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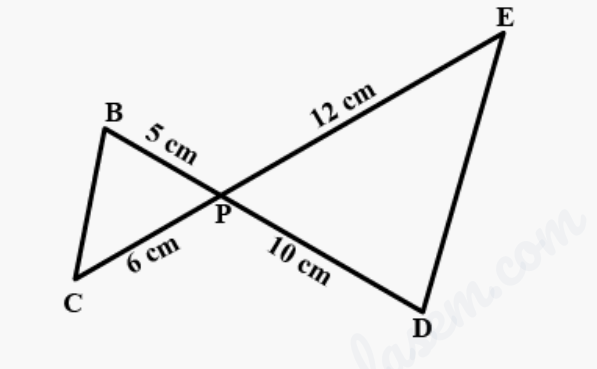
FOR HARYANA CLASS 10 PREPARATION

HBSE Class 10 Sample Paper 2027 Mathematics Basic Stepwise Marking Scheme

EXAM	YEAR	TYPE	SUBJECT
Haryana Class 10	2027	Answer Key	Maths

MARKING SCHEME BSEH Sample PAPER , 10TH MATHS (BASIC) 2026-27 (ENGLISH MEDIUM)		
Q. no.	**Expected solutions**	**marks**
	Section-A	
1	(b) 150	1
2	(a) x^2+2x+5	1
3	*(c)(x+2)(x-1)=x^2-2x-3*	1
4	(c)3 units	1
5	(a) -12	1
6	(a) 50°	1
7	(d) 55°	1
8	(b) $\frac{b}{\sqrt{a^2+b^2}}$	1
9	(a)60^0	1
10	(b) $10\sqrt{2}$	1
11	(d) 3	1
12	(a) $\frac{1}{5}$	1
13	Irrational number	1
14	$\sqrt{119}$ cm	1
15	tanθ =a b	1
16	$\frac{1}{2}$	1
17	$\frac{77}{2}$ cm^2 or $\frac{49\pi}{4}$ cm^2	1
18	False	1
19	(a)Both Assertion(A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion(A).	1
20	(b) Both Assertion(A) and Reason (R) are true but Reason (R) is the not correct explanation of Assertion(A).	1
	SECTION-B	
21.(a)	x/2 + 2y/3 = -1 3x + 4y = -6 ..... (i)	1/2

	…… .. x-y/3 = 3 3x – y = 9 ……. (ii) …… .. When the equation (ii) is subtracted from equation (i) we get, 5y = -15 y = -3 ……(iii) …… .. When the equation (iii) is substituted in (i) we get, 3x – 12 = -6 3x = 6 x = 2 Hence, x = 2 , y = -3	1/2 1/2 1/2
21.(b)	Using the property of a rectangle, We know that, Lengths are equal, i.e., CD = AB Hence, x + 3y = 13 …(i) …… .. Breadths are equal, i.e., AD = BC Hence, 3x + y = 7 …(ii) …… .. On multiplying Eq. (ii) by 3 and then subtracting Eq. (i), We get, 8x = 8 So, x = 1 …… .. On substituting x = 1 in Eq. (i), We get, y = 4 Therefore, the required values of x and y are 1 and 4, respectively.	1/2 1/2 1/2 1/2
22.	Let (– 4, 6) divide AB internally in the ratio k : 1.	

	Using the section formula, we get $(-4, 6) = \left(\frac{3k-6}{k+1}, \frac{-8k+10}{k+1}\right)$ ..... So, $-4 = \frac{3k-6}{k+1}$ ..... $\Rightarrow -4k - 4 = 3k - 6$ $\Rightarrow 7k = 2$ $\Rightarrow, k : 1 = 2 : 7$ We can check for the y-coordinate also. So, the point $(-4, 6)$ divides the line segment joining the points A$(-6, 10)$ and B$(3, -8)$ in the ratio 2 : 7.	1 1/2 1/2
23.	 In ΔPBC and ΔPDE, ∠BPC = ∠EPD [vertically opposite angles] PB/PD = 5/10 = ½ … (i) PC/PE = 6/12 = ½ … (ii) ..... From equation (i) and (ii), We get, PB/PD = PC/PE Since, ∠BPC of ΔPBC = ∠EPD of ΔPDE and the sides including these.	1 1/2

