EXERCISE 1

1. (b) Number of transferred employees
   \[= 40\% \text{ of } 1225\]
   \[= \frac{1225 \times 40}{100} = 490\]

2. (b) Let the original fraction be \(\frac{x}{y}\).

   Then, \(\frac{x+5x}{y+3y} = \frac{2}{7}\)
   \[\Rightarrow \frac{6x}{4y} = \frac{18}{7}\]
   \[\Rightarrow \frac{x}{y} = \frac{12}{7}\]

3. (c) Let the income of Shilpa be \(\text₹}x\)

   \[\therefore \text{Expenditure on school fees, rent and furniture} = (8 + 25 + 17)\% = 50\%\]

   Remaining \(= \text₹}\frac{x}{2}\)

   Expenditure on medical bills \(= \text₹}\frac{x}{2} \times \frac{1}{4} \times \frac{x}{8}\)

   Remaining amount \(= \frac{x}{2} \times \frac{x}{8} = \frac{3x}{8}\)

   \[= \frac{4x}{8} = \frac{3x}{8}\]

   \[\therefore \frac{3x}{8} = 6000\]
   \[\Rightarrow x = \frac{6000 \times 8}{3} = \text₹16000\]

4. (b) Let the number be \(x\)

   \[\therefore (89 - 73)\% \text{ of } x = 448\]
   \[\Rightarrow \frac{x \times 16}{100} = 448\]
   \[\Rightarrow x = \frac{448 \times 100}{16} = 2800\]

   \[\therefore 49\% \text{ of } 2800 = \frac{2800 \times 49}{100} = 1372\]

5. (e) Required production \(= 70 \left(1 + \frac{8}{100}\right)^2\) lakh tonnes

   \[= 70 \left(1 + \frac{2}{25}\right)^2\] lakh tonnes

   \[= 70 \times \frac{27}{25}\times \frac{27}{25} = 81.648\text{ lakh tonnes}\]

6. (b) Let the number be \(x\)

   According to the question,

   \((58 - 39)\% \text{ of } x = 247\)

   \[\text{or, } x \times \frac{19}{100} = 247\]

   \[\text{or, } x = \frac{247 \times 100}{19} = 1300\]

   \[\therefore 62\% \text{ of } 1300 = 1300 \times \frac{62}{100} = 806\]

7. (c) Population at the end of 2nd year

   \[= 126800 \times \left(1 + \frac{15}{100}\right) \times \left(1 - \frac{20}{100}\right)\]
8. (a) Let the number be \( x \).

\[
\therefore \quad \frac{75x - 20y}{100} = \frac{378.4}{100}
\]

or, \( x = \frac{378.4 \times 100}{55} \)

\[
\therefore \quad \frac{40x}{100} = \frac{378.4 \times 100}{55} \times \frac{40}{100} = 275.2
\]

9. (e) Fraction is \( \frac{x}{y} \)

\[
\frac{x + 200}{y + 150} = \frac{9}{35}
\]

\[
\therefore \quad \frac{x + 2x}{y + 1.5y} = \frac{9}{35}
\]

\[
\Rightarrow \quad \frac{3x}{2.5y} = \frac{9}{35}
\]

\[
\therefore \quad \frac{x}{y} = \frac{9 \times 2.3}{3 \times 35} = \frac{3}{14}
\]

10. (b) Let the number be \( x \)

According to the question,

\( (42 - 35)\% \) of \( x = 110.6 \)

or, \( x \times \frac{7}{100} = 110.6 \)

or, \( x = \frac{110.6 \times 100}{7} = 1580 \)

\[
\therefore \quad 60\% \text{ of } 1580 = \frac{1580 \times 60}{100} = 948
\]

11. (c) Let the original fraction be \( \frac{x}{y} \)

12. (a) Weight of low quality of wheat in 150 kgs of wheat

\[
= \frac{150 \times 10}{100} = 15 \text{ kg.}
\]

Suppose that \( x \) kgs of good quality wheat is mixed.

