Solutions

Chapter – 1
(Additions, Subtractions and Multiplications)

Exercise – 1(a)

Solutions for questions 1 to 30:

1. Adding the last two digits of all the given numbers at a time, we have the sum as 184 (45 + 67 + 23 + 49). Carrying 1 and now adding the next 2-digits at a time, the sum is152 (23 + 45 + 81 + 02 + 1) Proceeding as above for the remaining digits, required sum is 16 (1 + 3 + 7 + 4 + 1). Hence the sum of the given numbers is 165284.

2. Proceeding as shown in solution of Question 1, the sum is 231476.

3. Proceeding as shown above the sum is 143571.

4. In this case, we have both addition and subtraction. Doing addition and subtraction simultaneously for two 2- digits at a time, we have the sum of the last 2-digts of the given numbers as 24(74 – 62 + 21 – 09). Continuing the sum for the remaining numbers, we have the sum of the given numbers as 48. (12 – 03 + 43 – 04). Hence the required sum is 44824 (9 – 4 + 5 – 6).

5. Proceeding as shown above, the required sum is 3645.

6. Proceeding as shown in the solution of question number 1, the sum is 23270.

7. Proceeding as shown above the sum 25937

8. Proceeding as shown in solution of question number 4, the sum is 498.

9. Proceeding as shown above, the sum is 172625.

10. Proceeding as shown above the sum is 656.

11. Proceeding as shown above, the sum is 30479.

12. Proceeding as shown above, the sum is 23187.

13. Proceeding as shown above, the sum is 225320.

14. Proceeding as shown above, the sum is 13958

15. Proceeding as shown above, the sum is 70626.

16. Proceeding as shown above, the sum is 870981

17. Proceeding as shown above, the sum is 26963.

18. Proceeding as shown above, the sum is 839

19. Proceeding as shown above, the sum is 49716.

20. Proceeding as shown above, the sum is 32609.

21. Proceeding as shown above, the sum is 29321.

22. Proceeding as shown above, the sum is 743.

23. Proceeding as shown above, the sum is 1919.

24. Proceeding as shown above, the sum is 8799.

25. Proceeding as shown above, the sum is 4891.

26. Proceeding as shown above, the sum is 283590.

27. Proceeding as shown above, the sum is –4916.

28. Proceeding as shown above, the sum is 8585.

29 Proceeding as shown above, the sum is 2225.

30. Proceeding as shown above, the sum is 18031.

Solutions for questions 31 to 45:

31. $1342 \times 6471 = 8684082$

32. 712×642
$712 \rightarrow + 12$ (654 x 7 = 4578)
$642 \rightarrow - 58$
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654 –696

We now borrow '7' from 4578 which is equal to 700.
$\therefore$ 700 – 696 = 4 which will be written as 04.
$\therefore$ Product = 457104

33. 36×8109
$36 \times (8000 + 100 + 9) = 291924$

34. 309×701

$$\frac{309 \times 2 \times 701}{2}$$

$$\frac{618 \times 701}{2}$$

$618 \rightarrow - 82$
$701 \rightarrow + 1$ Ans (216609)

35. 1241×6421 Ans (7968461)

36. 729×297
$729 \times (300 - 3)$ Ans (216513)

37. $213 \times 417 = \frac{213 \times 2 \times 417}{2} = \frac{426 \times 417}{2}$
$426 \rightarrow + 26$
$417 \rightarrow + 17$
and continue Ans (88821)

38. $998 \times 112 = (1000 - 2) \times 112 = 111776$

39. $664 \times 457 = 664 \times (500 - 50 + 5 + 2) = 303448$

40. $298 \times 982 = (300 - 2) \times 982 = 292636$

41. 351×621

$$\frac{702 \times 621}{2}$$

$702 \rightarrow + 2$
$621 \rightarrow - 79$
and continue Ans (217971)

42. $324 \times 809 = 324 \times (800 + 8 + 1) = 262116$

43. $416 \times 872 = \frac{416 \times 2 \times 872}{2}$

$$\frac{832 \times 872}{2}$$

$832 \rightarrow + 32$
$872 \rightarrow + 72$
and continue Ans (362752)

44. 2432×234
$(2340 + 90 + 2) \times 234$
To find 2340×234
We have to find $(234)^2$
$234 \rightarrow + 34$
$234 \rightarrow + 34$
and so on Ans (569088)

45. $113 \times 49 = 113 \times 50 - 113$ Ans (5537)

Exercise – 1(b)

Solutions for questions 1 to 20:

1. Adding two-two digits at a time for the given set of numbers, we have the sum for the last two-digits as 48(72 + 02 – 43 – 17 + 34). Now doing the same for the remaining digits by considering two-two digits, at a time, the sum is 45 (43 + 77 – 88 – 11 + 24). Hence the sum is 4548.

2. Proceeding as shown above, the sum is 23211.

3. Proceeding as shown above, the sum is 5157.

4. Proceeding as shown above, the sum is 3943.

5. Proceeding as shown above, the sum is 56105.

6. Proceeding as shown above, the sum is 8919.

7. Proceeding as shown above, the sum is 3599.

8. Proceeding as shown above, the sum is 3939.

9. Proceeding as shown above, the sum is 4057.

10. Proceeding as shown above, the sum is 1070.

11. Proceeding as shown above, the sum is 25619.

12. Proceeding as shown above, the sum is 20044.

13. Proceeding as shown above, the sum is 62857.

14. Proceeding as shown above, the sum is 15753.

15. Proceeding as shown above, the sum is –451.

16. Proceeding as shown above, the sum is 29945.

17. Proceeding as shown above, the sum is 5425.

18. Proceeding as shown above, the sum is 30370.

19. Proceeding as shown above, the sum is 7075.

20. Proceeding as shown above, the sum is 7202.

Solutions for questions 21 to 45:

21. $(125 + 2)\ 64 \quad \left(\frac{1000}{8} + 2\right) 64 = 8000 + 128 = 8128$

22. 1013×973
$1013 \rightarrow + 13$
$973 \rightarrow - 27$ Ans (985649)

23. 483×512
$483 \rightarrow - 17$
$512 \rightarrow + 12$ Ans (247296)

24. 507×492
$507 \rightarrow + 7$
$492 \rightarrow - 8$ Ans (249444)

25. 888×923
$888 \rightarrow - 12$
$923 \rightarrow + 23$ Ans (819624)

26. 942×1003
$942000 + 942 \times 3$ Ans (944826)

27. 173×96
$173 \times (100 - 4)$ Ans (16608)

28. 4.77×518
$(4 \times 518) + \left(\frac{7}{9} \times 518\right) - \left(\frac{7}{900} \times 518\right)$
$2072 + 402.88 - 4.0288 = 2470.86$ Ans (2470.86)

29. 481×545
$481(500 + 50 - 5)$ Ans (262145)

30. 188×217
$188 \rightarrow -12$
$217 \rightarrow +17$ Ans (40796)

31. 793×841
$793 \rightarrow -7$
$841 \rightarrow +41$ Ans (666913)

32. 917×894
$917 \rightarrow + 17$
$894 \rightarrow - 6$ Ans (819798)

33. 342×421
$342 \times (400 + 20 + 1)$ Ans (143982)

34. 483×517
$(500 - 17)\ (500 + 17)$
$(500)^2 - (17)^2$ Ans (249711)

35. 1.49×2.11
consider $149 \times 211 = 149 \times (200 + 10 + 1)$
Then put the decimal point appropriately. Ans (3.1439)

36. $491 \times 509 = (500 - 9)\ (500 + 9)$ Ans (249919)

37. 688×713
$688 \rightarrow - 12$
$713 \rightarrow + 13$ Ans (490544)

38. 249×311
$249\ (300 + 10 + 1)$ Ans (77439)

39. 378×456
$378 \rightarrow - 22$
$456 \rightarrow + 56$ Ans (172368)

40. $198 \times 747 = 747\ (200 - 2)$ Ans (147906)

41. $555 \times 958 = 958\ (500 + 50 + 5)$ Ans (531690)

42. $345 \times 678 \quad \frac{345 \times 2 \times 678}{2}$
$690 \rightarrow - 10$
$678 \rightarrow - 22$ Ans (233910)

43. 131×141
$131 \rightarrow + 31$
$141 \rightarrow + 41$ or $131 \times 141 = (136 - 5)\ (136 + 5)$
$= (136)^2 - (5)^2$ Ans (18471)

44. $414 \times 532 = 532 \times (400 + 10 + 4)$ Ans (220248)

45. 324×821
$(333 - 10 + 1) \times 821$ Now consider
$333 \times 821 = \frac{999 \times 821}{3} = \frac{821 \times (1000 - 1)}{3}$ Ans (266004)

Chapter – 2
(Squares, Cubes, Square roots, Cube roots)

Exercise – 2(a)

Solutions for questions 1 to 25:

1. $(808)^2$
$808 \rightarrow + 8$
$808 \rightarrow + 8$ Ans (652864)

2. $(102)^2$
$102 \rightarrow + 2$
$102 \rightarrow + 2$ Ans (10404)

3. $(297)^2$
$297 \rightarrow - 3$
$297 \rightarrow - 3$ Ans (88209)

4. $(1002)^2$
$1002 \rightarrow +2$
$1002 \rightarrow +2$ Ans (1004004)

5. $(373)^2$
$373 \rightarrow -27$
$373 \rightarrow -27$ Ans (139129)

6. $(991)^2$
$991 \rightarrow -9$
$991 \rightarrow -9$ Ans (982081)

7. $(737)^2 - (27)^2 = (737)^2 - 729$
To find $(737)^2$
$737 \rightarrow +37$
$737 \rightarrow +37$ Ans (542440)

8. $(394)^2$
$394 \rightarrow -6$
$394 \rightarrow -6$ Ans (155236)

9. $(9.98)^2$
Calculate $(998)^2$ and then put the decimal point appropriately
Ans (99.6004)

10. 87^2
$87 \rightarrow -13$
$87 \rightarrow -13$ Ans (7569)

11. 137^2
Use three-digit multiplication method. Ans (18769)

12. 113^2
$113 \rightarrow +13$
$113 \rightarrow +13$ Ans (12769)

13. Ans (529)

14. 319 x 319
$319 \rightarrow +19$
$319 \rightarrow +19$ Ans (101761)

15. $(218)^2$
$218 \rightarrow +18$
$218 \rightarrow +18$ Ans (47524)

16. $13^6/13^4 = 13^2 = 169$

17. $(164)^2$
$165^2 - 165^{th}$ odd number
27225 – 329 Ans (26896)

18. 653 x 653 (Use 3-digit multiplication method)
Ans (426409)

19. $(99)^2$
$99 \rightarrow -1$
$99 \rightarrow -1$ Ans: (9801)

20. 10025 x 10025
$10025 \rightarrow +25$
$10025 \rightarrow +25$
$(10025)^2 = 100500625$

21. $(786)^2$
$786 \rightarrow -14$ (772 x 8 = 6176)
$786 \rightarrow -14 = 617796$

22. $4^3 - \left(1\frac{1}{2}\right)^3 - \left(2\frac{1}{2}\right)^3 = 4^3 + \left(1\frac{1}{2}\right)^3 + \left(2\frac{1}{2}\right)^3$

now $4 - 1\frac{1}{2} - 2\frac{1}{2} = 0$

$\therefore$ required answer $= 3 \times 4 \left(-1\frac{1}{2}\right) \times \left(-2\frac{1}{2}\right) = 45$

23. $(129)^2 = 130^2 - 130^{th}$ odd number $16900 - 259 = 16641$

24. $(11)^2 = 121$
$111^2 = 12321$
$\therefore 1111^2 = 1234321$

25. $56^2 - 27^2 = 3136 - 729 = 2407$

Solutions for questions 26 and 27:

26. $$\frac{(3.572)^3 + (2.428)^3}{(3.572)^2 - 3.572 \times 2.428 + (2.428)^2}$$
$$= \frac{\left\{(3.572)^2 - 3.572 \times 2.428 + (2.428)^2\right\}\left\{3.572 + 2.428\right\}}{(3.572)^2 - 3.572 \times 2.428 + (2.428)^2}$$
$= 3.572 + 2.428 = 6$ Choice (D)

27. $(2.75)^3 - (2.00)^3 - (0.75)^3$
$a^3 + b^3 + c^3 = (a + b + c)(a^3 + b^3 + c^3 - ab - bc - ca)$
If $a + b\ c = 0$' then $a^3 + b^3 + c^3 = 3abc$
Here $2.75 - 2.00 - 0.75 = 0$
So, $(2.75)^3 - (2.00)^3 + (0.75)^3$
$= 3 \times 2.75 \times 2 \times 0.75 = 3 \times 1.5 \times 2.75$
$= 4.5 \times 2.75$ Choice (D)

Solutions for questions 28 to 45:

28. $\sqrt{3600} \times 52 = ?$
$\Rightarrow ? = 60 \times 52 = 3120$ Choice (C)

