



<b>Name of the Bundle</b>	Intermediate Bundle V1	<b>Subject</b>	Aptitude
<b>Topic</b>	Simplification	<b>Last updated on</b>	19 August 2024

## Simplification

Conversion of complex arithmetic expressions into simple ones is called **Simplification**.

- Remember the following fundamental formulas that might be utilized in such a situation:
- $(a+b)^2 = a^2 + b^2 + 2ab$
- $(a-b)^2 = a^2 + b^2 - 2ab$
- $a^2 - b^2 = (a+b)(a-b)$
- $a^3 + b^3 = (a+b)(a^2 - ab + b^2)$
- $(a+b)^3 = a^3 + b^3 + 3ab(a+b)$
- $(a-b)^3 = a^3 - b^3 - 3ab(a-b)$

### **VBODMAS:**

RULE:

Vinculum > brackets > of > division > multiply > addition > subtraction.

1) Simplify:  $5000 - 5000/10$

- a. 0
- b. 4500
- c. 500
- d. 1000

**Ans: b. 4500**

**Explanation:**

**By using VBODMAS**

$$5000 - 500 = 4500$$



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2) If  $X/Y = 2$  then, find the value of  $Y^2/X^2$ .

- a.  $1/4$
- b.  $1/2$
- c.  $1$
- d.  $2$

**Ans: a.  $1/4$**

**Explanation:**

$$Y^2/X^2 = 1/2^2 = 1/4$$

3)  $a/3 = b/4 = c/7$  then find the value of  $(a+b+c) / c$ .

- a.  $3$
- b.  $7$
- c.  $12$
- d.  $2$

**Ans: b.  $7$**

**Explanation:**

$$(a+b+c) / c = (3+4+7)/7 \\ = 7$$

4) Find the value of  $\sqrt{1.21 \times 0.9 / 1.1 \times 0.11}$

- a.  $1$
- b.  $11$
- c.  $3$
- d.  $1.1$

**Ans: c.  $3$**

**Explanation:**

$$\sqrt{121 \times 9 / 11 \times 11} = 3$$



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5) Simplify:  $(81)^{3.6} \times (9)^{2.7} \div (81)^{4.2} \times (3)^1$  .

- a. 3
- b. 9
- c. 27
- d. 81

Ans: b. 9

Explanation:

$$\begin{aligned}(81)^{3.6} \times (9)^{2.7} \div (81)^{4.2} \times (3)^1 &= (81)^{3.6-4.2} \times 3^{5.4-1} \\ &= 81^{-.6} \times 3^{4.4} \\ &= 3^4 \times 3^{-2.4} \\ &= 3^{1.6} \\ &= 9\end{aligned}$$

6) If  $\frac{5}{10} \times \frac{8}{7} \times \frac{100}{50} \times \frac{35}{40} \times \frac{x}{16} = \frac{1}{8}$  then, find the value of 'x'.

- a. 3
- b. 2
- c. 4
- d. 5

Ans: b.2

Explanation:

$$\frac{5}{10} \times \frac{8}{7} \times \frac{100}{50} \times \frac{35}{40} \times \frac{x}{16} = \frac{1}{8}$$

$$X=2$$



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7) Find the value of  $(1 + 1/2) (1 + 1/3) (1 + 1/4) \dots (1 + 1/120)$ .

- a. 40
- b. 40.5
- c. 60
- d. 60.5

**Ans: d. 60.5**

**Explanation:**

$$3/2 \times 4/3 \times 5/4 \dots 120/119 \times 121/120$$

$$= 121/2$$

$$= 60.5$$

8) If  $144 / 0.144 = 14.4 / x$ , then find the value of 'x'.

- a. 144
- b. 14.4
- c. 1.44
- d. 0.0144

**Ans: d. 0.0144**

**Explanation:**

$$X = 14.4 \times .144 / 144$$

$$= 0.0144$$



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9) Find the value of  $y^{a-b} \times y^{b-c} \times y^{c-a}$ .

- a. 0
- b. -1
- c. 2
- d. 1

**Ans: d. 1**

**Explanation:**  $y^a/y^b \times y^b/y^c \times y^c/y^a = 1$

10)  $49 \times 49 \times 49 \times 49 = 7^?$

- a. 4
- b. 7
- c. 8
- d. 16

**Ans: c. 8**

**Explanation:**  $7^2 \times 7^2 \times 7^2 \times 7^2 = 7^?$

$$7^? = 7^8 \Rightarrow ? = 8.$$

11)  $1/5 + 1/7 + 2/3 = ?$

- a.  $1 \frac{1}{105}$
- b.  $104/105$
- c.  $1 \frac{1}{7}$
- d.  $1 \frac{2}{105}$

**Ans: a.  $1 \frac{1}{105}$**

**Explanation:**  $1/5 + 1/7 + 2/3 = (21+15+70)/105$

$$= 106/105$$

$$= 1 \frac{1}{105}$$

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12)  $10^{150} \div 10^{146} = ?$

- a. 1000
- b. 10000
- c. 100000
- d. 10

**Ans: b. 10000**

**Explanation:**

$$= 10^{150 - 146}$$

$$= 10^4$$

$$= 10000$$

13) If  $27^{15} = 3^y$  then, find the values of 'y'.

