Answer the questions

(1) Kareem's income is 50% less than Ridhima's income, Ashish's income is 20% less than Kareem's income, and Sonia's income is 40% less than Kareem's income. If Ridhima gave 40% of his income to Ashish and 60% of his income to Sonia. What would be the fraction of Ashish's new income and Sonia's new income?

(2) An article with price tag of Rs.600 is sold at 25% discount. Due to off-season shopkeeper provides additional discount of 40% on the discounted price. Find the selling price of the article.

Choose correct answer(s) from given choice

(3) \(200\% \text{ of } \left(\frac{1}{2}\right)^3 =\)
   a. 1.25  
   b. 0.025  
   c. 2.5  
   d. 0.25

(4) A cat is walking on periphery of a regular polygon as shown below.

If it starts from point S, cat will be on which side after walking 80% distance of the periphery in clock-wise direction?
   a. F  
   b. E  
   c. A  
   d. D

(5) 1.8 is what percent of 300?
   a. 6%  
   b. 0.6%  
   c. 0.006%  
   d. 0.06%
(6) How many more squares need to be shaded to cover 50% of the total area?

- a. 15
- b. 5
- c. 10
- d. 7

(7) A total of 1200 cookies were brought to the school picnic. The children ate 996 of the cookies. What was the percentage of cookies left?

- a. 7 %
- b. 17 %
- c. 37 %
- d. 27 %

(8) Neha donated 20% of his salary to charity and spent 10% of the remaining amount. She still has Rs.11880 left. What was her total salary?

- a. Rs.17150
- b. Rs.16500
- c. Rs.15840
- d. none of these

Fill in the blanks

(9) Balvinder got 12 out of 25 in his French test. His percentage is ___ \%.

(10) \((18\% \text{ of } 50) - (50\% \text{ of } 18) = \text{_____}.

(11) Convert to a decimal

A) \(54.5\% = \text{_____}\)  
B) \(103.3\% = \text{_____}\)  
C) \(124\% = \text{_____}\)

D) \(164.1\% = \text{_____}\)  
E) \(130.9\% = \text{_____}\)  
F) \(162.9\% = \text{_____}\)

(12) Convert the fraction representation of the percentages given below into the decimal form:

A) \(\frac{11}{20} \% = \text{_____}\)  
B) \(\frac{3}{4} \% = \text{_____}\)

C) \(\frac{9}{20} \% = \text{_____}\)  
D) \(\frac{3}{20} \% = \text{_____}\)

(13) When 24 is added to 40 \% of a number, it gives the number itself. The number is \text{_____}.

(14) Ria stays in the school hostel and gets Rs. 2532 from home every month. She spends 17 percent of this amount on hostel fees. The monthly hostel fees is Rs. \text{_____}.
(15) If salary of Matthew is 22% more than salary of Sara, salary of Sara will be 22% less than salary of Matthew.

☐ True  ☐ False
Step 1
In the question, there are four people: Kareem, Ashish, Sonia and Ridhima. Everyone's income is directly or indirectly told in terms of Ridhima's income.

Step 2
Let's write Kareem's, Ashish's and Sonia's income as a percentage of Ridhima's income first.

Step 3
Kareem's income:
Kareem's income is 50% less than Kareem's income. This means,
Kareem's income is (100 - 50) = 50% of Ridhima's income

Step 4
Ashish's income:
Ashish's income is 20% less than Kareem's income. This means,
Ashish's income is (100 - 20) = 80% of Kareem's income
= 80% of 50% of Ridhima's income ...[Kareem's income is 50% of Ridhima's income]
= 80% × 50% of Ridhima's income
= (80 × 50)/100 % of Ridhima's income ...[When we multiply two percentages, we need to divide by 100 to get final percentage]
= 4000/100 % of Ridhima's income
= 40% of Ridhima's income

Step 5
Sonia's income:
Sonia's income is 40% less than Kareem's income. This means,
Sonia's income is (100 - 40) = 60% of Kareem's income
= 60% of 50% of Ridhima's income
= 60% × 50% of Ridhima's income
= (60 × 50)/100 % of Ridhima's income
= 30% of Ridhima's income

Step 6
We have just found that:
Ashish's income = 40% of Ridhima's income
Sonia's income = 30% of Ridhima's income

Ridhima gives 40% of his income to Ashish and 60% of his income to Sonia. Their new incomes will be:

Ashish's new income = (40 + 40) = 80% of Ridhima's income
Sonia's new income = (30 + 60) = 90% of Ridhima's income

Step 7
Fraction of Ashish's new income to Sonia's new income = (80% of Ridhima's income)/(90% of Ridhima's income)

\[
= \frac{80}{90} = \frac{8}{9}
\]

(2) Rs.270

**Step 1**

If you look at the question carefully then you will notice that
the price of an article = Rs.600
Since the article is sold at 25% discount
Therefore the discounted price of an article = Price of an article - discount at the article

\[
= 600 - 600 \times \frac{25}{100}
\]

\[
= 600 - \frac{15000}{100}
\]

\[
= 600 - 150
\]

\[
= 450
\]

**Step 2**

Since due to off-season shopkeeper provides additional discount of 40% on the discounted price.
Now the selling price of an article = discounted price of an article - additional discount on the discounted price

\[
= 450 - 450 \times \frac{40}{100}
\]

\[
= 450 - \frac{18000}{100}
\]

\[
= 450 - 180
\]

\[
= 270
\]

**Step 3**

Therefore the selling price of an article = Rs.270

(3) d. 0.25
Step 1
If you look at the regular polygon carefully, you will notice that the number of sides of a regular polygon are 6.