29. $\sqrt[3]{4913} + 123 = ? \div 33$
$\Rightarrow ? \times \frac{1}{33} = 140$
$\Rightarrow ? = 140 \times 33 = 4620$ Choice (A)

30. $\sqrt[3]{216400} + \sqrt{280} + \sqrt{322}$
$= 60 + 16.5 + 18 = 94.5 \cong 95$
Choice (D)

31. $15625 \times 8 + 35000 = (?)^2$
$\Rightarrow (?)^2 = 125000 + 35000 = 160000$
$\Rightarrow ?^2 = 400^2$
$\therefore ? = 400$ Choice (B)

32. $\frac{?}{9261} = \left(\frac{11}{21}\right)^3 = \frac{1331}{9261} \Rightarrow ? = 1331.$ Choice (B)

33. $\frac{49^2 \times 324}{324} = 49^2$ Choice (C)

34. $\sqrt[3]{27400} + \sqrt[3]{64100} + \sqrt[3]{7980}$
$\approx 30 + 40 + 20 = 90.$ Choice (C)

35. $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
$$\frac{(1.8)^3 + (1.2)^3}{3.24 - 2.16 + 1.44}$$
$$= \frac{(1.8 + 1.2)(1.8^2 - (1.8 \times 1.2) + 1.2^2)}{3.24 - 2.16 + 1.44}$$
$$= \frac{3(3.24 - 2.16 + 1.44)}{(3.24 - 2.16 + 1.44)} = 3$$ Choice (D)

36. $(28)^2 + (34)^2 - (19)^2 = ?$
$\Rightarrow ? = 784 + 1156 - 361$
$= 1579 \approx 1580$ Choice (A)

37. $\sqrt{200} \approx 14$; $\sqrt{1300} \approx 36$; and $\sqrt{150} \approx 12$
$\Rightarrow ? = 14 \times 36 \div 12 = 42$ Choice (D)

38. $\sqrt{?} + 14 = 56$

$\Rightarrow \sqrt{?} = 56 - 14 = 42$

$\therefore ? = (42)^2 = 1764$ Choice (C)

39. $53 + 47 = 88 + \sqrt{?}$

$\Rightarrow \sqrt{?} = 53 + 47 - 88 = 12$

$\therefore ? = (12)^2 = 144$ Choice (B)

40. $\sqrt[3]{110592} = 48$ Choice (C)

41. $2304 \div \sqrt{?} = 32 \times 3$

$\Rightarrow \sqrt{?} = \frac{2304}{96} = 24$

$\therefore ? = (24)^2 = 576$ Choice (D)

42. $?^3 + 125 \times 40 = 7744$

$\Rightarrow ?^3 = 7744 - 5000 = 2744 = 14^3$

$\therefore ? = 14$ Choice (C)

43. $114 \times 54 - 5476 = \sqrt{?} + 625$

$\Rightarrow \sqrt{?} = 6156 - 5476 - 625 = 55$

$\therefore ? = (55)^2 = 3025$ Choice (C)

44. $\sqrt{21904} + \sqrt{5776} = ? \div 28$

$\Rightarrow ? \div 28 = 148 + 76 = 224$

$\Rightarrow ? = 224 \times 28 = 6272$ Choice (D)

45. $\sqrt[3]{32768} + \sqrt{2601} \times 49 = (?)^2 + 31$

$\Rightarrow 32 + 51 \times 49 = (?)^2 + 31$

$\Rightarrow (?)^2 = 32 + 2499 - 31 = 2500$

$\Rightarrow ? = \sqrt{2500} = 50$ Choice (C)

Exercise – 2(b)

Solutions for questions 1 to 24:

1. $3481 - 3025 = (?)^2 + 200$

$\Rightarrow ?^2 = 3481 - 3025 - 200 = 256$

$\therefore ? = \sqrt{256} = 16$ Choice (C)

2. $(?)^2 = 400 + 441 = 841$

$\therefore ? = \sqrt{841} = 29$ Choice (C)

3. $? = 72^2 (72 - 1)$

$\Rightarrow ? = 5184 \times 71 = 368064$ Choice (D)

4. $(27 \times 5)^2 - (115)^2 = ? \times 2^3$

$\Rightarrow ? \times 8 = 135^2 - 115^2$

$\Rightarrow ? \times 8 = (135 + 115)(135 - 115)$

$\therefore ? = \frac{250 \times 20}{8} = 625$ Choice (C)

5. $(?)^2 = \frac{525 \times 525}{25}$

$\Rightarrow ?^2 = 21 \times 21 \times 25 = (21 \times 5)^2$

$\therefore ? = 21 \times 5 = 105$ Choice (B)

6. $47 \times ? = 1175$

$\Rightarrow ? = \frac{1175}{47} = 25$ Choice (B)

7. $2209 + (?)^2 = 5458$

$\Rightarrow (?)^2 = 5458 - 2209 = 3249$

$\therefore ? = \sqrt{3249} = 57$ Choice (A)

8. $\frac{841 - 441}{144 + 256} = ?$

$\Rightarrow ? = \frac{400}{400} = 1$ Choice (A)

9. $(11)^3 \times (?)^2 \times \frac{1}{33} = 1452$

$\Rightarrow (?)^2 = \frac{1452 \times 33}{1331} = 36$

$\therefore ? = \sqrt{36} = 6$ Choice (B)

10. $? \cong 44^2 - 50^2 + 26^2 = (2.22)^2 - (2.25)^2 + (2.13)^2$ $= 4(484 - 625 + 169) = 4(28) = 112$. Closest answer choice is 105. Choice (D)

11. $? \cong \frac{\sqrt{3600} \times \sqrt{625}}{\sqrt{400}} = \frac{60 \times 25}{20} = 75$ Choice (B)

12. $72 \times 72 \times \frac{1}{36} = (?)^2$

$\Rightarrow (?)^2 = 144 = (12)^2$

$\therefore ? = 12$ Choice (C)

13. $\frac{\sqrt{16 \times 10^{\ 2} \times 64 \times 10^{\ 6}}}{32 \times 10^{\ 4}} \times 10^2 = ?$

$? = \frac{4 \times 10^{\ 1} \times 8 \times 10^{\ 3} \times 10^2}{32 \times 10^{\ 4}} = 100$ Choice (D)

14. $\frac{42}{14} = \frac{?}{28}$

$\Rightarrow ? = \frac{42 \times 28}{14} = 84$ Choice (A)

15. $\sqrt{343 \times 100 \times \frac{1}{49} \times \frac{1}{7}} = ?$

$\Rightarrow ? = \sqrt{\frac{343}{343}} = \sqrt{1} = 1$ Choice (D)

16. $91125 \times 27 - 2418025 = ?$

$\Rightarrow ? = 2460375 - 2418025 = 42350$ Choice (A)

17. $\frac{\sqrt{844416 \ \div 23456}}{3} = ?$

$\Rightarrow ? = \frac{\sqrt{36}}{3} = \frac{6}{3} = 2$ Choice (D)

18. $1.25 \times 2.6 \times ? = 182$

$\Rightarrow ? = \frac{182}{1.25 \times 2.6} = 56$ Choice (C)

19. $\frac{24^{\ 2} - 13^{\ 2} + 7^{\ 2}}{19} = \frac{576 - 169 + 49}{19}$

$= 24$ Choice (B)

20. $\sqrt{529.09} - \sqrt{359.89}$

$= 23 - 19 = 4$ Choice (A)

21. $\sqrt[3]{215.87} + \sqrt{63.96}$

$\approx \sqrt[3]{216} + \sqrt{64}$

$= 6 + 8 = 14$ Choice (A)

22. $(27.96)^2 - (16.08)^2$
$= (28)^2 - 16^2 = 784 - 256 = 528$ Choice (C)

23. $\sqrt[3]{124.994} - \sqrt{16.09} = ?$
$\sqrt[3]{125} - \sqrt{16} = 5 - 4 = 1$ Choice (B)

24. $? = \dfrac{\sqrt{7390} \times \sqrt{1370}}{\sqrt{680}} = \dfrac{\sqrt{7396} \times \sqrt{1369}}{\sqrt{676}} = \dfrac{86 \times 37}{26} = 122$
Closest answer is 120 Choice (A)

Solutions for questions 25 to 45:

25. $435^2 = (43 \times 44)/5^2 = 189225$ Ans (189225)

26. 864 $\rightarrow$ – 36
864 $\rightarrow$ – 36

Ans (746496)

27. 683 $\rightarrow$ – 17
683 $\rightarrow$ – 17

Ans (466489)

28. 832 $\rightarrow$ +32
832 $\rightarrow$ +32 Ans (692224)

29. 768 x 768
(Use 3-digit multiplication method) Ans (589824)

30. 295 $\rightarrow$ – 5
295 $\rightarrow$ – 5 Ans (87025)

31. 339 $\rightarrow$ + 39
339 $\rightarrow$ + 39 Ans (114921)

32. $38^2 - 20^2 = 19^2 \times 4 - 400 = 1444 - 400 = 1044$
Ans (1044)

33. 218^2
218 $\rightarrow$ + 18
218 $\rightarrow$ + 18 Ans (47524)

34. $69^2 - 58^2$
$= (69 + 58)(69 - 58) = 1397$ Ans (1397)

35. $(271)^2 = (300 - 29)^2$
$= (300)^2 - 2 \times 300 \times 29 + (29)^2$
$= 90000 - 17400 + 841 = 73441$
or
$(270 + 1)^2 = 72900 + 540 + 1$ Ans (73441)

36. 661^2
661 $\rightarrow$ – 39
666 $\rightarrow$ – 39 Ans (436921)

37. 93^2
93 $\rightarrow$ – 7
93 $\rightarrow$ – 7 Ans (8649)

38. $89^2 - 62^2$
$(89 - 62)(89 + 62)$
$= 27 \times 151 = 24 (150 + 1)$ Ans (4077)

39. 318^2
318 $\rightarrow$ + 18
318 $\rightarrow$ + 18 Ans (101124)

40. $(217)^2 - (67)^2$
$= (217 - 67)(217 + 67)$
$= 150 \times 284$ Ans (42600)

41. $(1004)^2$
1004 $\rightarrow$ +4
and proceed Ans (1008016)

42. $(598)^2$
598 $\rightarrow$ –2
598 $\rightarrow$ –2
and proceed Ans (357600)

43. $(768)^2 - (32)^2$
$= (768 + 32)(768 - 32) = 800 \times 736$ Ans (588800)

44. $512^2 = \dfrac{25}{\dfrac{5 \times 12 \times 2}{144}} = 262144$

45. 133^2
133 $\rightarrow$ +33
133 $\rightarrow$ +33 Ans (17689)

Chapter – 3
(Percentage calculations, Fractions)

Exercise – 3(a)

Solutions for questions 1 to 29:

1. 13% of 29 $= 2.9 + 0.29 \times 3 = 3.77$

2. 18% of 91 = 20% – 2%
$= \dfrac{1}{5} \times 91 - \dfrac{1}{10} \times \dfrac{1}{5} \times 91$
$= 18.2 - 1.82 = 16.38$

3. $\dfrac{89}{161} \times 100$
$16.1 \times 5 = 80.5 = 50\%$
$89 - 80.5 = 8.5$
$8.5 \cong 5.3\%$ of 161
So, 55.3%.
Answer will be slightly less than this.

4. $\dfrac{256}{2079} \times 100$ 1% = 20.8
12% = 249.6
$256 - 249.6 = 6.4 \cong 0.3\%$
$\therefore$ 256 = 12.3%

5. 23.75% = 25% – 1.25%
$= \dfrac{1}{4} \times 160 - \dfrac{1}{4} \times \dfrac{1}{2} \times 16 = 38$

6. 54% of 1111 $= \dfrac{1}{2} \times 1111 + 11.11 \times 4$
$= 555.5 + 44.44 = 599.94$

Alternatively
54% x 1111 $= \dfrac{6}{11}$ x 1111 – $\dfrac{6}{11}$ x 11.11
(as $\dfrac{6}{11}$ = 54.54%) = 606 – 6.06 = 599.94

7. 81% of 909 $= \dfrac{4}{5} \times 909 + 9.09 = 727.2 + 9.09 = 736.29$

8. 72% of 541 $\dfrac{3}{4} \times 541 - 5.41 \times 3$
405.75 – 16.23 = 389.52

9. 33% of 649
$64.9 \times 3 + 6.49 \times 3$
194.7 + 19.47 = 214.17

10. 25% of $\dfrac{8}{90} = \dfrac{1}{4} \times \dfrac{8}{90} = \dfrac{1}{45}$

11. $\dfrac{588}{933} \times 100 = \dfrac{196}{311} \times 100$ $31.1 \times 6 = 186.6$
$196 - 186.6 = 9.4 = 3.11 \times 3$
$\therefore$ 196 = 63% of 311 or 588 = 63% of 933

12. $\frac{412-322}{322} = \frac{90}{322}$
$= 32.2 \times 3 - 3.2 \times 2 = 28\%$

13. $\frac{754}{1457} \times 100$ 50% of 1457 = 728
754 – 728 = 26 ≅ 14.57 + 7.28 + 3.64
= 1.75%
So, 754 ≅ 51.75%

14. 35% of 4712 = $471.2 \times 3 + 235.6 = 1649.2$

15. 23.83% of 272
= 20% + 3.33% + 0.5% = $\frac{1}{5} \times 272 + \frac{1}{10} \times \frac{1}{3} \times 272 + 1.36$
= 64.826
(Answer will be slightly less than this)

16. $\frac{18}{472} \times 100 = 4.782 \times 4 = 18.88$
18.88 – 18 = 0.88 ≅ 0.2%
4% – 0.2% = 3.8%

17. $\frac{23}{67} \times 100$
$\frac{67}{3}$ = 22.33
23 – 22.33 = 0.67 = 1%
23 = 33.33% + 1% = 34.33%

18. 88.88% of 0.99 = $8/9 \times 0.99 = 0.88$

19. $\frac{1372}{1498} \times 100 \cong 1372 \times \frac{100}{1500}$ = 91.46%
Actual answer will be slightly more than this.