- a. 18
- b. 45
- c. 30
- d. 42

**Ans: b. 45**

**Explanation:**

$$3^{3 \times 15} = 3^y$$

$$y = 45$$



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14) The price of 10 chairs is equal to that of 4 tables. The price of 15 chairs and 2 tables together is Rs. 4000. The total price of 12 chairs and 3 tables is:

- Rs. 3500
- Rs. 3750
- Rs. 3840
- Rs. 3900

**Ans: d. 3900**

**Explanation:**

Let the cost of a chair and that of a table be Rs.  $x$  and Rs.  $y$  respectively.

Then, $10x =$	$5x$
$4y$ or $y =$	$2.$

$\therefore 15x + 2y = 4000$

$\Rightarrow 15x + 2$	$5$	$x =$
$x$	$2$	$4000$

$\Rightarrow 20x = 4000$

$\therefore x = 200.$

So, $y$	$5$	$x$	$=$
$=$	$2$	$200$	$500.$

Hence, the cost of 12 chairs and 3 tables =  $12x + 3y$

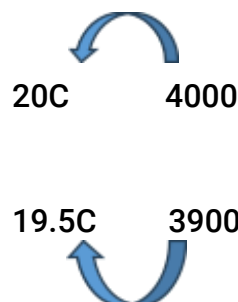
= Rs.  $(2400 + 1500)$  = Rs. 3900.

**ALTER METHOD**

$10C = 4T$

$15C + 5C = 4000$

$12C + 7.5C = ?$



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15) If  $a - b = 3$  and  $a^2 + b^2 = 29$ , find the value of  $ab$ .

- a. 10
- b. 12
- c. 15
- d. 18

**Ans: a. 10**

**Explanation:**

$$2ab = (a^2 + b^2) - (a - b)^2$$

$$= 29 - 9 = 20$$

$$\Rightarrow ab = 10.$$

**ALTER METHOD**

$$A=5 \text{ \& \ } B=2$$

$$5-2=2$$

$$5^2 \times 2^2 = 29$$

$$5 \times 2 = 10 \text{ ANS}$$

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16) The price of 2 sarees and 4 shirts is Rs. 1600. With the same money one can buy 1 saree and 6 shirts. If one wants to buy 12 shirts, how much shall he have to pay?

- Rs. 1200
- Rs. 2400
- Rs. 4800
- Cannot be determined

**Ans: b. 2400**

**Explanation:**

Let the price of a saree and a shirt be Rs.  $x$  and Rs.  $y$  respectively.

Then,  $2x + 4y = 1600$  .... (i)

and  $x + 6y = 1600$  .... (ii)

Divide equation (i) by 2, we get the below equation.  $\Rightarrow x + 2y = 800$ . --- (iii) Now subtract (iii) from (ii)  $x + 6y = 1600$  (-)  $x + 2y = 800$  -----  $4y = 800$  -----  
Therefore,  $y = 200$ . Now apply value of  $y$  in (iii)  $\Rightarrow x + 2 \times 200 = 800 \Rightarrow x + 400 = 800$   
Therefore  $x = 400$

Solving (i) and (ii) we get  $x = 400, y = 200$ .

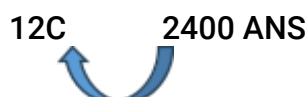
Cost of 12 shirts = Rs.  $(12 \times 200) = \text{Rs. } 2400$ .

**ALTER METHOD**

$2x + 4y = 1600$  .... (i)

$x + 6y = 1600$  .... (ii)

1 Sarees = 2 Shirts





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17)  $(469 + 174)^2 - (469 - 174)^2$   
----- = ?

$$(469 \times 174)$$

- a. 2
- b. 4
- c. 295
- d. 643

**Ans: b. 4**

**Explanation:**

$$= (a + b)^2 - (a - b)^2 / ab$$

$$= 4ab/ab$$

$$= 4$$

18) Find the values of

$$(1.75 \times 1.75 \times 1.75 + 1.25 \times 1.25 \times 1.25) \div (1.75 \times 1.75 - 1.75 \times 1.25 + 1.25 \times 1.25)$$

- a. 1
- b. 2
- c. 3
- d. 21

**Ans: c. 3**

**Explanation:**

$$a^3 + b^3 / (a^2 - ab + b^2) = (a+b) \\ = 1.75 + 1.25 = 3$$



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19) Find the values of

$$1/2 + 1/6 + 1/12 + 1/20 + 1/30 + 1/42 + 1/56 + 1/72 + 1/90 + 1/110 + 1/132$$

- a.  $4/7$
- b.  $7/11$
- c.  $11/12$
- d.  $13/15$

**Ans: c. 11/12**

**Explanation:**

$$1/2 = 1/1 \times 2$$

$$1/6 = 1/2 \times 3$$

In a denominator Last and first values are same numbers then we will take sum of nominator and the first and last numbers are multiple

$$= 11/1 \times 12$$

$$= 11/12$$



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20)  $a^2 + b^2 = 117$ ,  $ab = 54$  then find the value of  $a+b / a-b$ .

- a. 6
- b. 4
- c. 5
- d. 7

**Ans: c. 5**

**Explanation:**

$$(a+b)^2 = a^2 + b^2 + 2ab = 117 + 2(54) = 117 + 108 = 225$$

$$(a+b) = 15$$

$$(a-b)^2 = a^2 + b^2 - 2ab = 117 - 108 = 9$$

$$(a-b) = 3$$

$$(a+b)/(a-b) = 15/3$$

$$(a+b)/(a-b) = 5$$

**ALTER METHOD**

$$a=9 \text{ \& } b=6$$

$$9^2 + 6^2 = 117$$

$$9 \times 6 = 54$$

$$a+b / a-b = 9+6/9-6 = 15 / 3 = 5$$

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