APPOLO STUDY CENTRE

TNPSC GROUP I, II & IIA
SIMPLIFICATION WORK SHEET

Simplification	6	NEW	1	1.3
	7	OLD	1	1.1 to 1.8
	7	NEW	1	1.1 to 1.6
	8	OLD	1	1.1, 1.2, 1.3
	8	NEW	1	1.1, 1.2
	9	OLD		2.2
	9	NEW	2	3.2
	10	OLD		3.11
	10	NEW		3.4, 3.5, 3.6

1. $(a+b)^2 = a^2 + b^2 + 2ab$
2. $(a - b)^2 = a^2 + b^2 - 2ab$
3. $a^2 - b^2 = (a + b)(a - b)$
4. $(a + b)^2 - (a - b)^2 = 4ab$
5. $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$
6. $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
7. $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
8. $a^m \times a^n = a^{m+n}$
9. $\frac{a^m}{a^n} = a^{m-n}$
10. $(a \times b)^n = a^n \times b^n$
11. $\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$
12. $\sqrt{a/b} = \frac{\sqrt{a}}{\sqrt{b}}$
13. $\sqrt{x} = x^{1/2}$
14. $\sqrt[3]{x} = x^{1/3}$

15. $\sqrt[n]{x} = x^{1/n}$

16. $a^o = 1$ (where $a \neq o$)

17. $a^{-n} = \frac{1}{a^n}$

18. $a^{m/n} = \sqrt[n]{a^m}$

19. $\left(\sqrt[n]{a}\right)^n = \left(a^{1/n}\right)^n = a$

20. $\sqrt[n]{ab} = \sqrt[n]{a} . \sqrt[n]{b}$

21. $\sqrt[n]{a/b} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$

22. $\left(\sqrt[n]{a}\right)^m = \sqrt[n]{a^m}$

23. $\sqrt[m]{n\sqrt{a}} = \sqrt[mn]{a}$

24. $(a - b - c)^2 = a^2 + b^2 + c^2 - 2ab + 2bc - 2ca$

25. $(a + b)^2 + (a - b)^2 = 2(a^2 + b^2)$

BODMAS Rule :

BODMAS

B Bracket
O of
D Division
M Multiplication
A Addition
S Subtraction

Modulus of a Real number :

Modulus of a real number a is defined as

$$|a| = \begin{cases} a \text{ if } a > o \\ -a, \text{ if } a < o) \end{cases}$$

thus $|7| = 7$; and $|-7| = 7$

26. $a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$

27. $(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

28. $(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$

$x + \frac{1}{x} = a$; then

i. $x^2 + \frac{1}{x^2} = a^2 - 2$

ii. $x^3 + \frac{1}{x^3} = a^3 - 3a$

iii. $x - \frac{1}{x} = \sqrt{a^2 - 4}$

iv. $x^4 + \frac{1}{x^4} = (a^2 - 2)^2 - 2$

v. $x^5 + \frac{1}{x^5} = (a^2 - 2)(a^3 - 3a) - a$

vi. $x^6 + \frac{1}{x^6} = (a^3 - 3a)^2 - 2$

Virnaculum (or) BAR:

When an expression contains virnaculum, before applying the 'BODMAS' Rule, we simplify the expression under the virnaculum.

Level – I

1. $108 \div 36 \text{ of } \frac{1}{4} + \frac{2}{5} \times 3\frac{1}{4}$

   a. $\frac{3}{4}$ b. $1\frac{1}{20}$ c. $13\frac{3}{10}$ d. $12\frac{13}{10}$

2. $2 - [2 - \{(2 - 2)(2 + 2)\}] = ?$

   a. -4 b. 4 c. 6 d. none of these

3. $\frac{180 \times 15 - 12 \times 20}{140 \times 8 + 2 \times 55} = ?$

   a. $\frac{1}{7}$ b. $\frac{4}{5}$ c. 2 d. 4

4. $5\frac{5}{6} - 3\frac{8}{9} - ? = 1$

   a. $\frac{2}{3}$ b. $\frac{3}{2}$ c. $\frac{17}{18}$ d. 3

5. $\frac{3}{5} \text{ of } \frac{4}{7} \text{ of } \frac{5}{9} \text{ of } \frac{21}{24} \text{ of } 504$

   a. 63 b. 69 c. 96 d. 84

6. Buy how much is three fifth of 350 greater than $\frac{4}{7}$ of 210

   a. 90 b. 110 c. 120 d. 210

350 இல் ஐந்து மூன்று பங்கு ஆனது 210 ல் $4/7$ என்பதை விட எவ்வளவு அதிகம்?

a. 90 b. 110 c. 120 d. 210

7. What is the value of $\frac{(P+Q)}{(P-Q)}$ if $\frac{P}{Q}=7$

a. $\frac{1}{3}$ b. $\frac{2}{3}$ c. $\frac{4}{3}$ d. $\frac{7}{8}$

$\frac{P}{Q}=7$ எனில் $\frac{(P+Q)}{(P-Q)}$ ன் மதிப்பு?

