a(1 - 2x) - 3b(-2x + 1)$$

$$= (1 - 2x)(2a - 3b)$$

c) $\frac{x-11}{2} - \frac{x-3}{5} = 2$

$$5(x - 11) - 2(x - 3) = 20$$

$$3x - 49 = 20$$

$$3x = 69$$

$$x = 23$$