According to the question,

\[
\frac{(x + 150) \times 5}{100} = 15
\]

or, \( x = 150 \text{ kg.} \)

13. (b) Let the number be \( x \)

Difference in \% = \( 42 - 28 = 14\% \)

or \( x = \frac{210 \times 100}{14} = 1500 \)

\[
\therefore \quad \text{Required answer} = \frac{59}{100} \times 1500 = 885
\]

14. (e) Let the maximum aggregate marks = \( x \)

According to the question,

\( 40\% \) of \( x - 4\% \) of \( x = 261 \)

or \( x \times \frac{(40 - 4)}{100} = 261 \)

\[
\therefore \quad x = \frac{261}{36} \times 100 = 725
\]

15. (b) Let the number be \( x \).
16. (a) The monthly salary of Manish will be

\[ \frac{3818 \times 100}{20} = \text{₹}19090 \]

17. (e) Required number of transfered employees

\[ \frac{1556 \times 25}{100} = 389 \]

18. (d) Required % = \[ \frac{555 \times 100}{850} = 65.294\% \]

19. (d) Total marks obtained by the student

\[ 6 \times \frac{64}{100} \times 150 = 576 \]

Marks obtained in Hindi and English

\[ 25\% \text{ of } 576 \]

\[ 576 \times \frac{25}{100} = 144 \]

20. (b) Required percentage = \[ \frac{1012}{1150} \times 100 = 88 \]

21. (b) Population of the town after 2 years

\[ 198000 \left(1 + \frac{7}{100}\right) \left(1 - \frac{5}{100}\right) \]

\[ = \frac{198000 \times 107 \times 95}{100 \times 100} = 201267 \]

22. (d) Let the number be \( x \).

According to the question,
\[ (38 - 24\%) \text{ of } x = 135.10 \]

or, \[ x \times \frac{14}{100} = 135.10 \]

or, \[ x = \frac{135.10 \times 100}{14} = 965 \]

\[ \therefore 965 \text{ of } 40\% \]

\[ = 965 \times \frac{40}{100} = 386 \]

23. (b) Let the number of girls in the school be = \( x \)

\[ \therefore \text{Number of boys} = \frac{124x}{100} \]

\[ \therefore \text{Required ratio} = \frac{124x}{100} : x \]

\[ = 124 : 100 = 31 : 25 \]

24. (d) Let the number be = \( x \)

According to the question,
\[ (58 - 37)\% \text{ of } x = 399 \]

or, \[ x \times \frac{21}{100} = 399 \]

\[ \therefore x = \frac{399 \times 100}{21} = 1900 \]

\[ \therefore 72\% \text{ of } 1900 = 1900 \times \frac{72}{100} = 1368 \]

25. (c) Let the maximum marks be = \( x \)

According to the question,
\[ x \text{ or } 5\% = 296 - 259 \]

or, \[ \frac{x \times 5}{100} = 37 \]

\[ \therefore x = \frac{3700}{5} = 740 \]

26. (b) Let the number be = \( x \)

According to the question,
\[ \frac{58x}{100} = \frac{28x}{100} \]

\[ = 225 \]
or, \( \frac{30x}{100} = 225 \)

or, \( x = \frac{225 \times 100}{30} = 750 \)

\[ \therefore \text{Required answer} = 750 \times \frac{38}{100} = 285 \]

27. (c) Let the number be \( x \)

\[ \therefore \frac{67x}{100} - \frac{42x}{100} = 214 \]

\[ \Rightarrow x = \frac{214 \times 100}{25} \]

\[ \therefore \frac{75x}{100} = \frac{214 \times 100}{25} \times \frac{75}{100} = 642 \]

28. (c) Required number of employees

\[ = \frac{1850 \times 38}{100} = 703 \]

29. (c) Required maximum aggregate marks

\[ = (256 - 192) \times \frac{100}{10} = 640 \]