a. $\frac{1}{3}$ b. $\frac{2}{3}$ c. $\frac{4}{3}$ d. $\frac{7}{8}$

8. $a/b=\frac{4}{3}$, then the value of $\frac{6a+4b}{6a-5b}$

a. -1 b. 3 c. 4 d. 5

$a/b=\frac{4}{3}$, எனில் $\frac{6a+4b}{6a-5b}$ ன் மதிப்பு

a. -1 b. 3 c. 4 d. 5

9. $a/b = 4/5$ and $b/c=15/16$ then $\frac{c^2-a^2}{c^2+a^2}$ is

a. $1/7$ b. $7/25$ c. $3/4$ d. none of these

$a/b = 4/5$; $b/c=15/16$ எனில் $\frac{c^2-a^2}{c^2+a^2}$ ன் மதிப்பு?

a. $1/7$ b. $7/25$ c. $3/4$ d. இவற்றில் எதுவுமில்லை

10. $(0.000729)^{-3/4} \times (0.09)^{-3/4}$

a. $\frac{10^3}{3^3}$ b. $\frac{10^5}{3^5}$ c. $\frac{10^2}{3^2}$ d. $\frac{10^6}{3^6}$

Level – II

11. $\sqrt{27}+\sqrt{12}=$

a. $\sqrt{39}$ b. $5\sqrt{6}$ c. $5\sqrt{3}$ d. $3\sqrt{5}$

12. simplify: $\frac{(561\times561)-(31\times31)}{530}$

a. 530 b. 561 c. 31 × 31 d. 592

சுருக்குக: $\frac{(561\times561)-(31\times31)}{530}$

a. 530 b. 561 c. 31 × 31 d. 592

13. simplify: $\frac{\sqrt[3]{729}-\sqrt[3]{27}}{\sqrt[3]{512}+\sqrt[3]{343}}$

a. $\frac{2}{5}$ b. $6/20$ c. $6/4$ d. $5/2$

சுருக்குக: $\frac{\sqrt[3]{729}-\sqrt[3]{27}}{\sqrt[3]{512}+\sqrt[3]{343}}$

a. $\frac{2}{5}$ b. $6/20$ c. $6/4$ d. $5/2$

14. If 4x + 5y = 83; and $\frac{3x}{2y}=\frac{21}{22}$, then y – x = ?

a. 3 b. 4 c. 7 d. 11

4x + 5y = 83 மற்றும் $\frac{3x}{2y}=21/22$ எனில் y – x ன் மதிப்பு?

a. 3 b. 4 c. 7 d. 11

15. $\left(999\frac{1}{7}+999\frac{2}{7}+999\frac{3}{7}+999\frac{4}{7}+999\frac{5}{7}+999\frac{6}{7}\right)$ is simplified to

a. 2997 b. 5979 c. 5994 d. 5997

சுருக்குக: $\left(999\frac{1}{7}+999\frac{2}{7}+999\frac{3}{7}+999\frac{4}{7}+999\frac{5}{7}+999\frac{6}{7}\right)$

a. 2997 b. 5979 c. 5994 d. 5997

16. When $\left(2\sqrt{5}-\sqrt{2}\right)^2$ is simplified, we get

a. $4\sqrt{5}+2\sqrt{2}$ b. $22-4\sqrt{10}$ c. $8-4\sqrt{10}$ d. $2\sqrt{10}-2$

$\left(2\sqrt{5}-\sqrt{2}\right)^2$ இதன் சுருங்கிய வடிவம்

a. $4\sqrt{5}+2\sqrt{2}$ b. $22-4\sqrt{10}$ c. $8-4\sqrt{10}$ d. $2\sqrt{10}-2$

17. $0.\overline{34}+0.3\overline{4}$ =

a. $0.68\overline{7}$ B. $0.\overline{68}$ C. $0.6\overline{8}$ d. $0.68\overline{7}$

18. x = $\sqrt{5}+2$ then find the value of $x^2+\frac{1}{x^2}$

a. 23 b. 21 c. 18 d. 29

x = $\sqrt{5}+2$ எனில் $x^2+\frac{1}{x^2}$ ன் மதிப்பை காண்க.

a. 23 b. 21 c. 18 d. 29

19. simplify: $2\sqrt{72}\times5\sqrt{32}\times3\sqrt{50}$

a. $30\sqrt{115200}$ b. $7200\sqrt{2}$ c. $14400\sqrt{2}$ d. none of these

சுருக்குக:

a. $30\sqrt{115200}$ b. $7200\sqrt{2}$ c. $14400\sqrt{2}$ d. இவற்றில் எதுவுமில்லை

20. Simplify: $(7\sqrt{a} - 5\sqrt{b})$ $(7\sqrt{a} + 5\sqrt{b})$

a. $7a^2 - 5b^2$ b. $49a - 25b$ c. $49a^2 - 25b^2$ d. $\left(7\sqrt{a}-5\sqrt{b}\right)^2$

