Simplification & Approximation by Alok sir Solutions

1. $\left(\frac{12}{15}\right)\times\left(\frac{40}{100}\right)\times 1800 = ?\times 480$

$\left(\frac{12}{15}\right)\times\left(10\times\frac{4}{100}\right)\times(5\times 120) = ?\times 4\times 120$

$?=\frac{(12\times 10\times 4\times 120)}{(4\times 120\times 100)}$

$?=\frac{(12\times 10)}{100}=1.20$

2. $(?)^2\times 3 = 49\times 57-41\times 18-1380$

$(?)^2\times 3 = 2793-738-1380=675$

$(?)^2=225$

$?=15$

3. $9^2\times 27+3^3\times 7+?=59^2=3481$

$?=3481-9^2\times 27-3^3\times 7$

$?=3481-2187-189=1105$

4. $(0.4^3)^{123}\div(0.4^2)^{47}\times(0.4^1)^{34}\times(0.4^1)^{29}=(0.4^1)^?$

$(0.4)^{(3\times 123-2\times 47+1\times 34+1\times 29)}=(0.4^1)^?$

So, $?=(3\times 123-2\times 47+1\times 34+1\times 29)/1=338$

5. $\frac{(65\times 71+20\times 400)}{100}=?+241$

$?=\frac{12615}{100-241}=-114.85$

6.

$?\approx\frac{(13\times 560\times 136)}{(70\times 34)}$

$=13\times\left(\frac{560}{70}\right)\times\left(\frac{136}{34}\right)$

$=13\times 8\times 4=416$

7. $(?)^2\approx 34^2-22-8^3$

$=1156-22-512=622$

So, $?\approx 25$

8. $?=3094\div 91\times 61-26$

$=34\times 61-26$

$=2074-26=2048$

9. $?\approx\left(\frac{40}{2}\right)+8\times 16-\left(\frac{480}{8}\right)+23$

$=20+128-60+23$

$=111$

10. $?\approx\left(\frac{140}{2}\right)-5\times 11+\sqrt[3]{1331}$

$=70-55+11=26$

11. $?\approx\frac{(30\times\sqrt{529})}{\sqrt{100}}$

$=\left(30\times\frac{23}{10}\right)=69$

12. $?\approx\left(\frac{30\times 3000}{100}\right)+\sqrt{289-897}$

$=900+17-897=20$

13. $25\%\text{ of }(?)^2=7+\frac{145}{5}=7+29=36$

$?^2=36\times\frac{100}{25}=144$

$?=12$

14. $?\approx 195\times 16+290\times 5$

$=3120+1450=4570$

15. $16^2=256, 4^4=256, 13^3=2197$

$?\approx 256-4+13=265$

16. $?\approx\left[\frac{(112\times 185)}{(16\times 37)}\right]\times(21+9^3-21^2)$

$=\left[\frac{(112\times 185)}{(16\times 37)}\right]\times(21+729-441)$

$=\left[\frac{(112\times 185)}{(16\times 37)}\right]\times 309$

$=309\times\left(\frac{112}{16}\right)\times\left(\frac{185}{37}\right)$

$=309\times 7\times 5=10815$

17. $?$

$\approx 550\times 25+23^2-15^3-32-\sqrt{676}$

$=22+529-3375-32-26$

$=-2882$

18. $26^2=676, 47^2=2209, 27^2=729$

$10^3=1000, 17^3=4913, 30^2=900$

$?=\sqrt{676}+\sqrt[3]{1000}+\sqrt{2209}+30^2+\sqrt{729}+\sqrt[3]{4913}$

$=26+10+47+900+27+17$

$=1027$

19. $?\approx 31^2-34^2+25^2+8^3-10^3$

$=961-1156+625+512-1000$

$=-58$

20. $?\times 27\approx 47\times 40+22\times 66+70\times 39-14$

$?\times 27=1880+1452+2730-14$

$?\times 27=6048$

$?=\frac{6048}{27}=224$

21. $?\approx(35\times 560/100)-(30\times 760/100)+(80\times 1030/100)-(45\times 800/100)$

$=\left(\frac{19600}{100}\right)-\left(\frac{22800}{100}\right)+\left(\frac{82400}{100}\right)-\left(\frac{36000}{100}\right)$

$=196-228+824-360=432$

22. $? = \left(\frac{120}{2}\right) + 12 \times 7 - \left(\frac{245}{7}\right) + 11$

$= 60 + 84 - 35 + 11 = 120$

23. $? = \left(\frac{880}{8}\right) - 4 \times 14 + \sqrt{324}$

$= 110 - 56 + 18 = 72$

24. $(?)^2 + ? = 13^2 + 22^2 + 2715 - 12^3$

$= 169 + 484 + 2715 - 1728 = 1640$

By substituting the given options, we have $? = 40$

25. $? = 48 \div 41 \times 779 + 55 \div 36 \times 648 + 12 \div 47 \times 799$

$= (48 \times 779/41) + (55 \times 648/36) + (12 \times 799/47)$

$= (48 \times 779/41) + (55 \times 648/36) + (12 \times 799/47)$

$= (48 \times 19) + (55 \times 18) + (12 \times 17)$

$= 912 + 990 + 204 = 2106$

26. $? = \left(40 \times \frac{540}{27}\right) + \left(29 \times \frac{748}{34}\right) - \left(14 \times \frac{525}{35}\right)$