	Then, by SAS similarity criteria ΔPBC ~ ΔPDE	1/2
24.(b)	We know that, cos 60° = 1/2 sec 30° = 2/√3 tan 45° = 1 sin 30° = 1/2 cos 30° = √3/2 …… Now, substitute the values in the given problem, we get $(5\cos^2 60° + 4\sec^2 30° - \tan^2 45°)/(\sin^2 30° + \cos^2 30°)$ $= \{5(1/2)^2+4(2/\sqrt{3})^2-1\}/(1/2)^2+(\sqrt{3}/2)^2$ …… = (5/4+16/3-1)/(1/4+3/4) ={ (15+64-12)/12}/(4/4) …… = 67/12	1/2 1/2 1/2
24.(a)	LHS = $\sqrt{\frac{1+\sin A}{1-\sin A}}$ By rationalization $= \sqrt{\frac{1+sinA}{1-sinA} \times \frac{1+sinA}{1+sinA}}$ ……	1/2 1/2

	$=\frac{1+\sin A}{\sqrt{1-\sin^2 A}}$ …… $=\frac{1+\sin A}{\sqrt{\cos^2 A}}$ …… $=\frac{1+\sin A}{\cos A}$ = secA +tanA = RHS	1/2 1/2
25.	Area swept by the minute hand in 60 minutes = Area of the circle with radius equal to the length of the minute hand = πr^2 …… Area swept by minute hand in 1 minute = $\pi r^2/60$ …… Thus, area swept by minute hand in 5 minutes = $(\pi r^2/60) \times 5 = \pi r^2/12$ [∵Length of the minute hand (r) = 14 cm] …… = $1/12 \times 22/7 \times 14 \times 14$ cm^2 = $154/3$ cm^2	1/2 1/2 1/2 1/2
	SECTION-C	

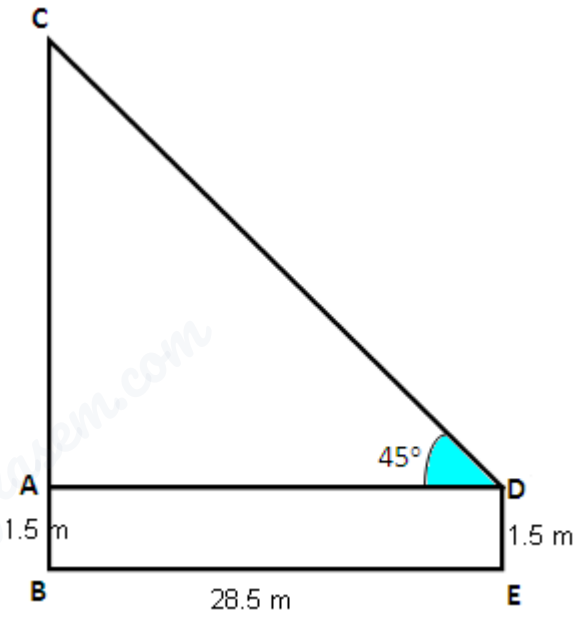
26.	मान लीजिए कि $3-2\sqrt{5}$ परिमेय संख्या है ..... अतः इसे $\frac{a}{b}$ रूप में लिखा जा सकता है जहाँ a और b सह-अभाज्य हैं और $b \neq 0$ अतः $3-2\sqrt{5} = \frac{a}{b}$ ..... $\Rightarrow 2\sqrt{5} = 3 - \frac{a}{b} = \frac{3b-a}{b}$ ..... $\Rightarrow \sqrt{5} = \frac{3b-a}{2b}$ ..... जहाँ $\sqrt{5}$ अपरिमेय है तथा $\frac{3b-a}{2b}$ परिमेय है । क्योंकि अपरिमेय संख्या≠ परिमेय संख्या ..... अतः उपरोक्त एक विरोधाभास है। इसलिए हमारी कल्पना ग़लत है. अतः $3-2\sqrt{5}$ अपरिमेय है।	
27.	$6x^2-3-7x=6x^2-7x-3=0$ $\Rightarrow 6x^2+2x-9x-3=0$ $\Rightarrow 2x(3x+1)-3(3x+1)=0$ $\Rightarrow (2x-3)(3x+1)=0$ Zeros = 3/2,−1/3 ..... $\alpha+\beta=-b/a \Rightarrow (3/2)+(-1/3)=7/6=-(-7)6=-b/a$	1 1