20. $\frac{277.7}{100} \times 330 \cong \frac{2500}{9} \times \frac{1}{100} \times 330$
$= \frac{330 \times 25}{9} = \frac{330}{36} \times 100$ = 916.6

21. 412 – 161 = 251
$\frac{251}{412} \times 100$ $\frac{412}{2}$ = 206
251 – 206 = 45 ≅ 41.2 + 4.12 or 11%
So, 50% + 11% = 61%

22. 17.42% of 264 = 12.5% + 5% – 0.08%
$= \frac{1}{8} \times 264 + 13.2 - \frac{8}{100} \times 2.64$
= 33 + 13.2 – 0.2112 = 45.9888
Alternately :
17.42% = 16.67% + 0.75%
$= \frac{1}{6}$ x 264 + $\frac{3}{400}$ x 264 = 44 + 1.98 = 45.98

23. 28.75% of 480 = $\frac{1}{4} \times 480 + \frac{15}{4} \times 4.8$ = 120 + 18 = 138

24. 34% of 4500
45% – 11%
$45 \times 45 - 11 \times 45 = 2025 - 495 = 1530$
Alternately :
34% = 33.33% + 0.67%
$= \frac{1}{3} \times 4500 + \frac{2}{3} \times 45 = 1530$

25. $\frac{1186}{890} \times 100 = \left(\frac{890}{890} + \frac{296}{890}\right) 100$
$= \left(1 + \frac{1}{3}\right) 100 = 133.33\%$

26. $\frac{445}{160} \times 100$
$160 \times 3 = 480$
480 – 445 = 35 = $16 \times 2 + 1.6 \times 2 = 22\%$
∴ 445 = 300% – 22% = 278% x 160
or 178% more than 160

27. 34.09% of 792 = 25% + 9.09%
$= \frac{1}{4} \times 792 + \frac{1}{11} \times 792$ = 198 + 72 = 270

28. 81.81% is equal to 9/11 as a fraction.
Hence the result is $\frac{20}{11} \times 3289$ i.e., 5980.

29. 36.66% of 1566
= (30 % + 6.66%) of 1566
= 30 % of 1566 + $\frac{1}{15}$ of 1566.
= 469.8 + 104.4 = 574.2

Solutions for questions 30 to 34:

30 LCM of denominators of the given fractions is 27, 216, 24 and 54 is 648.
$\therefore \frac{13}{27} + \frac{197}{216} + \frac{19}{24} + \frac{47}{54} = \frac{312 + 591 + 513 + 564}{648}$
$= \frac{1980}{648} = \frac{55}{18}$

31. The L.C.M. of (9, 6, 11 and 5) is 990
$\therefore \frac{4}{9} + \frac{5}{6} + \frac{9}{11} + \frac{3}{5} = \frac{440 + 825 + 810 + 594}{990}$ i.e., 2669/990

32. Proceeding as shown above the required sum is 521/176.

33 Proceeding as shown above, the required sum is 97/77.

34. HCF of fractions= $\frac{\text{HCF of Numerators}}{\text{LCM of Deno min ators}}$
HCF of 2/3, 4/13, and 6/11 is $\frac{\text{HCF of } (2,4,6)}{\text{LCM of } (3,13,11)} = \frac{2}{429}$

35. 21.66 of 240 = $1/6 \times 240 + 12 = 52$

Solutions for questions 35 to 45:

36. $\frac{985}{434} \times 100$
$434 \times 2 = 868$
985 – 868 = 117 = $43.4 \times 3 - 4.3 \times 3$
∴ 227%

37. $\frac{525-186}{186} \times 100 = \frac{339}{186} \times 100 = \frac{113}{62} \times 100$
113 = 124 – 12.4 + 1.4
= 200% – 20% + 2.3% = 182.3%

38. 91.66% of 228 = $\frac{11}{12} \times 228$ = 209

39. $\frac{4932}{5480} \times 100$
$548 \times 9 = 4932$
So, 90%

40. $\frac{520}{650} \times 100 = 4/5 \times 100 = 80\%$

41. 69.57% of 546 = 70% – 0.43% = 70% – (0.5% – 0.07%)
= 70% + 0.07% – 0.5% = 379.85

42. $10/12 \times 833$ Ans (694.16)

43. 9.39% of 120
9.09% + 0.2% = $1/11 \times 120 + 0.12 \times 3 = 11.268$

44. $\frac{136}{980} \times 100$
$\frac{980}{7} = 140$
140 – 136 = 4 ≅ 0.4%
∴ 136 = 14.28% – 0.4% = 13.88%

45. $\frac{683}{495} \times 100$
683 = 495 + 188
188 ≅ 38% of 495
∴ 683 = 138% of 495

Exercise – 3(b)

Solutions for questions 1 to 12:

1. 86.88% of 465 = 88.88% – 2% = $8/9 \times 465 - 4.65 \times 2$
= 403.99

2. 58.3% of 1440
$= 720 + \frac{1}{12} \times 1440 - \frac{1}{1000} \times \frac{1}{3} \times 1440$
= 720 + 120 – 0.48 = 839.52

3. 86.3% of 546
$\cong \frac{10}{12} \times 546 + 5.46 \times 3 = 471.38$
Answer will be slightly less than this.

4. $\frac{152}{555} \times 100$
$55.5 \times 3 = 166.5$
166.5 – 152 = 14.5 = 2.6% of 555
∴ 27.4%

5. $\frac{1296}{4624} \times 100$
$1/4 \times 4624 = 1156$
1296 – 1156 = 140
≅ 3% of 4624 ∴ 28%

6. 18% of 419
20% – 2% Ans (75.42)

7. 27% of 743 = $74.3 \times 3 - 7.43 \times 3 = 200.61$

8. $\frac{147}{274} \times 100$
$1/2 \times 274 = 137$
147 – 137 = 10 ≅ $2.74 \times 4 - 0.27 \times 3$
∴ 50% + 4% – 0.3% = 53.7%

9. 84% of 947
$4/5 \times 947 + 47.3 - 9.47$
(80%) + (5%) – (1%) = 795.43

10. $\frac{83}{516} \times 100$
$1/6 \times 516 = 86$
86 – 83 = 3 ≅ 0.6% of 516
∴ 16.66% – 0.6% = 16.06%

11. 88% of 738
$\frac{4}{5} \times 738 + \frac{4}{50} \times 738 = 649.44$

12. $\frac{281}{1384} \times 100$
$138.4 \times 2 = 276.8$
281 – 276.8 = 4.2
≅ 0.3% of 1384
∴ 20.3%

Solutions for questions 13 to 39:

13. 6 of $5/8 \div 5/8 - 1/8$
$= 30/8 \div 5/8 - 1/8 = 30/8 \times 8/5 - 1/8 = 6 - 1/8 = 5\frac{7}{8}$
Choice (D)

14. $25\frac{2}{5} + 8\frac{4}{5} + \frac{3}{5} = 34\frac{4}{5} \cong 35$ Choice (B)

15. $\frac{\frac{180}{37} \text{ of } 14 \cdot 8}{\frac{17}{60.1} \text{ of } 180 \cdot 30} \approx \frac{72}{51} = \frac{24}{17} = 1.41$ Choice (A)

16. $\frac{1}{3} \times \frac{1}{3} \times \frac{1}{7} \times \frac{1}{9} \times 2140 = ?$
? = 3.77 Choice (B)

17. 12 + 16 – 10 = 18
and $\frac{13}{18} + \frac{11}{27} - \frac{5}{9} = \frac{39 + 22 - 30}{9 \times 2 \times 3} = \frac{31}{54}$
The answer is $18\frac{31}{54}$ Choice (B)

18. $\frac{\frac{5}{8} \times \frac{12}{5} - \frac{5}{4}}{\frac{5}{4}} \quad \frac{\frac{3}{2} - \frac{5}{4}}{5/4} = \frac{1}{5}$. Choice (A)

19. $?^2 = \frac{3}{7} \times \frac{4}{9} \times \frac{2}{5} \times 7560$
$\Rightarrow ?^2 = 576 = 24^2$
∴ ? = 24 Choice (C)

20. $\frac{135 - 25}{1920 \div 320} = ? \Rightarrow ? = \frac{110}{6} = 18\frac{1}{3}$ Choice (C)

21. $\frac{13}{5} \times \frac{17}{5} \div \frac{221}{25} = ?$
$\Rightarrow ? = \frac{13}{5} \times \frac{17}{5} \times \frac{25}{221} = 1$ Choice (D)

22. $\frac{192 + 38}{90 + 2} = ?$
$\Rightarrow ? = \frac{230}{92} = 2.5$ Choice (B)

23. $? = \frac{7}{17}$ Choice (B)

24. $\frac{29}{7} \div \frac{26}{3} \times \frac{13}{4} \times \frac{31}{12} = \frac{29}{7} \times \frac{3}{26} \times \frac{13}{4} \times \frac{31}{12} = 4.01$
Choice (C)

25. $\frac{5}{2} \times \frac{3}{4} \times \frac{4}{9} \times \frac{5}{4} = \frac{25}{24}$ Choice (D)

26. $?^2 = 9\frac{7}{8} - 3\frac{1}{4} - 2\frac{1}{6} - \frac{11}{24} = 4 + \left(\frac{7}{8} - \frac{1}{4} - \frac{1}{6} - \frac{11}{24}\right)$

$= 4 + \frac{21 - 6 - 4 - 11}{24} = 4$

$? = \pm 2$

Only 2 is given in the choices. Choice (D)

27. $\frac{3}{2} + \frac{5}{3} \div \frac{1}{42} = ? \Rightarrow \frac{3}{2} + \frac{5}{3} \times \frac{42}{1} = ?$

$\Rightarrow ? = 1.5 + 70 = 71.5$ Choice (C)

28 $? = \frac{1}{3}$ Choice (A)

29. $\frac{16}{3} \times \frac{15}{7} \times \frac{47}{5} \times \frac{35}{8} \times \frac{100}{47} = ?$

$\Rightarrow ? = 1000$ Choice (C)

30. $\frac{2}{5} \times \frac{3}{4} \times \frac{1}{7} \times 10800 = \frac{3}{7} \times \frac{9}{5} \times ? \times 840$

$\Rightarrow ? = \frac{2}{5} \times \frac{3}{4} \times \frac{1}{7} \times \frac{7}{3} \times \frac{5}{9} \times \frac{10800}{840} = \frac{5}{7}$ Choice (C)

31. $? = 4 \times 8 \times 5 = 160$ Choice (A)

32. $11\frac{3}{5} \times 1\frac{1}{2} \times 7\frac{7}{9} \times \frac{1}{203}$

$= \frac{58}{5} \times \frac{3}{2} \times \frac{70}{9} \times \frac{1}{203} = \frac{2}{3}$ Choice (C)

33. $\frac{3}{17}$ of $204 + \frac{3}{7}$ of 301

$= 36 + 129 = 165$ Choice (D)

34. $3\frac{1}{8} \times 3\frac{1}{5} \times 2\frac{1}{2} \div 5 = \frac{25}{8} \times \frac{16}{5} \times \frac{5}{2} \times \frac{1}{5} = 5$

Choice (B)

35. $\frac{3.98 \times 5.01}{0.915 \times 0.487}$

$\approx \frac{4 \times 5}{1 \times 0.5} = 40$. The nearest answer is 45.