30. (a) Required monthly income

\[ = \frac{3960 \times 100}{30} = ₹13200 \]

31. (e) Required approximate percentage

\[ = \frac{654 \times 100}{950} = 68.84\% \]

\[ \approx 69\% \]

32. (b) Total amount spent

\[ = 44620 + 32764 = ₹77384 \]

Percentage of amount spent

\[ = 100 - 32 = ₹68\% \]

\[ \therefore 68\% = 77384 \]

\[ \therefore 100\% = \frac{77384 \times 100}{68} = ₹113800 \]

33. (c) Required amount

\[ = \frac{2100}{6} \times (6 + 8 + 9) \]

\[ = \frac{2100}{6} \times 23 = ₹8050 \]

34. (a) Let the maximum marks be \( x \)

\[ \therefore (265 + 55) = \frac{40x}{100} \]

or \( 320 \times 100 = 40x \)

\[ \therefore x = \frac{320 \times 100}{40} = 800 \]

35. (a) Let the original fraction be \( \frac{x}{y} \)

According to the question,

\[ \frac{300x}{100} - \frac{260y}{100} = \frac{7}{13} \]

\[ \text{or} \quad \frac{30x}{26y} = \frac{7}{13} \]

\[ \therefore \frac{x}{y} = \frac{7}{13} \times \frac{26}{15} = \frac{7}{15} \]

36. (b) 60% of 250 = 150

40% of 125 = 50

No. of correct answers in remaining 125 questions

\[ = 150 - 50 = 100 \]

\[ \therefore \text{Percentage} = \frac{100 \times 100}{125} = 80\% \]

37. (a) Let the original fraction be \( \frac{x}{y} \), then, \( \frac{x \times 320}{y \times 250} = \frac{4}{5} \)
38. (e) Population after two years
\[ \frac{x}{y} = \frac{25 \times 4}{32 \times 5} = \frac{5}{8} \]

Then, \[ \frac{x + 2x}{y + 2.5y} = \frac{3}{14} \]
\[ \Rightarrow \frac{3x}{3.5y} = \frac{3}{14} \]
\[ \Rightarrow \frac{x}{y} = \frac{3 \times 3.5}{14 \times 3} = \frac{1}{4} \]

39. (d) Dhreew's monthly salary
\[ = \frac{600000}{12} = \text{₹} 50000 \]
Surya's monthly salary
\[ = 50000 \times \frac{40}{100} = \text{₹} 20000 \]
Pranab's monthly salary
\[ = 20000 \times \frac{80}{25} = \text{₹} 64000 \]

40. (a) Total marks in the test
\[ = (280 + 80) \times \frac{100}{45} \]
\[ = 800 \]
Passing marks for girls
\[ = 800 \times \frac{30}{100} = 240 \]
\[ \therefore \text{Required marks} = 240 - 108 = 132 \]

41. (e) Votes obtained by winner candidate = 64%
Votes obtained by runner candidate
\[ = (400 - 64) = 36\% \]
Difference of votes = (64 - 36) = 28%
According to question,
Total votes = \(\frac{992 \times 100}{28} = 3542\)

42. (e) Let the original fraction be \(\frac{x}{y}\).

43. (e) Let the maximum marks be \(x\)
According to the question,
\[ \therefore \frac{35x}{100} + 42 = 336 \]
\[ \therefore x = 840 \]

**EXERCISE 2**

1. (d) Let the third number be 100. Then, the first and second numbers will be 20 and 50, respectively.