$= \left(40 \times \frac{540}{27}\right) + \left(29 \times \frac{748}{34}\right) - \left(14 \times \frac{525}{35}\right)$

$= (40 \times 20) + (29 \times 22) - (14 \times 15)$

$= 800 + 638 - 210 = 1228$

27. $21^3 = 9261, 34^3 = 39304, 32^2 = 1024, 25^2 = 625$

$(2 + ?)^3 = (9261)^{1/3} + \sqrt[3]{39304} + \sqrt{1024} + 113 + 25^2 + 2550$

$(2 + ?)^3 = 21 + 34 + 32 + 113 + 625 + 2550 = 3375$

Now, $15^3 = 3375$

So, $(2 + ?) = 15$ or $? = 13$

28. $62^2 = 3844, 46^2 = 2116, 51^2 = 2601, 11^2 = 121, 15^2$

$= 225, 5^2 = 25$

$\sqrt{(?)} = \sqrt{3844} \times \sqrt{2116} - 51^2 - \sqrt{121} - 15^2 + \sqrt{25}$

$\sqrt{(?)} = 62 \times 46 - 2601 - 11 - 225 + 5$

$\sqrt{(?)} = 20$ or $? = 400$

29. $88^2 = 7744, 76^2 = 5776, 71^2 = 5041$

$10^3 = 1000, 12^3 = 1728, 22^2 = 484$

$? = \sqrt{7744} - \sqrt[3]{1000} + \sqrt{5776} - 22^2 - \sqrt{5041} - \sqrt[3]{1728}$

$= 88 - 10 + 76 - 484 - 71 - 12 = -413$

30. $? \times 26 = 34 \times 41 + 65 \times 29 - 45 \times 39 - 16$

$? \times 26 = 1394 + 1885 - 1755 - 16$

$? \times 26 = 1508$

$? = \frac{1508}{26} = 58$

31. $? = 1769 \div 61 - 11$

$= 29 - 11 = 18$

32. $50^2 = 2500, \ 45^2 = 2025, \ 67^2 = 4489$

$? \approx \sqrt{2500} - \sqrt{2025} + \sqrt{4489}$

$= 50 - 45 + 67 = 72$

33. $18^3 = 5832, \ 11^3 = 1331, \ 3^3 = 27$

$? \approx \sqrt[3]{5832} + \sqrt[3]{1331} - \sqrt[3]{27}$

$= 18 + 11 - 3 = 26$

34. $? \approx 22^2 - 38^2 + 16^2$

$= 484 - 1444 + 256 = -704$

35. $? = \frac{(34 \times 20 - 0)}{20}$

$= \frac{(680 - 0)}{20} = \frac{680}{20} = 34$

36. $? \approx \left(\frac{80 \times 785}{100}\right) + \left(\frac{5 \times 640}{100}\right)$

$= \left(\frac{62800}{100}\right) + \left(\frac{3200}{100}\right)$

$= 628 + 32 = 660$

37. $? \approx 45 \times 42 - 13 \times 8$

$= 1890 - 104 = 1786$

38. $(?)^2 \approx 39^2 - 23 - 7^3$

$= 1521 - 23 - 343 = 1155$

So, $? \approx 34$

39. $? = 3900 \div 65 \times 45 - 29$

$= 60 \times 42 - 29 = 2520 - 29 = 2491$

40. $? = \frac{(19 \times 108 \times 60)}{(18 \times 15)}$

$= 19 \times \left(\frac{108}{18}\right) \times \left(\frac{60}{15}\right)$

$= 19 \times 6 \times 4 = 456$

41. $? = \frac{(19 \times 144 \times 292)}{(18 \times 73)}$

$= 19 \times \left(\frac{144}{18}\right) \times \left(\frac{292}{73}\right)$

$= 19 \times 8 \times 4 = 608$

42. $? = 625^{(0.02 + 0.73)} = 625^{0.75} = 625^{3/4}$

Since, $625^{1/4} = 5, \quad ? = 5^3 = 125$

43. $? = 21^2 + 22^2 + 24^2$

$= 411 + 484 + 576 = 1501$

44. $? = 72 \times \left(\frac{10}{3}\right) - \sqrt{676}$

$= 24 \times 10 - 26 = 240 - 26 = 214$

45. $? = \left(\frac{180}{6}\right) + 12 \times 9 - \left(\frac{300}{5}\right) + 42$

$= 30 + 108 - 60 + 42 = 120$