Choice (C)

36. $5\frac{1}{6} + 2\frac{5}{6} - 5\frac{?}{3} = 2\frac{1}{3}$

$\Rightarrow 5\frac{?}{3} = 5\frac{1}{6} + 2\frac{5}{6} - \frac{7}{3} = \frac{31}{6} + \frac{17}{6} - \frac{7}{3} - 3$

$= \frac{31 + 17 - 14}{6} \Rightarrow 5\frac{?}{3} = 5\frac{2}{3} \Rightarrow ? = 2$ Choice (B)

37. $\frac{\frac{1}{8} \text{ of } 1608}{\frac{1}{13} \text{ of } 69} = \frac{201}{3} = 67$ Choice (A)

38. $\frac{9.93 \times 19.8}{35.03 + 2.9 + 1.96}$

$\approx \frac{10 \times 20}{35 + 3 + 2} = \frac{200}{40} = 5$ Choice (C)

39. $? = \frac{897}{64} \times \frac{782}{17} \times \frac{220}{74} \approx 14 \times 46 \times 3 = 1932$

Closest answer is 1920. Choice (A)

Solutions for questions 40 to 45:

40. $\frac{17}{41} - \frac{34}{82} + \frac{171}{41} + \frac{37}{123}$

$= \frac{17}{41} - \frac{17}{41} + \frac{513}{123} + \frac{37}{123} = \frac{550}{123}$

41. $\frac{77}{11} + \frac{14}{22} + \frac{21}{33} = ?$

$\Rightarrow ? = \frac{462 + 42 + 42}{66} \Rightarrow ? = \frac{546}{66} = \frac{91}{11}$.

42. $? = \frac{21}{48} - \frac{82}{41} + \frac{119}{170} + \frac{156}{78}$

$\Rightarrow ? = \frac{7}{16} - 2 + \frac{7}{10} + 2$

$\Rightarrow ? = \frac{7(5+8)}{80} \Rightarrow ? = \frac{91}{80}$.

43. $? = \frac{18}{66} + \frac{33}{132} + \frac{42}{924}$

$\Rightarrow ? = \frac{3}{11} + \frac{1}{4} + \frac{1}{22}$

$\Rightarrow ? = \frac{12 + 11 + 2}{44} \Rightarrow ? = \frac{25}{44}$.

44. $? = \frac{2}{39} - \frac{1}{52} + \frac{3}{91}$

$\Rightarrow ? = \frac{56 - 21 + 36}{1092} \Rightarrow ? = \frac{71}{1092}$.

45. $\frac{2}{85} - \frac{1}{34} + \frac{1}{51} = ?$

$\Rightarrow ? = \frac{12 - 15 + 10}{510} \Rightarrow ? = \frac{7}{510}$.

Chapter – 4
(Comparison of Fractions)

Exercise – 4(a)

Solutions for questions 1 to 15:

1. $\frac{17}{23}, \frac{27}{33}, \frac{37}{43}, \frac{47}{53}$

As the difference between the numerator and the denominator is same in all the cases, and each fraction is <1.

$\frac{47}{53}$ is the largest.

2. $\frac{11}{24}, \frac{18}{26}, \frac{33}{52}, \frac{48}{62}$

Take reciprocals and compare

3. $\frac{192}{21}, \frac{189}{19}, \frac{146}{17}, \frac{261}{28}$

$\frac{192}{21} \cong 9, \frac{189}{19} \cong 10, \frac{146}{17} < 9$

and $\frac{261}{28}$ is clearly < 10

$\therefore \frac{189}{19}$ is the largest.

4. $\frac{2}{9}, \frac{14}{16}, \frac{23}{21}, \frac{63}{69}, \frac{19}{17}$

only $\frac{23}{21}$ and $\frac{19}{17}$ are > 1

$23 - 21 = 2$

$19 - 17 = 2$

$\therefore \frac{19}{17} > \frac{23}{21}$

Hence $\frac{19}{17}$ is the largest

5. By observation only $\frac{9}{26}$ and $\frac{63}{181}$ are $> \frac{1}{3}$ between them

$63 = 9 \times 7 \qquad 189 < 26 \times 7$

$\therefore \frac{63}{181} > \frac{9}{26}$

6. $\frac{111}{190}, \frac{41}{76}, \frac{4}{9}, \frac{52}{87}, \frac{31}{55}$

4/9 is the lowest < 1/2

$\frac{41}{76}, \frac{52}{87}$

52 = 41 + 11, 87 = 76 + 11

$\therefore \frac{52}{87} > \frac{41}{76}$

Now, compare $\frac{52}{87}, \frac{111}{190}, \frac{31}{55}$

Take reciprocals and compare

$\frac{87}{52} = 1 + \frac{35}{52}$

$\frac{190}{111} = 1 + \frac{79}{111}$

$\frac{55}{31} = 1 + \frac{24}{31}$

$\frac{87}{52}$ is the smallest

$\therefore \frac{52}{87}$ will be the largest

7. Take reciprocals and compare.

8. $\frac{6}{35}, \frac{19}{98}, \frac{13}{69}, \frac{21}{113}, \frac{15}{79}$

Take reciprocals and compare

9. Take reciprocals and compare

10. $\frac{33}{100} < \frac{1}{3}$ for the others take reciprocals and compare.

11. Take reciprocals and compare or by observation

only $\frac{173}{215} > 0.8$

12. $\frac{27}{10}, \frac{34}{13}, \frac{28}{15}, \frac{17}{11}$

$\frac{34}{13} > \frac{34}{15}$ [Numerator is same; Denominator is less]

$\frac{34}{13} > \frac{28}{13}$ [Denominator is same; Numerator is less]

$\frac{34}{13} > \frac{17}{11}$ [Numerator is double; Denominator is less than double]

$\frac{27}{10} > \frac{34}{13}$

$13 = 10 \times 1.3$

$34 < 27 \times 1.3$

$\therefore$ 27/10 is the largest fraction.

13. $\frac{1}{9}, \frac{12}{113}, \frac{5}{42}, \frac{39}{294}, \frac{76}{635}$

$\frac{1}{9} > \frac{12}{113}$

$12 = 1 \times 12$

$113 > 9 \times 12$

5/42 > 1/9

$5 = 5 \times 1$

$42 < 5 \times 9$

$\frac{39}{294} > \frac{5}{42}$

$39 > 7 \times 5$

$294 = 7 \times 42$

$\frac{39}{294} > \frac{76}{635}$

$76 < 2 \times 39$

$635 > 2 \times 294$

$\therefore \frac{39}{294}$ is the largest factor.

14. Among the fractions

$\frac{7}{8}, \frac{12}{13}$ and $\frac{18}{19}$

$\frac{18}{19}$ is the largest.

In a proper fraction, if the difference between the numerator and the denominator is constant, the fraction with largest number will be the largest.

Among fractions values $\frac{15}{19}$ and $\frac{9}{11}$

$\frac{9}{11} = \frac{18}{22}$

$\frac{18}{22} > \frac{15}{19}$ (Difference is constant)

Now between, $\frac{18}{19}$ and $\frac{18}{22}$, $\frac{18}{19} > \frac{18}{22}$

(Denominator is smaller, numerator being constant)

$\therefore \frac{18}{19}$ is the largest.

15. $\frac{91}{183} < \frac{1}{2}$ while others are $> \frac{1}{2}$

Consider $\frac{38}{71}, \frac{50}{81}, \frac{63}{117}, \frac{49}{87}$

Take reciprocals and compare

$\frac{71}{38}, \frac{81}{50}, \frac{117}{63}, \frac{87}{49}$

$1 + \frac{33}{38}, 1 + \frac{31}{50}, 1 + \frac{54}{63}, 1 + \frac{38}{49}$

Clearly $\frac{81}{50}$ is the smallest

Hence $\frac{50}{81}$ is the largest

Solutions for questions 16 to 23:

16. $\frac{20}{81}, \frac{3}{8}, \frac{9}{43}, \frac{1}{4}$

By observation $\frac{9}{43}$ which is close to $\frac{1}{5}$ is the smallest.

17. $\frac{31}{17}, \frac{24}{19}, \frac{42}{27}, \frac{37}{22}, \frac{31}{21}$

The differences are 14, 5, 15, 15, 10

By observation $\frac{24}{19}$ is the smallest

18. By observation

$\frac{18}{89} \cong \frac{1}{5}$ and $\frac{6}{29} \cong \frac{1}{5}$

One of these is the smallest. Take reciprocals and compare

$\frac{89}{18} = 5 - \frac{1}{18}$

$\frac{29}{6} = 5 - \frac{1}{6}$

$\therefore \frac{89}{18} > \frac{29}{6} \Rightarrow \frac{6}{29} > \frac{18}{89}$

19. $\frac{13}{15}, \frac{29}{41}, \frac{5}{6}, \frac{54}{71}, \frac{33}{45}$

$\frac{13}{15} = 1 - \frac{2}{15}$

$\frac{29}{41} = 1 - \frac{12}{41}$

$\frac{5}{6} = 1 - \frac{1}{6}$

$\frac{54}{71} = 1 - \frac{17}{71}$

$\frac{33}{45} = 1 - \frac{12}{45}$

$\frac{29}{41}$ is the smallest

20. $\frac{55}{11} > 1$ for the rest

Take reciprocals and compare $\frac{19}{8}, \frac{34}{15}, \frac{56}{23}, \frac{77}{36}$

$\frac{19}{8} = 2 + \frac{3}{8}$ $\quad \frac{34}{15} = 2 + \frac{4}{15}$

$\frac{56}{23} = 2 + \frac{10}{23}$ $\quad \frac{77}{36} = 2 + \frac{4}{36}$

$\frac{56}{23}$ is the largest

$\therefore \frac{23}{56}$ is the smallest

21. Only $\frac{15}{49}, \frac{8}{25}$ are $< \frac{1}{3}$

$\frac{15}{49} = \frac{1}{3.26}$ and $\frac{8}{25} = \frac{1}{3.12}$

$\therefore \frac{15}{49}$ is the smallest

22. $\frac{1}{12}, \frac{18}{218}, \frac{4}{50}, \frac{19}{230}$

Take reciprocals 12, $12 + \frac{2}{18}, 12.5, 12 + \frac{1}{19}$

$\therefore \frac{4}{50}$ is the smallest

23. $\frac{18}{484}, \frac{20}{500}, \frac{15}{408}, \frac{18}{360}$

$\frac{1}{26.8}, \frac{1}{25}, \cong \frac{1}{27.2}, \frac{1}{20}$

$\therefore \frac{15}{408}$ is the smallest.

Solutions for questions 24 to 32:

24. $\frac{18}{63}, \frac{24}{67}, \frac{29}{73}, \frac{33}{85}$

Take reciprocals $\frac{63}{18} = 3 + \frac{9}{18}$

$\frac{67}{24} = 2 + \frac{19}{24}$ $\quad \frac{73}{29} = 2 + \frac{15}{29}$

$\frac{85}{33} = 2 + \frac{19}{33}$

So, $\frac{63}{18} > \frac{67}{24} > \frac{85}{33} > \frac{73}{29}$

So, $\frac{18}{63} < \frac{24}{67} < \frac{33}{85} < \frac{29}{73}$

25. Here difference between numerator and denominator is same in all fractions.

$\therefore \frac{13}{15} < \frac{15}{17} < \frac{16}{18} < \frac{19}{21}$

26. Take reciprocals and compare

27. Take reciprocals and compare

28. Take reciprocals and compare

29. Take reciprocals and compare

30. $\frac{1}{25}, \frac{4}{103}, \frac{22}{554}, \frac{48}{208}$

$\frac{1}{25} > \frac{4}{103}$ $\quad 103 > 25 \times 4$

$\frac{1}{25} > \frac{22}{554}$ (for similar reason)

$22 = 5.5 \times 4$

$554 < 5.5 \times 103$

$\frac{48}{208} > \frac{22}{554}$

As 48 > 22

208 < 554

Also $\frac{48}{208} > \frac{1}{25}$

Now, to compare $\frac{4}{103}$ and $\frac{22}{554}$,

22 = 4 X 5.5

554 < 103 x 5.5

$\therefore \frac{22}{554} > \frac{4}{103}$

Hence $\frac{4}{103}, \frac{22}{554}, \frac{1}{25}, \frac{48}{208}$

31. $\frac{56}{99}, \frac{40}{98}, \frac{24}{42}, \frac{136}{154}$

Take reciprocals and compare

$\frac{99}{56} = 1 + \frac{43}{56}$

$\frac{98}{40} = 2 + \frac{18}{40}$

$\frac{42}{24} = 1 + \frac{18}{24}$

$\frac{154}{136} = 1 + \frac{18}{136}$

So, $\frac{40}{98}, \frac{56}{99}, \frac{24}{42}, \frac{136}{154}$

32. $\frac{81}{169} \cong \frac{1}{2}$ = a

$\frac{75}{182} < \frac{1}{2}$ = b

$\frac{73}{124}, \frac{101}{187}, \frac{211}{243}$ are all $> \frac{1}{2}$

Consider their reciprocals

$\frac{124}{73} = 1 + \frac{51}{73}$ = c′

$\frac{187}{101}=1+\frac{86}{101}$ = d′

$\frac{243}{211}=1+\frac{32}{211}$ = e′

d′ > c′ > e′ or e > d > c.