	…… $\alpha\beta = c/a \Rightarrow (3/2)(-1/3) = -1/2 = -3/6 = c/a$ Hence proved.	1
28.(a)	Let Rahul's age be x years and his son's age be y years. …… Five years hence(later), $x + 5 = 3(y + 5)$ $\Rightarrow x + 5 = 3y + 15$ $\Rightarrow x - 3y = 10$.....(1) …… Also, five years ago(before), $x - 5 = 7(y - 5)$ $\Rightarrow x - 5 = 7y - 35$ $\Rightarrow x - 7y = -30$.....(2) …… Subtracting equation (2) from (1), $x - 3y - x + 7y = 10 + 30$ (∵eq.(2) changes its sign) $4y = 40$ $\Rightarrow y = 10$ …… Put y = 10 in eq. (1),	1/2 1/2 1/2 1/2 1/2

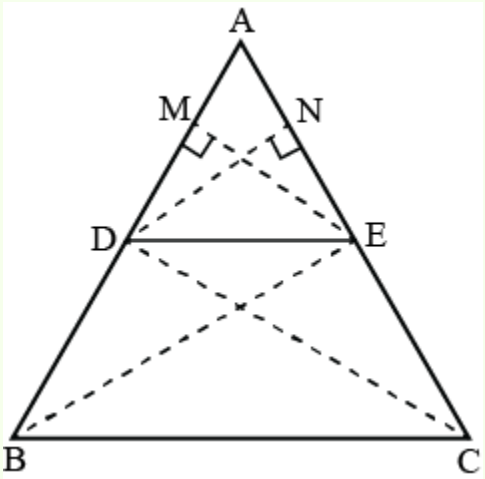
	x - 3(10) = 10 ⇒x - 30 = 10 ⇒x = 40 …… Thus, present age of Rahul=x=40 years and present age of Rahul's son=y=10 years.	 1/2
28.(b)	Let the larger angle = x Smaller angle = y As both angles are supplementary, x + y = 180 ⇒ x = 180 - y .... (i) …… Difference is 18 degrees. So, x - y = 18 ⇒ x = 18 + y .... (i) …… Substituting the value of x in equation (i) we get, ⇒ 18 + y = 180 - y ⇒ - y - y = 18 - 180 ⇒ - 2y = -162 ⇒ y=−162/−2 ⇒ y = 81 …… Substituting the value of y in equation (i), we get, ⇒ x = 180 - 81 = 99 …… Hence, the angles are 99° and 81°.	1 1/2 1/2 1/2 1/2
29.	We know that the distance between the two points is given by the Distance Formula = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ By substituting the values of points P (2, - 3) and Q (10, y) in the distance formula, we get ……	1/2

	PQ = $\sqrt{(2 - 10)^2 + (-3 - y)^2} = 10$ PQ = $\sqrt{(-8)^2 + (3 + y)^2} = 10$ …… Squaring on both sides, we get $64 + (y + 3)^2 = 100$ …… $(y + 3)^2 = 36$ $y + 3 = \sqrt{36}$ $y + 3 = \pm 6$ …… $y + 3 = 6$ or $y + 3 = -6$ Therefore, $y = 3$ or -9 are the possible values for y.	1/2 1/2 1/2 1
30.(a)	Given, $\cos A + \cos^2 A = 1$ $\Rightarrow \cos A = 1 - \cos^2 A$ $\Rightarrow \cos A = \sin^2 A$ [∵ $\sin^2 A = 1 - \cos^2 A$] ……(i) …… LHS=$(\sin^2 A + \sin^4 A) = (\sin^2 A + (\sin^2 A)^2)$ …… $= (\sin^2 A + (\cos A)^2)$ [using (i)] …… $= \sin^2 A + \cos^2 A$	1 1/2 1 1/2