Therefore the length of a side of the regular polygon = \( \frac{1}{6} \)

Step 2
Since distance walked by a cat on the periphery in clock-wise direction = 80% = \( \frac{80}{100} \)

Therefore the number of sides walked by a cat on the regular polygon =

\[
\frac{\text{Distance walked by a cat}}{\text{Length of a side of the polygon}} = \frac{80}{100} \times \frac{1}{6}
\]

\[
= \frac{80}{100} \times \frac{6}{1}
\]

\[
= \frac{480}{100}
\]

\[
= 4.8
\]

It means cat walked on 4 sides of the regular polygon and a cat is walking on the 5th side of the regular polygon in clock-wise direction.

Step 3
Since it starts from point s, cat will be on the side E after walking 80 distance of the periphery in clock-wise direction.

(5) b. 0.6%
c. 10

Step 1
Total number of squares,
\[ N = \text{number of rows} \times \text{number of columns} \]
\[ \Rightarrow N = 6 \times 5 \]
\[ \Rightarrow N = 30 \]

Step 2
Lets now find required number of shaded squares,
\[ S = 50\% \text{ of } 30, \]
\[ \Rightarrow S = 30 \times \frac{50}{100} \]
\[ \Rightarrow S = 15 \]

Step 3
We can see in the picture that 5 squares are already shaded

Step 4
Therefore number of squares which needs to be shaded,
= \[ S - 5 \]
= \[ 15 - 5 \]
= \[ 10 \]

b. 17 %

Step 1
Total cookies = 1200
Number of cookies ate by the children = 996
Number of cookies left = 1200 - 996 = 204

Step 2
We have been asked to find the percentage of left cookies.
\[ \% \text{ of left cookies} = \frac{204 \times 100}{1200} \]
\[ = \frac{20400}{1200} \]
\[ = 17 \% \]

Step 3
Therefore, 17 % cookies left.
b. Rs.16500

**Step 1**
Let’s assume the total salary of the man be \( x \)

**Step 2**
After donating 20%, percentage amount left with her = 100 - 20% = 80%.
Therefore amount remaining after donation = \( \frac{80x}{100} \)

**Step 3**
Similarly percentage amount remaining with her after spending 10% = 100 - 10% = 90%
Therefore amount remaining after spending = \( \frac{(90)(80)x}{10000} \)

**Step 4**
Since remaining amount is given in question to be Rs.11880,
\[ \frac{(90)(80)x}{10000} = 11880 \]
\[ x = \frac{(11880)(10000)}{(90)(80)} \]
\[ x = 16500 \]

**Step 5**
Therefore, her total salary was Rs.16500.

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48

**Step 1**
Marks obtained by the Balvinder = 12
Total marks of French test = 25

**Step 2**
We have been asked to find the percentage of marks that she got.

\[
\text{Percentage marks obtained by Balvinder in French test} = \frac{\text{Obtained marks}}{\text{Total marks}} \times 100
\]
\[ = \frac{12}{25} \times 100 \]
\[ = \frac{1200}{25} \]
\[ = 48\% \]

**Step 3**
Therefore, marks obtained by Balvinder is 48%.
Step 1
(18% of 50) = 50 × 18/100
⇒ (18% of 50) = (18 × 50)/100

Step 2
(50% of 18) = 18 × 50/100
⇒ (50% of 18) = (18 × 50)/100

Step 3
Now we can find value of required expression,
(18% of 50) - (50% of 18)
= (18 × 50)/100 - (18 × 50)/100,
= 0

A) 0.545

Step 1
We have been asked to convert 54.5% to the decimal.

Step 2
Now,
54.5 % = \frac{54.5}{100}
= 0.545

Step 3
Therefore, the decimal value of 54.5% is 0.545.

B) 1.033

Step 1
We have been asked to convert 103.3% to the decimal.

Step 2
Now,
103.3 % = \frac{103.3}{100}
= 1.033

Step 3
Therefore, the decimal value of 103.3% is 1.033.
C) 1.24

Step 1
We have been asked to convert 124% to the decimal.

Step 2
Now,
\[
124\% = \frac{124}{100}
\]
\[= 1.24 \]

Step 3
Therefore, the decimal value of 124% is 1.24.

D) 1.641

Step 1
We have been asked to convert 164.1% to the decimal.