சுருக்குக: $(7\sqrt{a} - 5\sqrt{b})$ $(7\sqrt{a} + 5\sqrt{b})$

a. $7a^2 - 5b^2$ b. $49a - 25b$ c. $49a^2 - 25b^2$ d. $\left(7\sqrt{a}-5\sqrt{b}\right)^2$

21. simplify : $\frac{\sqrt{5}}{\sqrt{6}+2} - \frac{\sqrt{5}}{\sqrt{6}-2}$

a. $-2\sqrt{5}$ b. $2\sqrt{5}$ c. $-\sqrt{5}/8$ d. $\sqrt{5}/34$

சுருக்குக: $\frac{\sqrt{5}}{\sqrt{6}+2} - \frac{\sqrt{5}}{\sqrt{6}-2}$

a. $-2\sqrt{5}$ b. $2\sqrt{5}$ c. $-\sqrt{5}/8$ d. $\sqrt{5}/34$

22. $x+1/x = 2$ then x^3+1/x^3

a. 8 b. 2 c. 6 d. 4

$x+1/x = 2$ எனில் x^3+1/x^3 ன் மதிப்பு

a. 8 b. 2 c. 6 d. 4

23. $\sqrt{24}=4.899$ the value of $\sqrt{8/3}$ is

a. 0.544 b. 1.33 c. 1.633 d. 2.666

24. $y - 1/y = 6$ find the value of $y^3 - 1/y^3$

a. 216 b. 222 c. 234 d. 228

$y - 1/y = 6$ எனில் $y^3 - 1/y^3$ ன் மதிப்பு

a. 216 b. 222 c. 234 d. 228

25. simplify: $\left(147+\frac{1}{42}\right)^2-\left(147-\frac{1}{42}\right)^2=$

a. 7 b. 5 c. 147 d. 14

சுருக்குக: $\left(147+\frac{1}{42}\right)^2-\left(147-\frac{1}{42}\right)^2=$

a. 7 b. 5 c. 147 d. 14

Level – III

26. find the value of a, b it $\frac{\sqrt{7}-2}{\sqrt{7}+2}=a\sqrt{7}+b$

a. a = $\frac{4}{3}$ b = $\frac{11}{3}$ b. $a=\frac{-11}{3}$; b = $\frac{4}{3}$

c. $a=\frac{-4}{3}\ b=-\frac{11}{3}$ d. $a=\frac{-4}{3};b=\frac{11}{3}$

a, b யின் மதிப்பை காண். $\frac{\sqrt{7}-2}{\sqrt{7}+2}=a\sqrt{7}+b$

a. a = $\frac{4}{3}$ b = $\frac{11}{3}$ b. $a=\frac{-11}{3}$; b = $\frac{4}{3}$

c. $a=\frac{-4}{3}\ b=-\frac{11}{3}$ d. $a=\frac{-4}{3};b=\frac{11}{3}$

27. $\frac{4+\sqrt{5}}{4-\sqrt{5}}-\frac{4-\sqrt{5}}{4+\sqrt{5}}$ = a + b$\sqrt{5}$ find the value of a and b.

$\frac{4+\sqrt{5}}{4-\sqrt{5}}-\frac{4-\sqrt{5}}{4+\sqrt{5}}$ = a + b$\sqrt{5}$ எனில் a, b ன் மதிப்புகளை காண்க.

a. a = 1, b = 0 b. a = 0, b = $\frac{-16}{11}$

c. a = 1, b = $\frac{16}{11}$ d. a = 0, b = $\frac{16}{11}$

28. If x = $\sqrt{3}+1$, find the value of $\left(x-\frac{2}{x}\right)^2$

a. $\sqrt{3}$ b. 3 c. 2 d. 4

x = $\sqrt{3}+1$ எனில் $\left(x-\frac{2}{x}\right)^2$ ன் மதிப்பு?

a. $\sqrt{3}$ b. 3 c. 2 d. 4

29. simplify: $\frac{x^3+8}{x^4+4x^2+16}$

a. $\frac{x+2}{x^2+2x+4}$ b. $\frac{x-2}{x^2+2x+4}$ c. $\frac{x+2}{x^2-2x+4}$ d. $\frac{x-2}{x^2-2x+4}$

சுருக்குக: $\frac{x^3+8}{x^4+4x^2+16}$

a. $\frac{x+2}{x^2+2x+4}$ b. $\frac{x-2}{x^2+2x+4}$ c. $\frac{x+2}{x^2-2x+4}$ d. $\frac{x-2}{x^2-2x+4}$

30. Find the value of $\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$

a. $3+\sqrt{15}$ b. $4+\sqrt{15}$ c. $2+\sqrt{12}$ d. $4+\sqrt{12}$

$\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$ ன் மதிப்பு

a. $3+\sqrt{15}$ b. $4+\sqrt{15}$ c. $2+\sqrt{12}$ d. $4+\sqrt{12}$