   Required % = \(\frac{20}{50} \times 100 = 40\%\)

2. (b) Weight of the 1st box = 200 kg
   Therefore, weight of 3rd box = 250 kg,
   Weight of 2nd box = 300 kg and
   Weight of 4th box = 350 kg
   Thus, weight of 5th box = 500 kg
   \[ \therefore \text{Average weight of four heaviest boxes} = \frac{1400}{4} = 350\text{kg} \]
   and average weight of four lightest boxes
   \[ \frac{1100}{4} = 275\text{kg} \]
   Required difference = 75 kg

3. (c) Let number be \(x\)

   then, \(\frac{2}{3} \times \frac{1}{7} \times x = \frac{240 \times 87.5}{100} \)
4. (d) Working with options, we have

<table>
<thead>
<tr>
<th>Original number</th>
<th>New number</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) 22</td>
<td>34</td>
<td>12</td>
</tr>
<tr>
<td>(b) 63</td>
<td>96</td>
<td>33</td>
</tr>
<tr>
<td>(c) 24</td>
<td>38</td>
<td>14</td>
</tr>
</tbody>
</table>

Obviously, (d) is the correct option.

5. (b) 15% of 40 = 6

6. (a) % change in rate $= \frac{27 - 24}{24} \times 100 = \frac{100}{8} \%$

For fixed expenditure, % change in consumption

$= \frac{\% \text{ change in rate}}{100 + \% \text{ change in rate}} \times 100$

$= \frac{100}{8} \times \frac{100}{100 + \frac{100}{8}} = \frac{100}{9} \% = 11\frac{1}{9} \%$

7. (b) Let the total number of original inhabitants be x.

Then,

$\left(100 - 25\right)\% \text{ of } \left(100 - 10\right)\% \text{ of } x = 4050$

$\Rightarrow \left( \frac{75}{100} \times \frac{90}{100} \times x \right) = 4050 \Rightarrow \frac{27}{40} \times x = 4050$

$\Rightarrow x = \frac{4050 \times 40}{27} = 6000$.

: The number of original inhabitants = 6000.

8. (d) Let the original Rs. x. Then

65% of x + 20% of x + 1305 = x

$0.65x + 0.2x + 1305 = x$

$\Rightarrow 0.15x = 1305 \Rightarrow x = Rs \ 8700$

∴ His total investment = 65% of 8700 + 20% of 8700

$= 85\% \times 8700 = Rs \ 7395$

9. (d) Net effect on sale $= \frac{\text{(common \% change)}^2}{100}$

$= \frac{(-15)^2}{100} = 2.25\% \text{ decrease}$

10. (a) Let the original price be x and sale be of y units.

Then, the revenue collected initially = x \times y

Now, new price = 0.8x, new sale = 1.8 y

Then, new revenue collected = 1.44xy

% increase in revenue $= \frac{0.44xy \times 100}{xy} = 44\% \text{ increase}$

11. (b) Since, expenditure = price \times consumption

\[ \therefore \ 110\% \text{ of } 30 = \frac{132}{100} \times \text{ new consumption} \]

\[ \Rightarrow \frac{110}{100} \times 30 = \frac{132}{100} \times \text{ new consumption} \]

\[ \Rightarrow \text{ New consumption} = 25 \text{ kg} \]

12. (a) Let the bill be Rs. x. Then

90% of x = 45

\[ \Rightarrow x = \frac{45 \times 100}{90} = Rs \ 50 \]

13. (d) Let one month ago, production be x chocolates.

Then, 130% of x = 9100

\[ \Rightarrow x = \frac{9100 \times 100}{130} = 7000 \text{ chocolates} \]

14. (b) Let total number of votes polled be x.

Then, votes polled by other candidate

$= (100 - 40)\% \text{ of } x = 60\% \text{ of } x$

Now 60% of x - 40% of x = 160

\[ \Rightarrow \frac{20x}{100} = 160 \Rightarrow x = 800 \text{ votes} \]

15. (c) After first year, the value of the scooter

= Rs 20,000

After second year, the value of scooter = Rs
16,000
After third year, the value of scooter = Rs 12,800

16. (b) Let the original number be 100.
Then, the new number = 100 \times 1.1 \times 0.9 = 99
i.e. the number decreases by 1%.