Step 2
Now,
\[
164.1\% = \frac{164.1}{100}
\]
\[= 1.641 \]

Step 3
Therefore, the decimal value of 164.1% is 1.641.

E) 1.309

Step 1
We have been asked to convert 130.9% to the decimal.

Step 2
Now,
\[
130.9\% = \frac{130.9}{100}
\]
\[= 1.309 \]

Step 3
Therefore, the decimal value of 130.9% is 1.309.
Step 1
We have been asked to convert 162.9% to the decimal.

Step 2
Now,

\[ 162.9 \% = \frac{162.9}{100} \]

\[ = 1.629 \]

Step 3
Therefore, the decimal value of 162.9% is 1.629.

Step 1
First of all we have to change the mixed fraction representation of the percentage \( \frac{11}{20} \% \) into the fraction representation of the percentage, by multiplying the denominator 20 to the whole number 24 and add the result to the numerator 11, as below:

\[ \frac{11}{20} \% = \frac{491}{20} \% \]

Step 2
Now, convert the fraction represent of the percentage \( \frac{491}{20} \% \) into the simple fraction, dividing by 100:

\[ \frac{491}{20} \% = \frac{491}{20 \times 100} \]

\[ = \frac{491}{2000} \]

\[ = 0.2455 \]

Step 3
Hence, the fraction representation of the percentage into the decimal form is 0.2455.
**Step 1**
First of all we have to change the mixed fraction representation of the percentage $81 \frac{3}{4} \%$ into the fraction representation of the percentage, by multiplying the denominator 4 to the whole number 81 and add the result to the numerator 3, as below:

$$81 \frac{3}{4} \% = \frac{81 \times 4 + 3}{4} \% = \frac{327}{4} \%$$

**Step 2**
Now, convert the fraction represent of the percentage $\frac{327}{4} \%$ into the simple fraction, dividing by 100:

$$\frac{327}{4} \% = \frac{327}{4 \times 100} = \frac{327}{400} = 0.8175$$

**Step 3**
Hence, the fraction representation of the percentage into the decimal form is 0.8175.
Step 1
First of all we have to change the mixed fraction representation of the percentage $30\frac{9}{20} \%$ into the fraction representation of the percentage, by multiplying the denominator 20 to the whole number 30 and add the result to the numerator 9, as below:

$$30\frac{9}{20} \% = \frac{609}{20} \%$$

Step 2
Now, convert the fraction represent of the percentage $\frac{609}{20} \%$ into the simple fraction, dividing by 100:

$$\frac{609}{20} \% = \frac{609}{20 \times 100}$$

$$= \frac{609}{2000}$$

$$= 0.3045$$

Step 3
Hence, the fraction representation of the percentage into the decimal form is $0.3045$. 
Step 1
First of all we have to change the mixed fraction representation of the percentage $\frac{20}{3}$ % into the fraction representation of the percentage, by multiplying the denominator 20 to the whole number 20 and add the result to the numerator 3, as below:

$\frac{20 \times 3}{20} \% = \frac{403}{20} \%$

Step 2
Now, convert the fraction represent of the percentage $\frac{403}{20}$ % into the simple fraction, dividing by 100:

$\frac{403}{20} \% = \frac{403}{20 \times 100} = \frac{403}{2000} = 0.2015$

Step 3
Hence, the fraction representation of the percentage into the decimal form is 0.2015.
Step 1
Let’s assume that the number is $x$,

\[ 40 \% \text{ of } x = x \times \frac{40}{100} = \frac{40x}{100} \]

Step 2
If you look at the question carefully, you will notice that the number ($x$) is equal to the sum of $24$ and $40 \%$ of $x$.

It can be written as:

\[ x = 24 + \frac{40x}{100} \]

\[ \Rightarrow x = \frac{24 \times 100 + 40x}{100} \]

\[ \Rightarrow x = \frac{2400 + 40x}{100} \]

By cross multiplying both sides

\[ 100x = 2400 + 40x \]

\[ \Rightarrow 100x - 40x = 2400 \]

\[ \Rightarrow 60x = 2400 \]

\[ \Rightarrow x = \frac{2400}{60} \]

\[ \Rightarrow x = 40 \]

Step 3
Therefore the number is $40$. 
Step 1
Money received by Ria every month = Rs. 2532
Money spend by Ria on hostel fees = 17 %

Step 2
We have been asked to find the monthly hostel fees of the Ria.
Monthly hostel fees = 17 % of 2532
\[
\frac{2532 \times 17}{100} = \frac{43044}{100} = Rs. 430.44
\]

Step 3
Therefore, the monthly hostel fees of Ria is **Rs. 430.44**.

(15) False

Step 1
When salary of Sara is compared with salary of Matthew, percentage is calculated using ratio of salary difference relative to Matthew's salary.

Step 2
While if we compare salary of Matthew with salary of Sara, the absolute difference remains same, but relative difference will change, since now percentage will be relative to Sara's salary.

Step 3
Therefore, these two percentages will be different. Hence, this statement is False.