$\therefore \frac{75}{182}<\frac{81}{169}<\frac{101}{187}<\frac{73}{124}<\frac{211}{243}$

Solutions for questions 33 to 39:

33. $\frac{26}{141},\frac{89}{343},\frac{11}{68},\frac{101}{659}$

$\frac{26}{141}$	$\frac{89}{343}$	$\frac{11}{68}$	$\frac{101}{659}$
$>\frac{1}{5}$ but $<\frac{1}{6}$	$>\frac{1}{4}$	$\cong\frac{1}{6}$	$<\frac{1}{6}$

So, $\frac{89}{343},\frac{26}{141},\frac{11}{68},\frac{101}{659}$

34. $\frac{29}{35},\frac{34}{42},\frac{21}{35},\frac{22}{28}$

Take reciprocals $\frac{35}{29}=1+\frac{6}{29}$

$\frac{42}{34}=1+\frac{8}{34}$ $\quad\frac{35}{21}=1+\frac{14}{21}$

$\frac{28}{22}=1+\frac{6}{22}$

So, $\frac{35}{21}>\frac{28}{22}>\frac{42}{34}>\frac{35}{29}$

$\therefore \frac{29}{35}>\frac{34}{42}>\frac{22}{28}>\frac{21}{35}$ (descending order)

35. Similar to the above method.

36. $\frac{13}{56}$ is obviously the least.

between $\frac{68}{99},\frac{79}{104}$

99 + 5% of 99 = 104

79 > 68 + 5% of 68

$\therefore \frac{79}{104}>\frac{68}{99}$

$\frac{83}{95}>\frac{79}{104}$

83 > 79

95 < 104

$\therefore \frac{83}{95},\frac{79}{104},\frac{68}{99},\frac{13}{56}$

37. If all the fractions have the same difference between the numerator and denominator and numerator is more than denominator in each case, then the fraction with the lowest denominator will be the highest and so on

$\therefore \frac{18}{11}>\frac{24}{17}>\frac{27}{20}>\frac{29}{22}>\frac{30}{23}$

38. $\frac{221}{39}$ = 5.5

$\frac{341}{37}$ > 9

$\frac{436}{47}$ > 9

$\frac{286}{35}$ = 9.1

$\frac{368}{49}$ > 7 but < 8

The tie is between $\frac{341}{37}$ & $\frac{436}{47}$

$\frac{341}{37}$ = 9.21; $\frac{436}{47}$ = 9.27

The descending order is $\frac{436}{47}$, $\frac{341}{37}$, $\frac{286}{35}$, $\frac{368}{49}$, $\frac{221}{39}$

39. $\frac{13}{86}=\frac{1}{6.6}$

$\frac{11}{92}=\frac{1}{8.3}$

$\frac{25}{79}=\frac{1}{3.15}$

$\frac{17}{93}=\frac{1}{5.5}$

$\frac{19}{101}=\frac{1}{5.3}$

The descending order is $\frac{25}{79},\frac{19}{101},\frac{17}{93},\frac{13}{86},\frac{11}{92}$

40. $\frac{63}{103}$, $\frac{93}{188}$, $\frac{101}{233}$, $\frac{40}{63}$, $\frac{131}{238}$

$\frac{63}{103}$, $\frac{40}{63}$, $\frac{131}{238}$, are > 0.5

so we have to compare $\frac{93}{188}$ and $\frac{101}{233}$

numerator is increasing by less than 10%
while denominator is increasing by approximately 25%

and hence $\frac{93}{188}$ is the fourth largest.

41. $\frac{162}{17}$, $\frac{349}{43}$, $\frac{591}{51}$, $\frac{801}{70}$, $\frac{1037}{85}$

$\frac{162}{17}$ > 9 and < 10

$\frac{349}{43}$ > 8 and < 9

$\frac{591}{51}$ > 11 and < 12

$\frac{801}{70}$ > 11 and < 12

$\frac{1037}{85}$ > 12

Now $\frac{591}{51}$

= 11 + $\frac{30}{51}$ = 11.6

$\frac{801}{70}$ = 11 + $\frac{31}{70}$ < 11.6

$\therefore \frac{801}{70}$ is the third largest

42. $\frac{8}{17},\frac{9}{19},\frac{25}{51},\frac{30}{61},\frac{18}{37}$

Take the reciprocals and compare

$\frac{17}{8},\frac{19}{9},\frac{51}{25},\frac{61}{30},\frac{37}{18}$

$2+\frac{1}{8},2+\frac{1}{9},2+\frac{1}{25},2+\frac{1}{30},2+\frac{1}{18}$

$\frac{9}{19}$ is second highest.

So, $\frac{9}{19}$ will be the fourth largest.

43. By observing the fractions closely, we find that for

$\frac{5}{11}, \frac{7}{15}, \frac{13}{30}$ and $\frac{21}{45}$

The denominator is more than twice the numerator.

$\frac{17}{28}$ is the largest fraction. (Two in common)

$\frac{5}{11} = \frac{1}{2\frac{1}{5}}$

$\frac{7}{15} = \frac{1}{2\frac{1}{7}}$

$\frac{13}{30} = \frac{1}{2\frac{4}{13}}$

$\frac{21}{46} = \frac{1}{2\frac{5}{21}}$

$\frac{7}{15} > \frac{5}{11} > \frac{21}{46} > \frac{13}{30}$

smallest + largest = $\frac{13}{30} + \frac{17}{28} = \frac{182+255}{420} = \frac{437}{420} = 1\frac{17}{420}$

44. By observing the fractions, we find that

$\frac{85}{191}$ = 1/2

$\frac{127}{391}$ = 1/3

$\frac{348}{1456}$ = 1/4.1

$\frac{101}{563}$ = 1/5.5

$\frac{131}{1561}$ = 1/12

The second largest and the third largest fractions are 1/3 and 1/4

$\frac{127}{391}$ and $\frac{348}{1456}$

45. $\frac{121}{367} = \frac{1}{3}$

$\frac{189}{523} = \frac{1}{2.8}$ (close to 1/3)

$\frac{179}{343} = \frac{1}{1.9}$ (close to 1/2)

$\frac{136}{409} = \frac{1}{3}$

$\frac{121}{179} = \frac{1}{1.47}$

$\frac{189}{523}$ is the middle value.

Exercise – 4(b)

Solutions for questions 1 to 10:

1. $\frac{23}{35}, \frac{31}{43}, \frac{39}{55}, \frac{47}{67}$

$1-\frac{12}{35}, 1-\frac{12}{43}$

$1-\frac{16}{55}, 1-\frac{20}{67}$

$1-\frac{1}{2.9}, 1-\frac{1}{3.5}, 1-\frac{1}{3.4}, 1-\frac{1}{3.3}$

so, $\frac{23}{35}, \frac{47}{67}, \frac{39}{55}, \frac{31}{43}$

2. $\frac{17}{19}, \frac{21}{23}, \frac{25}{31}, \frac{32}{39}$

$1-\frac{2}{19}, 1-\frac{2}{23}, 1-\frac{6}{31}, 1-\frac{7}{39}$

So, $\frac{25}{31}, \frac{32}{39}, \frac{17}{19}, \frac{21}{23}$

3. $\frac{17}{25}, \frac{18}{27}, \frac{23}{33}, \frac{47}{59}, \frac{61}{71}$

$1-\frac{8}{25}, 1-\frac{9}{27}, 1-\frac{10}{33}, 1-\frac{12}{59}, 1-\frac{10}{71}$

$\therefore \frac{18}{27}, \frac{17}{25}, \frac{23}{33}, \frac{47}{59}, \frac{61}{71}$

4. $\frac{19}{23}, \frac{29}{35}, \frac{69}{78}, \frac{49}{57}$

$1-\frac{4}{23}, 1-\frac{6}{35}, 1-\frac{9}{78}, 1-\frac{8}{57}$

$\therefore \frac{19}{23}, \frac{29}{35}, \frac{49}{57}, \frac{69}{78}$

5. $\frac{135}{23}, \frac{287}{26}, \frac{331}{47}, \frac{223}{35}, \frac{229}{28}$

$\frac{135}{23} \times 6$ $\frac{287}{26} \times 11$

$\frac{331}{47} \times 7$ $\frac{223}{35} \times 6.5$

$\frac{229}{28} \times 8$

So $\frac{135}{23} < \frac{223}{35} < \frac{331}{47} < \frac{229}{28} < \frac{287}{26}$

adceb (ascending order)

6. Consider the reciprocals of the fractions.

i.e. $\frac{29}{23}, \frac{40}{33}, \frac{43}{35}, \frac{45}{37}\frac{10}{7}$

$1+\frac{6}{23}, , 1+\frac{7}{33}, 1+\frac{8}{35}, 1+\frac{8}{37}, 1+\frac{3}{7}$

$\therefore$ eacdb is the ascending order of the original fractions.

7. $\frac{11}{120}, \frac{12}{130}, \frac{10}{108}, \frac{1}{11}$

$\frac{11}{120} = \frac{1}{10.9} = a$

$\frac{12}{130} = \frac{1}{10.83} = b$

$\frac{10}{108} = \frac{1}{10.8} = c$

$\frac{1}{11} = d$

$\therefore \frac{1}{11} < \frac{11}{120} < \frac{12}{130} < \frac{10}{108}$ (dabc)

8. $\frac{17}{86} = \frac{1}{5\frac{1}{17}}$

$\frac{12}{59} = \frac{1}{4\frac{11}{12}}$

$\frac{18}{77} = \frac{1}{4\frac{5}{18}}$

$\frac{22}{91} = \frac{1}{4\frac{3}{22}} = \frac{1}{4\frac{1}{7}}$

$$\frac{36}{121} = \frac{1}{3^{13/36}}$$

$$\frac{1}{3^{13/36}} > \frac{1}{4^{1/7}} > \frac{1}{4^{1/6}} > \frac{1}{4^{11/12}} > \frac{1}{5^{1/17}}$$

$$\frac{17}{86} < \frac{12}{59} < \frac{18}{77} < \frac{22}{91} < \frac{36}{121}$$

9. $\frac{13}{37} = \frac{1}{2^{11/13}}$

$$\frac{15}{43} = \frac{1}{2^{13/15}}$$

$$\frac{17}{31} = \frac{1}{1^{14/17}}$$

$$\frac{11}{45} = \frac{1}{4^{1/11}}$$

$$\frac{1}{1^{10/19}} > \frac{1}{1^{14/17}} > \frac{1}{2^{11/13}} > \frac{1}{2^{13/15}} > \frac{1}{4^{1/11}}$$

$$\therefore \frac{11}{45} < \frac{15}{43} < \frac{13}{37} < \frac{17}{31} < \frac{19}{29}$$

10. By close observation, we find that the difference between the numerator and the denominator is constant in each fraction. Since these are proper fractions, the fraction with largest numerator will have largest value. The ascending order is

$\frac{15}{17}, \frac{17}{19}, \frac{19}{21}, \frac{21}{23}, \frac{35}{37}$

Solutions for questions 11 to 37:

11. Difference between numerator and denominator is for all fractions

$\therefore \frac{78}{87}, \frac{45}{54}, \frac{34}{43}, \frac{12}{21}$

12. $\frac{19}{24}, \frac{73}{91}, \frac{43}{57}, \frac{17}{25}$

$\frac{19}{24} < 0.8$ $\quad$ $\frac{43}{57} > 0.7, < 0.8$

$\frac{73}{91} \cong 0.8$ $\quad$ $\frac{17}{25} < 0.7$

between $\frac{19}{24}$ and $\frac{43}{57}$

$1 - \frac{5}{24}$ $\quad$ $1 - \frac{14}{57}$

$\frac{19}{24} > \frac{43}{57}$ $\quad$ $\therefore \frac{73}{91}, \frac{19}{24}, \frac{43}{57}, \frac{17}{25}$

13. $\frac{21}{32}, \frac{81}{102}, \frac{23}{37}, \frac{14}{23}, \frac{24}{37}$

Take reciprocals and compare

$\therefore \frac{81}{102}, \frac{21}{32}, \frac{24}{37}, \frac{23}{37}, \frac{14}{23}$

14. $\frac{9}{12}, \frac{45}{51}, \frac{65}{71}, \frac{99}{122}$

$\frac{45}{51} > \frac{9}{12}$

$45 = 9 \times 5$

$51 < 12 \times 5$

$\frac{65}{71} > \frac{45}{51}$

$71 - 65 = 6$

$51 - 45 = 6$

comparing $\frac{65}{71}, \frac{99}{122}$

$1 - \frac{6}{71}, 1 - \frac{23}{122}$

$\frac{65}{71} > \frac{99}{122}$ or $65 \times 122 > 71 \times 99$

$(71 \times 99 < 7100)$

$\frac{45}{51} > \frac{99}{122}$ and $\frac{99}{122} > \frac{9}{12}$

$\therefore \frac{65}{71}, \frac{45}{51}, \frac{99}{122}, \frac{9}{12}$

15. Similar to the above method.

16. $\frac{87}{143}$ is the largest fraction.

