

Simplification

Exercise 6A

Q1

Answer :

Given expression:

$$= 21 - 12 \div 3 \times 2$$

$$= 21 - 4 \times 2 \quad [\text{Performing division}]$$

$$= 21 - 8 \quad [\text{Performing multiplication}]$$

$$= 13 \quad [\text{Performing subtraction}]$$

Q2

Answer :

Given expression:

$$= 16 + 8 \div 4 - 2 \times 3$$

$$= 16 + 2 - 2 \times 3 \quad [\text{Performing division}]$$

$$= 16 + 2 - 6 \quad [\text{Performing multiplication}]$$

$$= 18 - 6 \quad [\text{Performing addition}]$$

$$= 12 \quad [\text{Performing subtraction}]$$

Q3

Answer :

Given expression:

$$= 13 - (12 - 6 \div 3)$$

$$= 13 - (12 - 2) \quad [\text{Performing division}]$$

$$= 13 - 10 = 3 \quad [\text{Performing subtraction}]$$

Q4

Answer :

Given expression:

$$= 19 - [4 + \{16 - (12 - 2)\}]$$

$$= 19 - [4 + \{16 - 10\}] \quad [\text{Removing parentheses}]$$

$$= 19 - [4 + 6] \quad [\text{Removing braces}]$$

$$= 19 - 10 \quad [\text{Removing square brackets}]$$

$$= 9$$

Q5

Answer :

Given expression:

$$= 36 - [18 - \{14 - (15 - 4 + 2 \times 2)\}]$$

$$= 36 - [18 - \{14 - (15 - 2 \times 2)\}] \quad [\text{Performing division}]$$

$$= 36 - [18 - \{14 - (15 - 4)\}] \quad [\text{Performing multiplication}]$$

$$= 36 - [18 - \{14 - 11\}] \quad [\text{Removing parentheses}]$$

$$= 36 - [18 - 3] \quad [\text{Removing braces}]$$

$$= 36 - 15 \quad [\text{Removing square brackets}]$$

$$= 21$$

Q6

Answer :

Given expression:

$$\begin{aligned}
 &= 27 - [18 - \{16 - (5 - \overline{4 - 1})\}] \\
 &= 27 - [18 - \{16 - (5 - 3)\}] && \text{[Removing bar]} \\
 &= 27 - [18 - \{16 - 2\}] && \text{[Removing parentheses]} \\
 &= 27 - [18 - 14] && \text{[Removing braces]} \\
 &= 27 - 4 && \text{[Removing square brackets]} \\
 &= 23
 \end{aligned}$$

Q7

Answer :

Given expression:

$$\begin{aligned}
 &= 4\frac{4}{5} \div \frac{3}{5} \text{ of } 5 + \frac{4}{5} \times \frac{3}{10} - \frac{1}{5} \\
 &= 4\frac{4}{5} \div \frac{3}{5} \times \frac{5}{1} + \frac{4}{5} \times \frac{3}{10} - \frac{1}{5} && \text{(Removing 'of')} \\
 &= \frac{24}{5} \div \frac{3}{1} + \frac{4}{5} \times \frac{3}{10} - \frac{1}{5} \\
 &= \frac{24}{5} \times \frac{1}{3} + \frac{4}{5} \times \frac{3}{10} - \frac{1}{5} && \text{(Removing '÷')} \\
 &= \frac{8}{5} + \frac{4}{5} \times \frac{3}{10} - \frac{1}{5} && \text{(Removing '×')} \\
 &= \frac{8}{5} + \frac{6}{25} - \frac{1}{5} && \text{(Removing '×')} \\
 &= \frac{40 + 6 - 5}{25} = \frac{41}{25} = 1\frac{16}{25}
 \end{aligned}$$

Q8

Answer :

Given expression:

$$\begin{aligned}
 &= \left(\frac{2}{3} + \frac{4}{9}\right) \text{ of } \frac{3}{5} \div 1\frac{2}{3} \times 1\frac{1}{4} - \frac{1}{3} \\
 &= \left(\frac{6+4}{9}\right) \text{ of } \frac{3}{5} \div 1\frac{2}{3} \times 1\frac{1}{4} - \frac{1}{3} && \text{(Removing parentheses)} \\
 &= \frac{10}{9} \times \frac{3}{5} \div 1\frac{2}{3} \times 1\frac{1}{4} - \frac{1}{3} && \text{(Removing 'of')} \\
 &= \frac{2}{3} \div \frac{5}{3} \times 1\frac{1}{4} - \frac{1}{3} \\
 &= \frac{2}{3} \times \frac{3}{5} \times \frac{5}{4} - \frac{1}{3} && \text{(Removing '÷')} \\
 &= \frac{2}{5} \times \frac{5}{4} - \frac{1}{3} \\
 &= \frac{1}{2} - \frac{1}{3} && \text{(Removing '×')} \\
 &= \frac{(3-2)}{6} = \frac{1}{6}
 \end{aligned}$$