17. (a) % reduction in consumption
\[ \frac{\% \text{ change in price}}{100} \times 100 = \frac{7}{100 + 7} \times 100 = \frac{7}{107} \% \]

18. (d) Total cost = Rs. \[1 \times 1000 + (100 - 2)\% \text{ of } 1 \times 4000\]
= Rs. \((1000 + 0.98 \times 4000) = \text{Rs. } (1000 + 3920)\]
= Rs. 4920

19. (b) \[\frac{\text{Marks of } y}{\text{Marks of } x} = \frac{100 + \% \text{ above minimum of } y}{100 + \% \text{ above minimum of } x}\]
\[\Rightarrow \frac{710}{515} = \frac{100 + y}{103}\]
\[\Rightarrow 100 + y = \frac{710 \times 103}{515} = 142\]
\[\Rightarrow y = 42\%\]

20. (c) Let the salary of Ram be Rs 100. Then, salary of
Amit = Rs 80 and salary of Ravi = Rs 120
Ratio of Ram’s salary to Ravi’s salary
= 100 : 120 = 5 : 6

21. (b) Total no. of machine parts in both the shipments
= \((120 + 80) = 200\)
Total defective machine parts in both the shipments
= \(120 \times 5\% + 80 \times 10\% = 6 + 8 = 14\)
Therefore, required % = \(\frac{14}{200} \times 100 = 7\%\)

22. (a) Let the numbers be x and y. Then,
\[x + y = \frac{28}{25} \Rightarrow y = \frac{28}{25}x - x \Rightarrow y = \frac{3}{25}x\]

\[\Rightarrow \frac{y}{x} = \left(\frac{3}{25} \times 100\right)\% = 12\%\]

23. (d) Let original price be Rs x per orange. Then,
Reduced rate = \((1 - 0.2)x = \text{Rs } 0.8x\)
\[\Rightarrow \frac{2.50}{0.8x} = 5\]
\[\Rightarrow \frac{25}{8x} \times x = 5 \Rightarrow x = \frac{1}{8}\]

\[\Rightarrow \text{Original price of oranges per dozen} = \frac{1}{8} \times 12 = \text{Rs } 1.5\]
and Reduced price = \((0.8)(1.5) = \text{Rs } 1.2\)

24. (c) Let the inspector examined x metres,
then \(0.08\%\) of \(x = 2\)
\[\Rightarrow \frac{x \times 0.08}{100} = 2\]
or \[x = \frac{200}{0.08} = 2500\text{ metres}\]

25. (c) If the radius is diminished by \(r\%\), then
\[\text{Area is diminished by } \left(\frac{2r - r^2}{100}\right)\%\]
\[= 2 \times 10 - \frac{10^2}{100} = 19\%\]

26. (b) Let the total number of votes enrolled be \(x\). Then,
Number of votes cast = 75\% of \(x\). Valid votes = 98\% of (75\% of \(x\)).
\[\Rightarrow 75\% \text{ of } [98\% \text{ of } (75\% \text{ of } x)] = 9261\]
\[\Rightarrow \left(\frac{75}{100} \times \frac{98}{100} \times \frac{75}{x}\right) = 9261\]
\[\Rightarrow x = \left(\frac{9261 \times 100 \times 100 \times 100}{75 \times 98 \times 75}\right) = 16800\]
27. (b) Let original income = Rs. 100. Then, saving = Rs. 10 and expenditure = Rs. 90.
    New income = Rs. 120, New saving = Rs. 10.
    New expenditure = Rs. (120 – 10) = Rs. 110.
    Increase in expenditure = Rs. (110 – 90) = Rs. 20.
    .: Increase % = \( \left( \frac{20}{90} \times 100 \right)\% = \frac{22.2}{9} \% \).