$\frac{87}{143} > \frac{1}{2}$

$\frac{29}{86} = \frac{1}{3}$ (approx)

$\frac{21}{80} = \frac{1}{4}$ (approx)

$\frac{37}{91} = \frac{1}{2.5}$ $\quad$ $\frac{69}{181} = \frac{1}{2.6}$

The descending order is

$\frac{87}{143}, \frac{37}{91}, \frac{69}{181}, \frac{29}{86}, \frac{21}{80}$

17. $\frac{231}{349}, \frac{352}{478}, \frac{453}{584}, \frac{759}{894}$

Take reciprocals and compare

$\frac{349}{231} = 1 + \frac{118}{231}$

$\frac{478}{352} = 1 + \frac{126}{352}$

$\frac{584}{453} = 1 + \frac{131}{453}$

$\frac{894}{759} = 1 + \frac{135}{759}$

So, $\frac{894}{759}$ is the smallest.

Hence, $\frac{759}{894}$ is the largest.

18. $\frac{14}{16}, \frac{18}{19}, \frac{12}{17}, \frac{13}{15}, \frac{11}{18}$

difference between numerator and denominator for each fraction

2, 1, 5, 2, 7 and the numerals in 18/19 are the largest. So, 18/19 is the largest.

19. Similar to the above method.

20. Only $\frac{212}{105} > 2$

21. $\frac{74}{151}, \frac{167}{426}, \frac{334}{537}, \frac{1011}{1597}, \frac{712}{1477}$

Take reciprocals and compare

$\frac{1011}{1597}$ is the largest.

22. $17/9 < 2$

$23/11 > 2$

$27/14 < 2$

$25/12 > 2$

$26/13 = 2$

so, we have to compare
23/ 11 and 25/12
23 x 12 = 276 and 25 x 11 = 275
∴ 23/11 > 25/12
23/11 is the greatest.

23. $\frac{88}{95}, \frac{123}{241}, \frac{76}{95}, \frac{13}{18}, \frac{105}{123}$

Take the reciprocals and compare $\frac{88}{95}$ is the largest

24. $\frac{62}{49}, \frac{523}{476}, \frac{36}{29}, \frac{283}{203}, \frac{1265}{942}$

diff. 13 57 7 80 323

$\therefore \frac{283}{203}$ is the largest as there is a large difference over a relatively small base.

25. Only 23/37 is significantly smaller than 0.8

26. $\frac{386}{495}, \frac{28}{93}, \frac{212}{613}, \frac{2}{5}, \frac{84}{253}$

Take reciprocals and compare

$\frac{495}{386} = 1 + \frac{109}{386}$

$\frac{93}{28} = 3 + \frac{9}{28}$

$\frac{613}{212} = 3 - \frac{23}{212}$

$\frac{5}{2} = 2 + \frac{1}{2}$

$\frac{253}{84} = 3 + \frac{1}{84}$

Clearly 93/28 is the largest.
Hence 28/93 is the smallest

27. $\frac{85}{48}, \frac{135}{123}, \frac{23}{15}, \frac{812}{795}, \frac{29}{23}$

$\frac{85}{48} = 1 + \frac{37}{48}$

$\frac{135}{123} = 1 + \frac{12}{123}$

$\frac{23}{15} = 1 + \frac{8}{15}$

$\frac{812}{795} = 1 + \frac{17}{795}$

$\frac{29}{23} = 1 + \frac{6}{23}$

Clearly the smallest fraction is $\frac{812}{795}$

28. $\frac{85}{96}, \frac{23}{88}, \frac{13}{45}, \frac{212}{841}, \frac{63}{219}$

Take reciprocals and compare

$\frac{96}{85} = 1 + \frac{11}{85}$

$\frac{88}{23} = 3 + \frac{19}{23}$

$\frac{45}{13} = 3 + \frac{6}{13}$

$\frac{841}{212} = 3 + \frac{205}{212}$

$\frac{219}{63} = 3 + \frac{30}{63}$

The largest fraction among the reciprocals is 841/212.
Hence, the smallest fraction is 212/841.

29. $\frac{7}{11}, \frac{21}{37}, \frac{34}{71}, \frac{43}{87}, \frac{101}{206}$

$\frac{1}{1\frac{4}{7}}, \frac{1}{1\frac{16}{21}}, \frac{1}{2\frac{3}{34}}, \frac{1}{2\frac{1}{43}}, \frac{1}{2\frac{4}{101}}$

Clearly $\frac{34}{71}$ is the smallest.

30. $\frac{52}{25} = 2 + \frac{2}{25}$

$\frac{39}{17} = 2 + \frac{5}{17}$

$\frac{49}{24} = 2 + \frac{1}{24}$

$\frac{25}{12} = 2 + \frac{1}{12}$

49/24 is the smallest

31. $\frac{80}{181}, \frac{95}{201}, \frac{76}{199}, \frac{101}{221}, \frac{58}{171}$

Consider the reciprocals

$\frac{181}{80} = 2 + \frac{21}{80}$

$\frac{201}{95} = 2 + \frac{11}{95}$

$\frac{199}{76} = 2 + \frac{47}{76}$

$\frac{221}{101} = 2 + \frac{19}{101}$

$\frac{171}{58} = 2 + \frac{55}{58}$

This is the highest.

So, $\frac{58}{171}$ is the smallest.

32. $\frac{31}{87} > \frac{30}{91}$

$\frac{27}{71} > \frac{21}{77}$

The smallest should be

$\frac{30}{91}$, $\frac{21}{77}$ or $\frac{41}{96}$

$\frac{30}{91} \simeq 1/3$

$\frac{41}{96} \simeq \frac{1}{2.3}$

$\frac{21}{77} \simeq \frac{1}{3.6}$

$\left[\frac{21}{77}\right] = \frac{1}{3.6}$ is the smallest

33. $\frac{45}{97}, \frac{231}{469}, \frac{28}{63}, \frac{49}{99}, \frac{24}{51}$

Multiplying numerators by 2.

$\frac{90}{97}, \frac{462}{469}, \frac{56}{63}, \frac{98}{99}, \frac{48}{51}$

Differences are 7,7,7,1,3

∴ From among the first three fractions, $\frac{56}{63}$ is the smallest.

Comparing, $\frac{56}{63}, \frac{98}{99}, \frac{48}{51}$

$\frac{56}{63} \Rightarrow \frac{28}{63}$ is the smallest.

34. $\frac{212}{843}, \frac{26}{103}, \frac{79}{314}, \frac{82}{271}, \frac{512}{1019}$

$\cong \frac{1}{4}, \cong \frac{1}{4}, \cong \frac{1}{4}, > \frac{1}{4}, \cong \frac{1}{2}$

So compare $\frac{212}{843}, \frac{26}{103}$ and $\frac{79}{314}$

$\therefore \frac{212}{843}$

35. Take the reciprocals and compare

36. $\frac{485}{381} = 1 + \frac{104}{381}$

$\frac{213}{120} = 2 - \frac{27}{120}$

$\frac{90}{83} = 1 + \frac{7}{83}$

$\frac{47}{25} = 2 - \frac{3}{25}$

$\frac{78}{41} = 2 - \frac{4}{41}$

So, largest is $\frac{78}{41}$, Smallest is $\frac{90}{83}$

37. Taking reciprocals, the numbers are $\frac{23}{11}, \frac{29}{14}, \frac{70}{33}, \frac{32}{15}$

$2 + \frac{1}{11}, 2 + \frac{1}{14}, 2 + \frac{4}{33}, 2 + \frac{2}{15}$

38. $\frac{5}{6}, \frac{7}{9}, \frac{10}{13}, \frac{9}{10}, \frac{11}{10}$ 11/10 = 1.1

9/10 = 0.9

$\frac{5}{6}, \frac{7}{9}, \frac{10}{13}$ (are each less than 0.9)

$\frac{5}{6} > \frac{10}{13}$ $\frac{5}{6} > \frac{7}{9}$

So, $\frac{5}{6}$ is the third highest.

39. $\frac{7}{15}, \frac{17}{30}, \frac{33}{61}, \frac{26}{37}, \frac{31}{46}$

$\frac{31}{46} \cong \frac{30}{45}$ or 6/9 $\frac{26}{37} \cong \frac{25}{35}$ or 5/7

$\frac{33}{61} \cong 0.55$

$\frac{17}{30}$ is close to 1/2 but > 1/2

Comparing

$\frac{33}{61}$ and $\frac{17}{30}$ $33 < 17 \times 2$ $61 > 30 \times 2$

$\frac{17}{30}$ is greater

7/15 is less than 1/2

So, $\frac{33}{61}$ is the fourth largest

40. $\frac{162}{314}, \frac{123}{248}, \frac{171}{337}, \frac{137}{291}, \frac{147}{293}$

$\frac{162}{314} > \frac{1}{2}$

$\frac{123}{248} < \frac{1}{2}$

$\frac{171}{337} > \frac{1}{2}$

$\frac{137}{291} < \frac{1}{2}$

$\frac{147}{293} \cong \frac{1}{2}$

Whichever is greater among

$\frac{123}{248}, \frac{137}{291}$ will be the fourth largest

$\frac{123}{248}$ is very close to $\frac{1}{2}$ while $\frac{137}{291}$ is less than ½ and away from it.

$\therefore \frac{123}{248}$ is the fourth largest

41. To find the third largest among

$\frac{221}{23}, \frac{274}{29}, \frac{643}{51}, \frac{862}{75}, \frac{1021}{90}$

$\frac{221}{23} < 10$

$\frac{274}{29} < 10$

$\frac{643}{51} > 12$

$\frac{862}{75} = \frac{825 + 37}{75} \cong 11.5$

$\therefore \frac{1021}{90} = \frac{990 + 31}{90} \cong 11.33$

$\frac{1021}{90}$ is the third largest.

42. $\frac{34}{23}, \frac{35}{24}, \frac{4}{3}, \frac{68}{35}, \frac{73}{38}$

$\frac{34+1}{23+1} = \frac{35}{24}$

$\therefore \frac{34}{23} > \frac{35}{24}$

Comparing $\frac{34}{23}$ and $\frac{68}{35}$

$34 \times 2 = 68$

$\therefore \frac{68}{35} > \frac{34}{23}$ also $\frac{73}{38} > \frac{34}{23}$

$73 > 2 \times 34$

$38 < 2 \times 23$

$\therefore \frac{68}{35}, \frac{73}{38}$ are the highest

(Note: We need not know which among the two is higher)

then $\frac{34}{23} > \frac{35}{24} > \frac{4}{3}$

so,35/24 is the fourth largest fraction.

43. $\frac{15}{87} = \frac{1}{5\frac{12}{15}}$ $\frac{11}{85} = \frac{1}{7\frac{8}{11}}$

$\frac{13}{96} = \frac{1}{7\frac{5}{13}}$ $\frac{15}{73} = \frac{1}{4\frac{13}{15}}$

$\frac{18}{95} = \frac{1}{5\frac{5}{18}}$

Clearly $\frac{15}{87}$ is the third largest.

Solutions for questions 44 and 45:

44. $\frac{11}{41}, \frac{32}{67}, \frac{43}{78}, \frac{55}{94}, \frac{17}{42}$

Take reciprocals and compare

$\frac{41}{11}, \frac{67}{32}, \frac{78}{43}, \frac{94}{55}, \frac{42}{17}$

$3 + \frac{8}{11}, 2 + \frac{3}{32}, 1 + \frac{35}{78}, 1 + \frac{39}{55}, 2 + \frac{8}{17}$

Clearly, among the reciprocals, $\frac{41}{11}$ is the largest and $\frac{94}{55}$ is the smallest.

$\therefore$ $\frac{11}{41}$ is the smallest and $\frac{55}{94}$ is the largest.