Q9

Answer :

The given expression

$$\begin{aligned}
 &= 7\frac{1}{3} \div \frac{2}{3} \text{ of } 2\frac{1}{5} + 1\frac{3}{8} \div 2\frac{3}{4} - 1\frac{1}{2} \\
 &= \frac{22}{3} \div \frac{2}{3} \text{ of } \frac{11}{5} + \frac{11}{8} \div \frac{11}{4} - \frac{3}{2} \\
 &= \frac{22}{3} \div \frac{2}{3} \times \frac{11}{5} + \frac{11}{8} \div \frac{11}{4} - \frac{3}{2} && \text{(Removing 'of')} \\
 &= \frac{22}{3} \div \frac{22}{15} + \frac{11}{8} \div \frac{11}{4} - \frac{3}{2} \\
 &= \frac{22}{3} \times \frac{15}{22} + \frac{11}{8} \div \frac{11}{4} - \frac{3}{2} && \text{(Removing '÷')} \\
 &= 5 + \frac{11}{8} \times \frac{4}{11} - \frac{3}{2} && \text{(Removing '÷')} \\
 &= 5 + \frac{1}{2} - \frac{3}{2} && \text{(On simplifying)} \\
 &= \frac{10+1-3}{2} = \frac{8}{2} = 4
 \end{aligned}$$

Q10

Answer :

Given expression:

$$\begin{aligned} &= 5\frac{1}{7} - \left\{ 3\frac{3}{10} \div \left(2\frac{4}{5} - \frac{7}{10} \right) \right\} \\ &= \frac{36}{7} - \left\{ \frac{33}{10} \div \left(\frac{14}{5} - \frac{7}{10} \right) \right\} \\ &= \frac{36}{7} - \left\{ \frac{33}{10} \div \left(\frac{28-7}{10} \right) \right\} \\ &= \frac{36}{7} - \left\{ \frac{33}{10} \div \frac{21}{10} \right\} && \text{(Removing parentheses)} \\ &= \frac{36}{7} - \left\{ \frac{33}{10} \times \frac{10}{21} \right\} && \text{(Removing ' } \div \text{ ')} \\ &= \frac{36}{7} - \frac{11}{7} && \text{(Removing braces)} \\ &= \frac{36-11}{7} = \frac{25}{7} = 3\frac{4}{7} && \text{(Simplifying)} \end{aligned}$$

Q11

Answer :

Given expression:

$$\begin{aligned} &= 9\frac{3}{4} \div \left[2\frac{1}{6} + \left\{ 4\frac{1}{3} - \left(1\frac{1}{2} + 1\frac{3}{4} \right) \right\} \right] \\ &= \frac{39}{4} \div \left[\frac{13}{6} + \left\{ \frac{13}{3} - \left(\frac{3}{2} + \frac{7}{4} \right) \right\} \right] \\ &= \frac{39}{4} \div \left[\frac{13}{6} + \left\{ \frac{13}{3} - \left(\frac{6+7}{4} \right) \right\} \right] \\ &= \frac{39}{4} \div \left[\frac{13}{6} + \left\{ \frac{13}{3} - \frac{13}{4} \right\} \right] && \text{(Removing parentheses)} \\ &= \frac{39}{4} \div \left[\frac{13}{6} + \left\{ \frac{52-39}{12} \right\} \right] \\ &= \frac{39}{4} \div \left[\frac{13}{6} + \frac{13}{12} \right] && \text{(Removing braces)} \\ &= \frac{39}{4} \div \left[\frac{26+13}{12} \right] \\ &= \frac{39}{4} \div \frac{39}{12} && \text{(Removing square brackets)} \\ &= \frac{39}{4} \times \frac{12}{39} = 3 && \text{(Removing ' } \div \text{ ')} \end{aligned}$$

Q12

Answer :