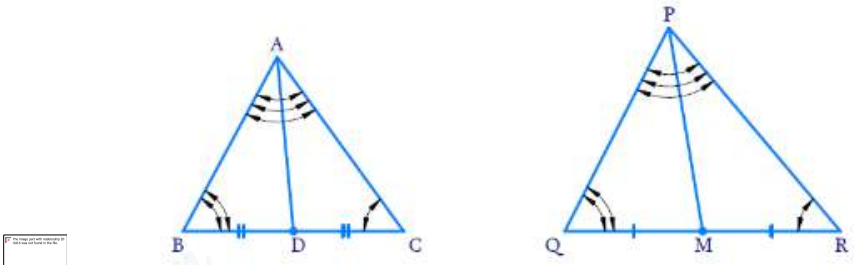
	= 1 = RHS	
30.(b)	LHS=$(\sin A+\operatorname{cosec} A)^2+(\cos A+\sec A)^2$ $=\sin^2 A+\operatorname{cosec}^2 A+2\sin A\operatorname{cosec} A+\cos^2 A+\sec^2 A+2\cos A\sec A$ …… $=\sin^2 A+\cos^2 A+\operatorname{cosec}^2 A+\sec^2 A+2\sin A\times 1/\sin A+2\cos A\times 1/\cos A$ [∵cosecA=1/sinA and secA=1/cosA] …… $=1+\operatorname{cosec}^2 A+\sec^2 A+2+2$ [∵$\sin^2 A+\cos^2 A=1$] …… $=5+(1+\cot^2 A)+(1+\tan^2 A)$ [∵$1+\tan^2 A=\sec^2 A$ and $1+\cot^2 A=\operatorname{cosec}^2 A$] $=7+\tan^2 A+\cot^2 A=$ RHS ……	1/2 1 1/2 1

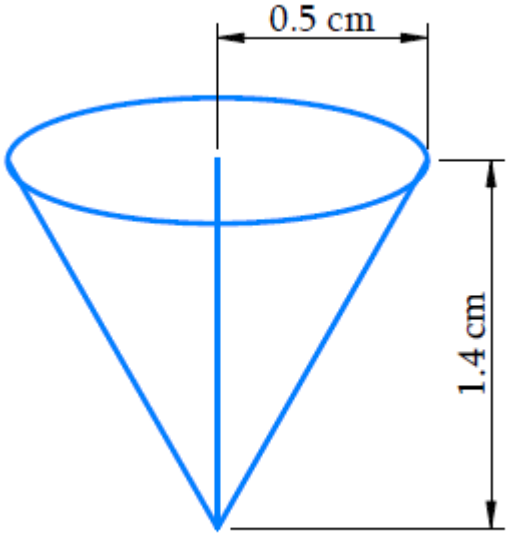
31.	 ..... Given the height of the observer be DE = 1.5 m That is AB = 1.5 m Let BC = h is the height of the chimney Hence AC = (h – 1.5) m Given the distance between the observer and the chimney is AD = BE = 28.5 m ..... In right △CAD,θ=45° tan 45°=AC/AD ⇒1=(h−1.5)/28.5 ..... ⇒28.5=h−1.5 ⇒h=28.5+1.5= 30 m Thus the height of the chimney is 30 m.	1/2 1/2 1 1
	SECTION-D	
32.(a)	Given, 2nd term, $a_2 = 14$ 3rd term, $a_3 = 18$ Common difference, $d = a_3 - a_2 = 18 - 14 = 4$	1

	We know that nth term of an AP is, $a_n = a + (n - 1)d$ $a_2 = a + d$ $14 = a + 4$ $a = 10$ ..... Sum of n terms of AP is given by $S_n = n/2 [2a + (n - 1) d]$ ..... $S_{51} = 51/2 [2 \times 10 + (51 - 1) 4]$ ..... $= 51/2 [20 + 50 \times 4]$ $= 51/2 \times 220$ $= 51 \times 110$ $= 5610$	1 1 1 1
32.(b)	nth term of an AP $a_n = a + (n - 1)d$ Let a be the first term and d the common difference. ..... According to the question, $a_3 = 16$ and $a_7 - a_5 = 12$ $a + (3 - 1)d = 16$ $a + 2d = 16$ ..... (1) ..... Using $a_7 - a_5 = 12$ $[a + (7 - 1) d] - [a + (5 - 1) d] = 12$ $[a + 6d] - [a + 4d] = 12$ $2d = 12$ $d = 6$ ..... By substituting this in equation (1), we obtain $a + 2 \times 6 = 16$ $a + 12 = 16$ $a = 4$	1/2 1 $1\frac{1}{2}$ 1

	Therefore, A.P. will be 4, 4 + 6, 4 + 2 × 6, 4 + 3 × 6, ... Hence, the sequence will be 4, 10, 16, 22, ...	1
33.(a)	**<u>Statement:Basic Proportionality Theorem</u>** Prove that if a line is drawn parallel to one side of a triangle ,the other two sides are divided in the same ratio. ……. **Given:** In ΔABC, DE||BC . . . . . .  . . . . To prove: $\frac{AD}{DB} = \frac{AE}{EC}$ _____	1 1/2 1/2 1/2