45. Similar to the above method.

Smallest = $\frac{11}{37}$

Largest = $\frac{21}{43}$

Chapter – 5
(Approximations)

Exercise – 5(a)

Solutions for questions 1 to 45:

1. $\frac{123}{x} = \frac{456}{80}$

$80 = \frac{1}{6} \times 456 + 4$

Now $4 \cong 4.56 \times 0.9$

$\therefore x = \frac{1}{6} \times 123 + 1.23 \times 0.9$

$\cong 20.5 + 1.08 = 21.58$

2. $\frac{71}{87} = \frac{97}{x}$

$87 = 71 + 16$

$= 71 + \frac{1}{4} \times (71 - 7) = 100\% + 22.5\% = 122.5\%$

$x = 97 + \frac{1}{4}(97 - 9.7) = 118.825.$

3. $x = 192 \times \frac{360}{432} = 192 \times \frac{40}{48} = 32 \times 5 = 160$

4. $\frac{676}{x} = \frac{208}{96}$

$208 = 96 \times 2 + 1/6 \times 96$

$\therefore 676 = x \times 2 + 1/6 \times x$

$x = 6/13 \times 676 = 6 \times 52 = 312$

5. $\frac{841}{145} = \frac{x}{35}$

$\frac{841}{145} \times 35 = x$

$x = 29 \times 7 = 203$

6. $\frac{114}{37} = \frac{43}{x}$

$\frac{114}{3} = 38$

$43 - 38 = 5$

$5 \cong 4 \times 1.14 + 0.57$

So, $x = \frac{37}{3} + (4 \times 0.37 + 0.18) = 13.99$

7. $\frac{231}{64} = \frac{33}{x} \Rightarrow \frac{21}{64} = \frac{3}{x} \Rightarrow x = \frac{64}{7} = 9.14$

8. $\frac{1029}{112} = \frac{1323}{x} \Rightarrow \frac{147}{16} = \frac{1323}{x}$

$\frac{49}{16} = \frac{441}{x} \Rightarrow x = 144$

9. $\frac{848}{x} = \frac{729}{3645}$ $\frac{848}{x} = \frac{81}{405} = \frac{1}{5}$

$x = 848 \times 5 = 4240$

10. $\frac{189}{x} = \frac{214}{250}$

$\therefore \frac{189}{214} = \frac{x}{250}$

$189 = 214 - 21.4 - 12/7 \times 2.1$

$\therefore x = 250 - 25 - 12/7 \times 2.5 = 220.79$

11. $\frac{x}{1234} = \frac{5678}{9876}$

$1234 = 1/8 \times 9876$

$\therefore x = 1/8 \times 5678 = 709.75$

12. $\frac{143}{x} = \frac{471}{220}$

$\frac{471}{2} = 235.5$

$235.5 - 220 = 15.5 \cong 1/3 \times 47.1$

$\therefore x = \frac{1}{2} \times 143 - \frac{1}{3} \times 14.3$

$= 71.5 - 4.76 = 66.74$

13. $\frac{216}{86} = \frac{x}{251}$

$\frac{216}{x} = \frac{86}{251}$

$251 = 86 \times 3 - 7$

$7 = 8\%$ of 86

$\therefore x = 216 \times 3 - 8 \times 2.16 = 630.72$

14. $\frac{174}{x} = \frac{71}{114}$

$\frac{174}{71} = \frac{x}{114}$

$71 \times 2 = 142$

$174 - 142 = 32$

$\cong 7.1 \times 4.5$

$\therefore x = 114 \times 2 + 11.4 \times 4 + 5.7 = 279.3$

15. $\frac{x}{318} = \frac{174}{681}$

$1/2 \times 681 = 340.5$

$340.5 - 318 = 22.5$

$22.5 \cong 1/3 \times 68.1$

$\therefore x = 1/2 \times 174 - 1/3 \times 17.4$

$= 87 - 5.8 = 81.2$

16. $\frac{147}{281} = \frac{670}{x}$

$670 = 147 \times 4 + 1/2 \times 147 + 1/2 \times 14.7 + 1.47$

$\therefore x = 281 \times 4 + 1/2 \times 281 + 1/2 \times 28.1 + 2.81$

$= 1124 + 140.5 + 14.05 + 2.81 = 1281.36$

17. $\frac{123}{x} = \frac{871}{676}$

$\frac{123}{x} = \frac{67}{52}$

$52 = 67 - 15$

$\cong 67 - 1/4 \times 67 + 0.67 \times 3$

$\therefore x = 123 - 1/4 \times 123 + 1.23 \times 3 = 95.94$

18. $\frac{x}{94} = \frac{243}{2920}$

$29.2 \times 3 + 2.92 \times 2 + 0.29 \times 3 \cong 94$

$\therefore x = 2.43 \times 3 + 0.243 \times 2 + 0.0243 \times 3$

$\cong 7.848$

19. $\frac{28}{43} = \frac{45}{x}$

$\frac{x}{43} = \frac{45}{28}$

$45 \cong 28 + 14 + 2.8 + 0.28$

$\therefore$ x = 43 + 21.5 + 4.3 + 0.43 = 69.23

20. $\frac{x}{48} = \frac{99}{245}$

$1/5 \times 245 = 49$

$49 - 48 = 1 = 4 \times 0.245$

$\therefore x = 1/5 \times 99 - 4 \times 0.099$

$= 19.8 - 0.396 = 19.404$

21. $\frac{304}{755} = \frac{x}{832}$

$832 = 755 + 75.5 + 2 \times 0.755$

$\therefore x = 304 + 30.4 + 2 \times 0.304 = 335.008$

22. $\frac{x}{88} = \frac{206}{109}$

$109 \times 2 = 218$

$218 - 206 = 12 = 10.9 + 1.09$

So, $206 = 109 \times 2 - (10.9 + 1.09)$

$\therefore x = 88 \times 2 - (8.8 + 0.88) = 166.32$

23. $\frac{284}{369} = \frac{317}{x}$

$\Rightarrow \frac{284}{317} = \frac{369}{x}$

$284 + 28.4 + 2.84 + 1.42 = 316.66 \cong 317$

$\therefore x = 369 + 36.9 + 3.69 + 1.84 = 411.43$

24. $\frac{412}{169} = \frac{616}{x}$

$x = \frac{169 \times 616}{412} = \frac{169 \times 154}{103}$

$= 169 \times 1.49$

$= 169(1.5 - 0.01) = 169 + 84.5 - 1.69 = 251.81$

(Answer will be slightly higher than this.)

25. $\frac{141}{124} = \frac{x}{384}$

$141 - 124 = 17$

$17 = 12.4 + 6.2 - 1.24 - 3 \times 0.12$

So, $141 = 124 + 12.4 + 6.2 - 1.24 - 3 \times 0.12$

Hence $x = 384 + 38.4 + 19.2 - 3.84 - 3 \times 0.38$

$= 436.62$

26. $\frac{19}{x} = \frac{228}{202}$

$x = \frac{19 \times 202}{228}$

$x = \frac{202}{12}$

$= 16.83 \cong 16.8$

27. $\frac{96}{161} = \frac{x}{131}$

$x = 96 \times 131 / 161$

$\cong 96 \times 13/16 = 78$

28. $\frac{119}{56} = \frac{509}{x}$

$x = \frac{56 \times 509}{119} = \frac{8 \times 509}{17}$

$510 = 17 \times 30$

$509 = 510 - 1 = 17 \times 30 - 17 \times .059$

$= 8 \times 29.44 = 239.52$

29. $\frac{x}{182} = \frac{634}{511}$

$634 = 511 + 123$ $\quad 123 = (51.1) \times 2 + (5.1) \times 4\ (8) \cong 24\%$

$634 = 124\%$ of 511

x = 182 + 20% of 182 + 4% of 182

$= 182 + 36.4 + 7.2 = 225.6$

30. $\frac{52}{55} = \frac{x}{42}$

$x = \frac{52 \times 42}{55}$

$= 52 \times \frac{8.4}{11} = 52 \times 0.763$

$= (50 + 2) \times 0.763 = 39.676$

31. $\frac{345}{348} = \frac{417}{x}$

$x = \frac{414 \times 348}{345}$

$414 = 69 \times 6$

$345 = 69 \times 5$

$x = \frac{6 \times 348}{5} = 417.6 \cong 418$

32. By approximating the given values, we get

$\frac{280}{390} = \frac{x}{2550}$

$x = \frac{280 \times 2550}{390} = 1830$

33. $\frac{717}{x} = \frac{171}{319}$

$171 \times 2 = 342$

$319 = 342 - 23$

$23 = 17.1 + (1.7) \times 3 + 0.8$

$\cong 13.5\%$

$\therefore$ 319 = (200% – 10% – 3.5%) of 171

$x = 717 \times 2 - 71.7 - 7.17 \times 3.5$

$\cong 1337.2$

34. $\frac{19}{52} = \frac{x}{71}$

$\frac{1}{2} \times 52 = 26$

$26 - 19 = 7 = 5.2 + 3 \times 0.52$

So, $19 = \frac{1}{2} \times 52 - [5.2 + 3 \times 0.52] + 0.26$

$\therefore x = 1/2 \times 71 - [7.1 + 3 \times 0.71\ 9 + 0.35] = 25.91$

35. $\frac{213}{x} = \frac{729}{421}$

$\frac{1}{2} \times 729 = 364.5$

$421 - 364.5 = 56.5$

$7.29 \times 7 + 7.29 \times 0.5 \cong 56$

$\therefore 421 = 1/2 \times 729 + 7.29 \times 7 + 7.29 \times 0.5$

So, $x = 1/2 \times 213 + 2.13 \times 7 + 2.13 \times 0.5 = 122.475$

36. $\frac{63}{93} = \frac{x}{41}$

$\frac{21}{31} = \frac{x}{41}$

$3.1 \times 7 = 21.7$

$21.7 - 21 = 0.7 = 0.31 \times 2 + 0.031 \times 3$

So, $21 = 3.1 \times 7 - [0.31 \times 2 + 0.031 \times 3]$

Hence $x = 4.1 \times 7 - [0.41 \times 2 + 0.041 \times 3] = 27.757$

37. $x^2 = 39 \times 121$

By approximation,

$x^2 = 40 \times 120$

$x = \sqrt{40 \times 40 \times 3}$

$x = 40 \times \sqrt{3} = 40 \times 1.732 \cong 69$

Answer will be slightly less than this.

38. $\frac{312}{966} = \frac{x}{47}$

$\frac{312}{966}$ what %

$\frac{966}{3}$ = 322

$\therefore 312 \cong \frac{966}{3} - 9.66$

$\therefore x \cong \frac{47}{3} - 0.47 = 15.19$

39. $x = \frac{267 \times 279}{123} = 267 \times 2.27$

= 534 + 27% of 267 = 534 + 72.09 = 606.1

40. $x = \frac{39 \times 89}{27}$

$\frac{13}{9} \times (90 - 1)$

$130 - \frac{13}{9} = 130 - 1 - \frac{4}{9}$

= 129 – .44 = 128.56

41. $\frac{456}{625} = \frac{x}{688}$, $\frac{456}{x} = \frac{625}{688}$

688 = 625 + 63

$\cong$ 110%

$\therefore$ x = 456 + 45.6 = 501.6

(Actual answer will be slightly more)

42. $\frac{146}{259} = \frac{x}{783}$

$259 \times 3 = 777$

783 – 777 = 6

$\cong$ 2% of 259

$\therefore x = 146 \times 3 + 1.46 \times 2$

$\cong$ 438 + 3 = 441

43. $\frac{x}{72} = \frac{542}{103}$

$542 = 5 \times 103 + 27$

$27 \cong$ 26% of 103

$\therefore x = 5 \times 72 + 26\%$ of 72

$= 360 + 1/4 \times 72 + 0.72 = 378.72$

44. $\frac{812}{2765} = \frac{x}{850}$

$276.5 \times 3 = 829.5$

829.5 – 812 = 17.5

$\cong 2/3 \times 27.65$

$\therefore$ 812 = (30% – $2/3 \times 1\%$) of 2765

$\therefore x = 85 \times 3 - 2/3 \times 8.5)$

= 249.4 (Actual answer will be slightly more than this.)

45. $\frac{43}{243} = \frac{x}{293}$

$\frac{43}{x} = \frac{243}{293}$

293 – 243 = 50 = (20% + 0.5%) of 243

$\therefore x = \frac{1}{5} \times 43 + \frac{1}{2} \times 0.43 + 43$

= 8.6 + .21 + 43 = 51.81

Exercise – 5(b)

Solutions for questions 1 to 30:

1. $\frac{53}{128} = \frac{x}{246}$

$128 \times 2 = 256$

256 – 246 = 10 $\cong$ 8% of 128

$x = 53 \times 2 - 8 \times 0.53 = 106 - 4.24 = 101.76$

2. $\frac{1234}{x} = \frac{567}{989}$

$1234 \cong 567 \times 2$ + 20% of 567 – 2.5% of 567

$\therefore x \cong 989 \times 2$ + 20% of 989 – 2.5% of 989

$\cong$ 1978 + 197.8 – 24.725

= 2151.075

Answer will be slightly more than this.

3. $x \times 102 = 63 \times 371$

$x = \frac{63 \times 371}{102} = \frac{23373}{102} \sim$ (230 x 102 – 0.8 x 102)

229.2

4. $\frac{179}{231} = \frac{33}{x}$

231 –179 = 52

$52 \cong 17.9$ x 3 – 1.79

$\therefore$ 231 = 179 + [17.9 x 3 – 1.79]

Hence x = 33 + [3.3 x 3 – 0.33]

= 42.57 (Actual answer will be slightly more than this)

5. $29 \times x = 71 \times 191$

$x = \frac{71 \times 191}{29} = \frac{13561}{29} = 467.6$

6. $\frac{x}{321} = \frac{173}{439}$

1/2 x 439 = 219.5

219.5 – 43.9 = 175.6

175.6 – 173 = 2.6

$2.6 \cong 6$ x 0.439

$\therefore$ 173 = 1/2 x 439 – 43.9 – 6 x 0.439

So, x =1/2 x 321 – 32.1 – 6 x 0.321 = 126.47

7. $\frac{263}{147} = \frac{60}{x}$

consider the numerators

$263 \rightarrow 60$

Whatever transaction is carried on to get 60 from 263, the similar transaction will be implemented for 147 to get the value of x.