28. (b) Let the original price of a screw driver and a hammer be Rs 100 each.
    Then, price of 3 screw drivers and 3 hammers
    = Rs 600
    Now, after increase of 5%, the price of 3 screw drivers = Rs 315
    And after 3% increase the price of 3 hammers
    = Rs 309
    Increased price of 3 hammers and 3 screw drivers
    = Rs 624
    Therefore, % increase in price = \( \frac{24}{600} \times 100 = 4\% \)

29. (a) Suppose price of the printer = P
    .: Price of a computer = 3P
    Total cost of 60 computers = 180 P
    Total cost of 20 printers = 20 P
    .: Total cost of the purchase = 200 P
    Thus total cost of the printers is 10% of the total cost.

30. (c) Let the total number of candidates = x
    Then, number of passed candidates
    = (100 – 31)% of x = 69% of x
    Now, 69 % of x – 31% of x = 247
    \( \Rightarrow \frac{38}{100} \times x = 247 \Rightarrow x = \frac{247 \times 100}{38} = 650 \)

31. (c) Let the total number of votes be x
    .: votes polled by winning candidate

= (100 – 30)% of x = 70% of x
Now, 70% of x – 30% of x = 15,000
\( \Rightarrow 40\% \text{ of } x = 15,000 \)
\( \Rightarrow x = \frac{15000 \times 100}{40} = 37,500 \)
\( \Rightarrow x = \frac{70 \times 37500}{100} = 26,250 \)

\[ \therefore \text{number of votes polled by winning candidate} = 70\% \text{ of } 37500 \]
\[ = \frac{70 \times 37500}{100} = 26,250 \]

32. (b) Let B’s salary be Rs 100,
    then A’s salary = Rs 125
    % lesser = \( \frac{125 \times 100 - 100}{125} \times 100 = \frac{25 \times 100}{5} \times 100 \)
    \[ = \frac{1}{5} \times 100 = 20\% \]

33. (c) Let the number of males be x. Then,
    number of females = (5000 – x).
    \[ \therefore 10\% \text{ of } x + 15\% \text{ of } (5000 – x) = (5600 - 5000) \]
    \[ \Rightarrow \frac{10}{100} x + \frac{15}{100} (5000 - x) = 600 \]
    \[ \Rightarrow 10x + 75000 - 15x = 60000. \]
    \[ \Rightarrow 5x = 15000 \Rightarrow x = 3000. \]

34. (d) 5 + 10% = 5.50
    10 + 10% = 11
    11 + 10% = 12.10

EXERCISE 3

1. (c) Total Tractor = 29400
   i.e., Mahindra + non Mahindra = 29400
   Given : Mahindra tractor = 15000
   \[ \therefore \text{Non - Mahindra tractor } = 29400 - 15000 = 14400 \]
   Now, 53% of 29400 = Red Mahindra + Red Non-
Mahindra

\[ 29400 \times \frac{53}{100} = 15582. \]

Thus, Red Mahindra + Red Non-Mahindra = 15582

Now, Non-Red Mahindra = 15582 - \( \frac{98 \times 15000}{100} \)

= 15582 - 14700 = 882.

\[ \therefore \text{\% non-Red Mahindra} = \frac{882}{14400} \times 100 = 6.125\% \]

2. (b) Let \( x \) be the total grown quantity of wheat.

\[ (7\% \text{ of } x) + 6 = \left(\frac{31}{4}\% \text{ of } x\right) + 3 \]

\[ \Rightarrow \frac{7x}{100} + 6 = \frac{31x}{400} + 3 \]

\[ \Rightarrow 3 = \left(\frac{31 - 28}{400}\right)x \]

\[ \Rightarrow \frac{1200}{3} = x \Rightarrow 400 \text{ million tonnes wheat grown.} \]

3. (d) Population after 1st year = \( \frac{110}{100} \times 100,000 \)

= 11000

Population after 2nd year

= 11000 \times \frac{120}{100} = 13200

Population after 3rd year

= 13200 \times \frac{95}{100} = 12,540

Hence, population after 3rd year = 12,540.