Given expression:

$$\begin{aligned} &= 4\frac{1}{10} - \left[2\frac{1}{2} - \left\{ \frac{5}{6} - \left(\frac{2}{5} + \frac{3}{10} - \frac{4}{15} \right) \right\} \right] \\ &= \frac{41}{10} - \left[\frac{5}{2} - \left\{ \frac{5}{6} - \left(\frac{2}{5} + \frac{3}{10} - \frac{4}{15} \right) \right\} \right] \\ &= \frac{41}{10} - \left[\frac{5}{2} - \left\{ \frac{5}{6} - \left(\frac{12+9-8}{30} \right) \right\} \right] \\ &= \frac{41}{10} - \left[\frac{5}{2} - \left\{ \frac{5}{6} - \frac{13}{30} \right\} \right] && \text{(Removing parentheses)} \\ &= \frac{41}{10} - \left[\frac{5}{2} - \left\{ \frac{25-13}{30} \right\} \right] \\ &= \frac{41}{10} - \left[\frac{5}{2} - \frac{12}{30} \right] && \text{(Removing braces)} \\ &= \frac{41}{10} - \left[\frac{75-12}{30} \right] \\ &= \frac{41}{10} - \frac{63}{30} && \text{(Removing square brackets)} \\ &= \frac{123-63}{30} = \frac{60}{30} = 2 \end{aligned}$$

Q13

Answer :

Given expression:

$$\begin{aligned}
&= 1\frac{5}{6} + \left[2\frac{2}{3} - \left\{ 3\frac{3}{4} \left(3\frac{4}{5} \div 9\frac{1}{2} \right) \right\} \right] \\
&= \frac{11}{6} + \left[\frac{8}{3} - \left\{ \frac{15}{4} \left(\frac{19}{5} \div \frac{19}{2} \right) \right\} \right] \\
&= \frac{11}{6} + \left[\frac{8}{3} - \left\{ \frac{15}{4} \left(\frac{19}{5} \times \frac{2}{19} \right) \right\} \right] \\
&= \frac{11}{6} + \left[\frac{8}{3} - \left\{ \frac{15}{4} \times \frac{2}{5} \right\} \right] \\
&= \frac{11}{6} + \left[\frac{8}{3} - \frac{3}{2} \right] \\
&= \frac{11}{6} + \left[\frac{16-9}{6} \right] \\
&= \frac{11}{6} + \frac{7}{6} \\
&= \frac{18}{6} = 3
\end{aligned}$$

(Removing parentheses)

(Removing braces)

(Removing square brackets)

Q14

Answer :

Given expression:

$$\begin{aligned}
&= 4\frac{4}{5} \div \left\{ 2\frac{1}{5} - \frac{1}{2} \left(1\frac{1}{4} - \overline{\frac{1}{4} - \frac{1}{5}} \right) \right\} \\
&= \frac{24}{5} \div \left\{ \frac{11}{5} - \frac{1}{2} \left(\frac{5}{4} - \overline{\frac{1}{4} - \frac{1}{5}} \right) \right\} \\
&= \frac{24}{5} \div \left\{ \frac{11}{5} - \frac{1}{2} \left(\frac{5}{4} - \frac{1}{20} \right) \right\} \\
&= \frac{24}{5} \div \left\{ \frac{11}{5} - \frac{1}{2} \left(\frac{25-1}{20} \right) \right\} \\
&= \frac{24}{5} \div \left\{ \frac{11}{5} - \frac{1}{2} \times \frac{24}{20} \right\} \\
&= \frac{24}{5} \div \left\{ \frac{11}{5} - \frac{12}{20} \right\} \\
&= \frac{24}{5} \div \left\{ \frac{44-12}{20} \right\} \\
&= \frac{24}{5} \div \frac{32}{20} \\
&= \frac{24}{5} \times \frac{20}{32} \\
&= \frac{3}{4} \times 4 = 3
\end{aligned}$$

(Removing bar)

(Removing parentheses)

(Removing ' × ')

(Removing braces)

(Removing ' ÷ ')

Q15

Answer :

Given expression:

$$\begin{aligned}
&= 7\frac{1}{2} - \left[2\frac{1}{4} \div \left\{ 1\frac{1}{4} - \frac{1}{2} \left(\frac{3}{2} - \overline{\frac{1}{3} - \frac{1}{6}} \right) \right\} \right] \\
&= \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5}{4} - \frac{1}{2} \left(\frac{3}{2} - \overline{\frac{1}{3} - \frac{1}{6}} \right) \right\} \right] \\
&= \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5}{4} - \frac{1}{2} \left(\frac{3}{2} - \frac{1}{6} \right) \right\} \right] \\
&= \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5}{4} - \frac{1}{2} \left(\frac{9-1}{6} \right) \right\} \right] \\
&= \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5}{4} - \frac{1}{2} \times \frac{4}{3} \right\} \right] \\
&= \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{5}{4} - \frac{2}{3} \right\} \right] \\
&= \frac{15}{2} - \left[\frac{9}{4} \div \left\{ \frac{15-8}{12} \right\} \right] \\
&= \frac{15}{2} - \left[\frac{9}{4} \div \frac{7}{12} \right] \\
&= \frac{15}{2} - \left[\frac{9}{4} \times \frac{12}{7} \right] \\
&= \frac{15}{2} - \frac{27}{7} \\
&= \frac{105-54}{14} = \frac{51}{14} = 3\frac{9}{14}
\end{aligned}$$