	–––––––––––––––––– **Construction :** Draw EM⊥AB and DN⊥AC. Join B to E and C to D --- **Proof**: In ΔADE and ΔBD $\frac{\text{Area of}\Delta ADE}{\text{Area of }\Delta BDE} = \frac{\frac{1}{2}\times AD\times EM}{\frac{1}{2}\times DB\times EM} = \frac{AD}{DB}$----------(i) --- In ΔADE and ΔCDE $\frac{\text{Area of}\Delta ADE}{\text{Area of }\Delta CDE} = \frac{\frac{1}{2}\times AE\times DN}{\frac{1}{2}\times EC\times DN} = \frac{AE}{EC}$ ----------(ii) --- Since, DE||BC [Given] ∴ ar(ΔBDE) = ar(ΔCDE) ---------- (iii) [Δs on the same base and between the same parallel sides are equal in area] --- From eq. (i), (ii) and (iii) ∴ $\frac{AD}{DB} = \frac{AE}{EC}$ Hence proved.	1/2 1/2 1/2 1/2 1/2

33.(b)		1/2
	Given, ΔABC ~ ΔPQR ⇒ ∠ABC = ∠PQR (corresponding angles) --------- (1) ⇒ AB/PQ = BC/QR (corresponding sides) ..... . ⇒ AB/PQ = (BC/2) / (QR/2) ⇒ AB/PQ = BD/QM (D and M are mid-points of BC and QR) ---------- (2) .... In ΔABD and ΔPQM, ∠ABD = ∠PQM (from 1) AB/PQ = BD/QM (from 2) ⇒ ΔABD ~ ΔPQM (SAS criterion) .... ⇒ AB/PQ = BD/QM = AD/PM (corresponding sides) ⇒ AB/PQ = AD/PM Hence proved.	1 1 $1\frac{1}{2}$ 1

34.(a)	 Depth of each conical depression, h_1 = 1.4 cm Radius of each conical depression, r = 0.5 cm Dimensions of the cuboid are 15 cm × 10 cm × 3.5 cm ……. . Volume of wood in the entire pen stand = volume of the wooden cuboid - 4 × volume of the conical depression ……. . $= l \times b \times h - 4 \times 1/3\ \pi r^2 h_1$ ……. . = (15 cm × 10 cm × 3.5 cm) - (4 × 1/3 × 22/7 × 0.5 cm × 0.5 cm × 1.4 cm) ……. . = 525 cm^3 - 1.47 cm^3	1 1 1 1 1

	$= 523.53\ cm^3$ The volume of wood in the entire stand is $523.53\ cm^3$.	
34.(b)	The total surface area of the cube $=6\times(edge)^2=6\times5\times5\ cm^2=150\ cm^2$. ..... The surface area of the block = Total Surface Area of cube - base area of hemisphere + Curved Surface Area of hemisphere ..... $=150-\pi r^2+2\pi r^2$ $=(150+\pi r^2)\ cm^2$, ... $=150\ cm^2+(22/7\times4.2/2\times4.2/2)\ cm^2$ $=(150+13.86)\ cm^2$ ..... $=163.86\ cm^2$	1 1 1 1 1
35.(a)	<table><tr><th>class interval</th><th>class-mark (x_i)</th><th>Number of children (f_i)</th><th>f_ix_i</th></tr><tr><td>11-13</td><td>12</td><td>7</td><td>84</td></tr><tr><td>13-15</td><td>14</td><td>6</td><td>84</td></tr><tr><td>15-17</td><td>16</td><td>9</td><td>144</td></tr><tr><td>17-19</td><td>18</td><td>13</td><td>234</td></tr><tr><td>19-21</td><td>20</td><td>f</td><td>20f</td></tr><tr><td>21-23</td><td>22</td><td>5</td><td>110</td></tr><tr><td>23-25</td><td>24</td><td>4</td><td>96</td></tr><tr><td></td><td></td><td>$\sum f_i=44+f$</td><td>$\sum f_ix_i=752+20f$</td></tr></table> ..... $\text{Mean} = \bar{x} = \frac{\sum f_ix_i}{\sum f_i}$ ..... $\Rightarrow 18 = \frac{752+20f}{44+f}$	1+1 1/2 1/2

	…… $\Rightarrow 18(44+f) = 752+20f$ $\Rightarrow 792 + 18f = 752 + 20f$ …… $\Rightarrow 792-752 = 20f - 18f$ …… $\Rightarrow 40 = 2f$ $\Rightarrow f = 20$ Hence, missing frequency f =20	1/2 1/2 1
35.(b)		