4. (c) Suppose there are 100 candidates for entrance.

\[ \therefore \text{No. of capable candidates} = 40 \text{ and} \]

\[ \text{No. of incapable candidates} = 100 - 40 = 60 \]

Now, no. of capable candidates who pass the test

\[ = 80\% \text{ of } 40 = 32 \]

No. of incapable candidates who pass the test

\[ = 25\% \text{ of } 60 = 15 \]

Note that these successful candidates become college students.

Thus, there are 32 + 15 = 47 college students in all, of which 32 are capable.

Hence, Proportion of capable college students

\[ = \frac{32}{47} \times 100 = 68\% \]

5. (a) Let the salary of July be Rs. \( \frac{5}{2}x \)

and the salary of June be Rs. \( \frac{9}{4}x \).

Required percentages

\[ = \frac{\frac{5}{2}x - \frac{9}{4}x}{\frac{9}{4}x} \times 100 \text{ and } \frac{\frac{5}{2}x - \frac{9}{4}x}{\frac{5}{2}x} \times 100 \]

\[ = 100\% \text{ and } 100\% = 11\frac{1}{9}\% \text{ and } 10\% \]

6. (b) 30% of the residents are children.

\[ \therefore 30\% \text{ of the total residents} = 24 \]

\[ \therefore \text{Total number of residents in the society} \]

\[ = \frac{24}{30} \times 100 = 80 \]

7. (b) Number of questions attempted correctly

\[ = (70\% \text{ of } 10 + 40\% \text{ of } 30 + 60\% \text{ of } 35) \]

\[ = (7 + 12 + 21) = 40 \]

Questions to be answered correctly for 60% grade = 60% of 75 = 45.

\[ \therefore \text{Required number of questions} = (45 - 40) = 5. \]

8. (b) Seats in executive class = 50

Seats for chair car = 450

Booked seats in total = 425
Booked in executive class = 48
Therefore, seats booked in chair class = (425 - 48) = 377
Empty seats for chair class = 450 - 377 = 73

9. (c) Let his sales be worth Rs. x. Then,
\[ 1000 + 2.5 \% \text{ of } (x - 4000) = 5\% \text{ of } x + 600 \]
\[ \Rightarrow \frac{5x}{100} = \frac{2.5(x - 4000)}{100} = 1000 - 600 \]
\[ \Rightarrow 2.5x + 10000 = 40,000 \]
\[ \Rightarrow x = \frac{30,000}{2.5} = 12,000 \]

10. (b) 40\% of boys = \frac{20}{2} girls
\[ \Rightarrow 40\% \text{ of boys} = 10 \text{ girls} \]

Total no. of boys = 25
\[ \therefore \text{Total number of students} = 25 + 20 = 45 \]

11. (b) Let the number of candidates appeared from each state be x.
Then, 7% of x - 6% of x = 80 \Rightarrow 1\% \text{ of } x = 80
\[ \Rightarrow x = 80 \times 100 = 8000 \]

12. (d) Let the number of students be x. Then,
Total number of students of 8 years and above 8 years
\[ = (100 - 20)\% \text{ of } x = 80\% \text{ of } x \]
\[ = \frac{80}{100} \times x = 80 \Rightarrow x = 100. \]

13. (b) Let the number be x. Then,
\[ \% \text{ error} = \frac{6x - x}{6x} \times 100 = \frac{35}{36} \times 100 = 97.2\% \]

14. (b) Let the total salary be Rs. x.
Then, (100 - 10)\% of (100 - 20)\% of (100 - 20)\% of \(x = 15552\)
\[ \Rightarrow \left( \frac{90}{100} \times \frac{80}{100} \times \frac{80}{100} \times \frac{90}{100} \right) = 15552 \]
\[ \Rightarrow x = \left( \frac{15552 \times 10000}{64 \times 81} \right) = 30,000. \]