(Removing bar)

(Removing parentheses)

(Removing ' × ')

(Removing braces)

(Removing ' ÷ ')

(Removing square brackets)

Simplification

Exercise 6B

Q1

Answer :

(c) 18

Explanation:

$$= 8 + 4 \div 2 \times 5$$

$$= 8 + 2 \times 5$$

$$= 8 + 10 = 18$$

Q2

Answer :

(b) 12

Explanation:

$$= 54 \div 3 \text{ of } 6 + 9$$

$$= 54 \div (3 \times 6) + 9$$

$$= 54 \div 18 + 9$$

$$= 3 + 9 = 12$$

Q3

Answer :

(b) 3

Explanation:

$$= 13 - (12 - 6 \div 3)$$

$$= 13 - (12 - 2)$$

$$= 13 - 10 = 3$$

Q4

Answer :

(a) 7

Explanation:

$$\begin{aligned} &= 1001 \div 11 \text{ of } 13 \\ &= 1001 \div (11 \times 13) \\ &= 1001 \div 143 = 7 \end{aligned}$$

Q5

Answer :

(b) 121

Explanation:

Given expression:

$$\begin{aligned} &= 133 + 28 \div 7 - 8 \times 2 \\ &= 133 + 4 - 8 \times 2 && \text{[Performing division]} \\ &= 133 + 4 - 16 && \text{[Performing multiplication]} \\ &= 137 - 16 && \text{[Performing addition]} \\ &= 121 && \text{[Performing subtraction]} \end{aligned}$$

Q6

Answer :

(a) 3636

Explanation:

Given expression:

$$\begin{aligned} &= 3640 - 14 \div 7 \times 2 \\ &= 3640 - 2 \times 2 && \text{[Performing division]} \\ &= 3640 - 4 && \text{[Performing multiplication]} \\ &= 3636 && \text{[Performing subtraction]} \end{aligned}$$

Q7

Answer :

(b) 920

Explanation:

Given expression:

$$\begin{aligned} &= 100 \times 10 - 100 + 2000 \div 100 \\ &= 100 \times 10 - 100 + 20 && \text{[Performing division]} \\ &= 1000 - 100 + 20 && \text{[Performing multiplication]} \\ &= 1020 - 100 && \text{[Performing addition]} \\ &= 920 && \text{[Performing subtraction]} \end{aligned}$$

Q8

Answer :

(b) 23

Explanation:

Given expression:

$$\begin{aligned} &= 27 - [18 - \{16 - (5 - \overline{4 - 1})\}] \\ &= 27 - [18 - \{16 - (5 - 3)\}] && \text{(Removing bar)} \\ &= 27 - [18 - \{16 - 2\}] && \text{(Removing parentheses)} \\ &= 27 - [18 - 14] && \text{(Removing braces)} \\ &= 27 - 4 && \text{(Removing square brackets)} \\ &= 23 \end{aligned}$$

Q9

Answer :

(a) 29

Explanation:

Given expression:

$$= 32 - [48 \div \{36 - (27 - \overline{16 - 9})\}]$$

$$= 32 - [48 \div \{36 - (27 - 7)\}]$$

(Removing bar)

$$= 32 - [48 \div \{36 - 20\}]$$

(Removing parentheses)

$$= 32 - [48 \div 16]$$

(Removing braces)

$$= 32 - 3$$

(Removing square brackets)

$$= 29$$

Q10

Answer :

(a) 6

Explanation:

Given expression:

$$= 8 - [28 \div \{34 - (36 - 18 \div 9 \times 8)\}]$$

[Performing division]

$$= 8 - [28 \div \{34 - (36 - 2 \times 8)\}]$$

[Performing multiplication]

$$= 8 - [28 \div \{34 - (36 - 16)\}]$$

$$= 8 - [28 \div \{34 - 20\}]$$

[Removing parentheses]

$$= 8 - [28 \div 14]$$

[Removing braces]

$$= 8 - 2 = 6$$

[Removing square brackets]