Number of Cars	Frequency
0-10	7
10-20	14
20-30	13
30-40	12
40-50	20
50-60	11
60-70	15
70-80	8

From the table, it can be observed that the maximum class frequency is 20, belonging to class interval 40 − 50 — 1
Therefore, modal class = 40 − 50

……

Class size, h = 10
Lower limit of modal class, l = 40
Frequency of modal class, $f_1 = 20$ — 1
Frequency of class preceding modal class, $f_o = 12$
Frequency of class succeeding the modal class, $f_2 = 11$
……

Mode = $l + [(f_1 - f_o)/(2f_1 - f_o - f_2)] \times h$
…… — 1

$= 40 + [(20 - 12)/(2 \times 20 - 12 - 11)] \times 10$ — 1/2

……

	= 40 + [8/(40 - 23)] × 10 = 40 + (8/17) × 10 = 40 + 4.705 …… = 44.705 ≈ 44.7 Hence, the mode is 44.7	1 1/2
	Section - E	
36.	(i) Time = $\frac{\text{Distance}}{\text{Speed}}$	1
	(ii)Let the usual speed of plane be x km/h New increased speed of plane= (x + 250)km/h Total distance=1500 km According to question $\frac{1500}{x} - \frac{1500}{x+250} = \frac{1}{2}$ …… $\frac{1500(x+250) - 1500x}{x(x+250)} = \frac{1}{2}$ $\frac{1500x + 375000 - 1500x}{x(x+250)} = \frac{1}{2}$ X^2 +250 x = 750000 X^2 +250 x - 750000=0	1/2 1/2
	(iii)(a) X^2 +250 x - 750000=0 X^2 +1000x - 750x- 750000=0 X(x+1000)-750(x +1000)=0 (x+1000)(x-750)=0 …… X=-1000 or x = 750 Reject x=-1000, because speed cannot be negative. Hence,usual speed of plane is 750km/h.	1 1
	(iii)(b) X^2 +250 x - 750000=0	

	X^2 +1000x - 750x- 750000=0 X(x+1000)-750(x +1000)=0 (x+1000)(x-750)=0 …… X=-1000 or x = 750 Reject x=-1000, because speed cannot be negative. Hence,new speed of plane is x+250= 750+250=1000km/h.	1 1
37.	(i) Since,radius at a point of contact is perpendicular to tangent. ∴ By Pythagoras theorem, we have PA = $\sqrt{PS^2 + AS^2}$=$\sqrt{12^2 + 5^2}$ =$\sqrt{169}$ = 13 cm …… (ii)one common tangent can be drawn when two circles touch externally. …… (iii)(a) By Pythagoras theorem, we have BQ = $\sqrt{TQ^2 + TQ^2}$=$\sqrt{3^2 + 4^2}$ =$\sqrt{25}$ = 5 cm …… QY= BQ- BY = 5-4 =1 cm …… (iii) (b) PK= PA + AK = 13 + 5 = 18 cm …… XY = XK + KY= 10 +8 = 18 cm	1 1 1 1 1 1
38.	(i) Total no. of fish in the aquarium = 13+18+12+11= 54 Number of male fish in the aquarium = 36 ∴Number of female fish in the aquarium =54- 36 =18 So,probability of selecting a female fish=	1

	$\frac{\text{no.of favourable outcomes}}{\text{total no.of possible outcomes}} = \frac{18}{54} = \frac{1}{3}$ …… (ii) The probability of selecting a flowerhorn fish= $\frac{\text{no.of favourable outcomes}}{\text{total no.of possible outcomes}} = \frac{18}{54} = \frac{1}{3}$ …… (iii) (a) The probability of selecting a koi fish $= \frac{\text{no.of favourable outcomes}}{\text{total no.of possible outcomes}} = \frac{12}{54} = \frac{2}{9}$ …… P(selecting a guppy fish) $= \frac{\text{no.of favourable outcomes}}{\text{total no.of possible outcomes}} = \frac{13}{54}$ (iii) (b)Total no. of angel fish and flowerhorn fish= 18 +11 =29 P (selecting either angel fish or flowerhorn fish)= $\frac{29}{54}$ …… P (selecting neither angel fish nor flowerhorn fish) = =1- P (selecting either angel fish or flowerhorn fish) = 1- $\frac{29}{54} = \frac{25}{54}$	1 1 1 1 1