15. (b) Let his investment in the year 2000 be Rs. x.
Then, income in 2000 = Rs. \[\frac{126}{100} (x - 5000)\].
\[\Rightarrow \text{Income in 2001} = \frac{126}{100} (x - 5000) \]
\[\Rightarrow \frac{120}{100} x = \frac{126}{100} (x - 5000) \Rightarrow 120x = 126(x - 5000) \]
\[\Rightarrow 6x = 630000 \Rightarrow x = 105000. \]

16. (d) Let the maximum marks be x.
Then, x \times 30\% + 10 = x \times 40\% - 15
\[\Rightarrow x \times 10\% = 25 \text{ or } x = 250 \]
Therefore, passing marks = \[250 \times \frac{30}{100} + 10 = 85 \]

17. (a) If side is increased by a\%, area increased by
\[\left( \frac{2a + a^2}{100} \right) \% \]
\[= 2 \times 5 + \frac{5^2}{100} = 10 + \frac{25}{100} = 10.25\% \]

18. (d) Number of ticketless travellers in April
\[= 4000 \times \left( \frac{1 + \frac{5}{100}}{1 - \frac{5}{100}} \right) \left( \frac{1 - \frac{10}{100}}{1 - \frac{10}{100}} \right) \]
\[= \left( \frac{4000 \times 21}{20} \times \frac{19}{20} \times \frac{9}{10} \right) = 3591. \]

19. (b) Let the capacity of the tank be 100 litres. Then,
Initially : A type petrol = 100 litres.
After first operation :
A type petrol = \( \frac{100}{2} \) = 50 litres;

B type petrol = 50 litres.

**After second operation:**

A type petrol = \( \frac{50}{2} + 50 \) = 75 litres;

B type petrol = \( \frac{50}{2} \times 50 = 25 \) litres

**After third operation:**

A type petrol = \( \frac{75}{2} \) = 37.5 litres;

B type petrol = \( \frac{25}{2} + 50 \) = 62.5 litres.

\[ \therefore \] Required percentage = 37.5%.

20. (a) Let the total number of students be \( x \).

Number passed in one or both is given by:

\[ n(A \cup B) = n(A) + n(B) - n(A \cap B) \]

\[ = 65\% \text{ of } x + 60\% \text{ of } x - 40\% \text{ of } x \]

\[ = \frac{65}{100}x + \frac{60}{100}x - \frac{40}{100}x = \frac{85}{100}x = \frac{17}{20}x. \]

Failed in both = \[ x - \frac{17}{20}x \] = \[ \frac{3x}{20} \]

\[ \therefore \frac{3x}{20} = 90 \Rightarrow x = \left( \frac{90 \times 20}{3} \right) = 600. \]

21. (c) \( n(A) = 40, n(B) = 50, n(A \cap B) = 10. \)

\[ n(A \cup B) = n(A) + n(B) - n(A \cap B) = 40 + 50 - 10 = 80. \]

\[ \therefore \text{ Percentage reading either or both newspapers = } 80\%. \]

Hence, percentage reading neither newspaper = \( (100 - 80)\% = 20\% \)

22. (c) Let the number of students be 100.

Then number of students who play both the games = \( (34 + 40) - (48) = 26 \)

If 26 students play both the games, then the total number of students = 100

Therefore, if 234 students play both the games, then the total number of students = \( 100 \times \frac{234}{26} = 900 \)

23. (d) Let the total no. of parts produced at initial stage be 100. Then after three successive percentage rejections of 10\%, 5\% and 2\%, we have

\[ 100 \times 0.9 \times 0.95 \times 0.98 = 83.79 \]

Therefore, a single effective rejection = \( 100 - 83.79 = 16.21 \)

24. (d) Let the original length and breadth be both 10 cm each.

Then original area = 100 cm\(^2\)

New length = \( 10 \times 1.25 = 12.5 \) cm

Let new breadth be \( x \). Then, \( 12.5x = 100 \)

\[ \Rightarrow x = \frac{100}{12.5} = 8 \text{ cm} \]

Hence, \% reduction in breadth

\[ = \frac{2}{10} \times 100 = 20\% \]