10% of 263% is 26.3

20% of 263 = 52.6

3% of 263 = 7.9

$\Rightarrow$ 23% of 263 = 60.5

0.2% of 263 = 0.52

$\Rightarrow$ 22.8% of 263 = 60

So 22.8% of 147 = 33.5

8. $\frac{293}{x} = \frac{4295}{6329}$

consider $\frac{4295}{6329} \cong \frac{4}{6} = \frac{2}{3}$ and the answer will be lesser than the value obtained

9. $\frac{245}{x} = \frac{312}{333}$

333 > 312, so x > 245

How much greater?

333 – 312 = 21

$3.1 \times 7 = 21.7$

so $2.4 \times 7 = 17 \Rightarrow x = 245 + 17 = 262$

10. $\frac{x}{25} = \frac{107}{237}$

$\frac{x}{107} = \frac{25}{237}$

25= 10% of 237 + 0.5% of 237

$\therefore$ x = 10.7 + 0.53 = 11.23

11. $\frac{213}{284} = \frac{113}{x}$

113= $\frac{213}{2}$ (i.e 106.5)

+ 6.5 (i.e. $\cong 1/3 \times$ {10% of 213})

so, x = $\frac{284}{2} + \frac{1}{3} \times 28.4$ = 142 + 9.5

= 151.5 (Answer will be slightly less than this.)

12. $\frac{76.9}{110} = \frac{x}{9167}$

70% of 110 = 77

769 = 77 – 0.1

0.1 ≅ 0.1% of 110

∴ 76.9 = 70% – 0.1%

x = 70% of 9167 – 0.1% of 9167 = 7 × 916.7 – 9.167

= 6407.7 (Answer will be slightly more than this.)

13. $\frac{1728}{x} = \frac{252}{294}$

$\frac{1728}{x} = \frac{18}{21} = \frac{6}{7}$

x = 7 × 288 = 2016

14. $\frac{172}{58} = \frac{512}{x}$

512 = 172 × 3 – 4

4 ≅ 2.5 % of 172

∴ x = 58 × 3 – 0.5 × 10/4 = 172.75

15. $\frac{x}{225} = \frac{460}{692}$

$\frac{692}{3} = 230.6$

230.6 – 225 = 5.6

≅ 0.8% of 692

∴ x = $\frac{460}{3}$ – 0.8 × 4.6

153.3 – 3.68 = 149.62

16. $\frac{144}{49} = \frac{x}{588}$

x = $\frac{144 \times 588}{49}$ = 144 × 12 = 1728

17. $\frac{12321}{x} = \frac{111}{88}$

$(111)^2 = 12321$

∴ x = 111 × 88 = 9768

18. 74% of 923 = 683.02

∴x ≅ 74% of 112 = 82.88

19. $\frac{x}{174} = \frac{361}{838}$

174 × 5 = 870

870 – 838 = 32 ≅ 1/5 × 174

∴ 838 = $\left(5 - \frac{1}{5}\right) \times 174$

∴ 361 = $\left(5 - \frac{1}{5}\right) \times x$

x = $\frac{5}{24} \times 361 \cong 75$

20. $\frac{729}{297} = \frac{x}{11}$

x = $\frac{729}{27}$ = 27

21. $\frac{961}{x} = \frac{217}{14} \Rightarrow \frac{961}{x} = \frac{31}{2}$

or x = 62

22. $\frac{841}{x} = \frac{290}{55}$

∵ $29^2 = 841$

$\frac{841}{290} = \frac{x}{55}$

2.9 = $\frac{x}{55}$

2.9 = $\frac{x}{55}$

x = 55 × 2.9 =159.5

23. $\frac{193}{x} = \frac{34}{413}$

193 = 34 x 6 – 1/3 x 34 + 0.34

∴ x = 413 x 6 – 1/3x 413 + 4.13 = 2344.46

24. $\frac{136}{x} = \frac{41}{1603}$

1603 = 41 x 40 – 0.9 x 41

∴ x = 136 x 40 – 0.9 x 136 = 5317.6

25. $\frac{233}{710} = \frac{x}{43}$

233 ≅ 71 x 3 + 7.1 x 3 – 0.71 x 2

∴ x = 4.3 x 3 + 0.43 x 3 – 0.043 x 2 = 14.104

26. $\frac{784}{x} = \frac{113}{28}$

113 × 7 = 791

7 to be subtracted

1.1 × 6 = 6.6

28 × 7 = 196

0.28 × 6 = 1.68

So, x = 196 – 1.68 = 194.32

27. $\frac{539}{x} = \frac{1617}{1236}$

x = $\frac{1236}{3} = 412$

28. $\frac{1272}{x} = \frac{848}{1431}$

$\frac{159}{x} = \frac{106}{1431}$

$\frac{159}{106} = \frac{x}{1431}$

1.5 = $\frac{x}{1431}$

∴x = 1431 + 715.5 = 2146.5

29. $\frac{x}{729} = \frac{361}{171}$

∴ $\frac{x}{729} = \frac{19}{9}$

x = 19 × 81 = 1539

30. x = $\frac{646}{102} \times 114 = \frac{38}{6} \times 114$ = 38 × 19 = 722

Chapter – 6
(VBODMAS)

Exercise – 6(a)

Solutions for questions 1 to 30:

1. 16 + $\frac{3}{4}$of [32 – 24 + 12 + 3 – 12] = 16 + $\frac{3}{4}$of [1]

= 16 + $\frac{3}{4} \times 11$

= 16 + $\frac{33}{4} = \frac{97}{4}$. Choice (C)

2. $3\frac{2}{9}+5\frac{1}{4}\left(16\frac{2}{3}\div13\frac{4}{6}\right)\div6\frac{3}{4}$

$= \frac{29}{9}+\frac{21}{4}\left(\frac{50}{3}\times\frac{6}{82}\right)\div\frac{27}{4} = \frac{29}{9}+\frac{21}{4}\times\frac{50}{3}\times\frac{6}{82}\times\frac{4}{27}$

$= \frac{29}{9}+\frac{350}{9\times41} = \frac{1539}{369}.$ Choice (D)

3. 40% of $[\{(8+6)\times5-6\}\times2+3]$

$= \frac{2}{5}$of $[64\times2+3] = \frac{2}{5}\times131 = \frac{262}{5}.$ Choice (D)

4. $\frac{15}{2}$ % of $[108+\frac{3}{8}$of $\{16+32\times12\}]$

$= \frac{15}{200}$ of $[108+\frac{3}{8}[\times400] = 1\frac{3}{40}$ of $2580 = 19.35.$

Choice (B)

5. $3025+[232\times\left(\frac{4}{3}\text{of}6\right)-20\%\text{ of }250]\div301$

$= 3025+(232\times8-50)\div301 = 3025+1806\div301$
$= 3025+6 = 3031.$ Choice (A)

6. 16% of $2250\div\sqrt{30\%\text{ of }300\ -1\%\text{ of }4500}$

$= \frac{16}{100}\times2250\div\frac{30}{100}\times300-\frac{1}{100}\times4500$

$= 360\div\sqrt{90-45} = 360\div45 = 8.$ Choice (B)

7. $\frac{3.4\times0.64\ +0.17\times1.6}{6.8\times0.0004} = \frac{(34\times64\ +17\times16)}{68\times4}\times100$

$= \frac{68\times4(8+1)}{68\times4}\times100 = 900.$ Choice (C)

8. Applying BODMAS required value
$= 6.03\times9-\{207-(303+129-198)\}$
$\simeq 6\times9-\{207-(234)\}$
$= 6\times9-(-27) = 54+27 = 81.$ Choice (B)

9. $\sqrt{14.44} = \sqrt{\frac{1444}{100}}$

$= \sqrt{\frac{4\times361}{100}} = \sqrt{\frac{2^2\times19^2}{10^2}} = \frac{2\times19}{10} = 3.8.$

Required value $= (3.8-2.5)^2\div1.68 =$ i.e.
$= 1.69\div1.68\simeq1.$ Choice (A)

10. $1441\div8\div5=90\%$ of x

$\simeq \frac{1440}{(8)(5)} = \frac{90}{100}$ x

$\Rightarrow 36 = \frac{9}{10}$ x $\Rightarrow$ x = 40. Choice (B)

11. $[12\times5-\{200-(501+247-386)\}]\div2$
$= [12\times5-\{200-362\}]\div2$
$= [60+162]\div2 = 111.$ Choice (A)

12. 0.5 of $98\div7\times[4+\{3-(4-7)\}+5]$
$= 49\div7\times[4+6+5\} = 7\times15 = 105.$ Choice (A)

13. $201+651+(201-0.25\{378+(2561-137)+263\})$
$= 201+651+(201-0.25\times760)$
$= 201+651+(201-190)$
$= 201+651+11 = 863.$ Choice (A)

14. $[20+2\{16\times4+6\times40)+(98\times12\div4\times10)\}-10]$
$= [20+2\{64+240\}+2940\}-10]$
$= [20+6488-10] = 6498.$ Choice (A)

15. $\{6+(6464\div101)-(7\times31\div186\times6)\}+21$
$= (6+64-(7\times\frac{1}{6}\times6)\}+21$
$= 63+21 = 84.$ Choice (B)

16. $\frac{3}{4}$% of $\{54\times8+(16\times9-12)\}+1125\div5\times4-3$

$= \frac{3}{4}$% of $\{432+123\}+225\times4-3$

$= \frac{3}{4}$% of $564+900-3 = \frac{3}{400}\times564+897$
$= 4.23+897 = 901.23.$ Choice (D)

17. $168\div21\times16+\left(\frac{5}{6}\text{of }42-\overline{\frac{7}{3}+\frac{5}{4}}\right)$

$= 8\times16+\left(\frac{5}{6}\times42-\frac{43}{12}\right) = 128+\left(35-\frac{43}{12}\right)$

$= 128+\frac{377}{12} = \frac{1913}{12}.$ Choice (B)

18. $230-\frac{10}{7}$ % of $\left[\frac{16}{3}\text{of}126\div\overline{14-2}\times6\right]$

$= 230-\frac{10}{7}$ % of $[672\div12\times6]$

$= 230-\frac{10}{7}$ % of $[56\times6]$

$= 230-\frac{10}{700}\times56\times6 = 230-4.8 = 225.2.$ Choice (D)

19. $1256+\left\{326+\frac{11}{13}[24\times15-126]\right\}$

$= 1256+\left\{326+\frac{11}{13}(360-126)\right\}$

$= 1256+\left\{326+\frac{11}{13}\times234\right\}$
$= 1256+[326+198] = 1780$ Choice (B)

20. $\frac{3}{4}$of $3600\div54-130+25\times36\%$ of 200

$= 2700\div54-155\times\frac{36}{100}\times200 = 50-11160$
$= -11110.$ Choice (A)

21. $44\times\frac{60}{80}+\frac{45}{15} = 44\times\frac{3}{4}+3 = 33+3 = 36.$

Choice (A)

22. $? = \frac{330\ +12.48\%\text{ of }144}{33\ -37.5\%\text{ of }24}\simeq ?$

$= \frac{330\ +(144\ /8)}{33-(3\times24\ /8)}$

$\Rightarrow ? =. \frac{348}{24} = 14.5$ Choice (A)

23. $? = \frac{35}{2100}\times175+\frac{1}{5}\div20\simeq ?$

$= \frac{35}{21}$of $\frac{1}{5}\times20\simeq\frac{7}{20}\div20$
$= 7/240$ Choice (C)

24. $? = \dfrac{\frac{189}{31}\times 12.42}{\frac{21}{61.1}\times 427.75} \simeq \dfrac{189\times\frac{12.4}{31}}{21\times\frac{427.7}{61.1}} = \dfrac{189\times 0.4}{21\times 7} = \dfrac{3.6}{7}$

$\Rightarrow ? = 0.51.$ Choice (A)

25. Applying BODMAS, we have $\{(12 \times 15) - 9.72\} \div 9 = \{180 - 9.72\} \div 9 = 170.28 \div 9 = 18.92.$

Choice (B)

26. Applying BODMAS, we have $9 - 9 + 9 \times 9 \div 9 = 9 - 9 + 9 \times \frac{9}{9}$ i.e. $9 - 9 + 9 \times 1 = 9 - 9 + 9 = 9.$ Choice (A)

27. Applying BODMAS, we have $108 \times 24 \div 96 + 288 \div 48 = 108 \times \frac{24}{96} + \frac{288}{48} = 108 \times \frac{1}{4} + 6 = 27 + 6$

$= 33.$ Choice (C)

28. $? = 6417 - \frac{1}{2}(2619) + \frac{625}{2}$; $\therefore ? = 6417 - \frac{3244}{2}$ i.e. $6417 - 1622 = 4795.$ Choice (D)

29. $\dfrac{1700}{100}\times 680 \div 34 \div 340 = 1$ Choice (A)

30. $?= \dfrac{17}{5}\times\dfrac{13}{5}+\dfrac{1}{5}$ i.e. $\dfrac{226}{25}.$ Choice (D)

Exercise – 6(b)

Solutions for questions 1 to 30

1. Given, $? = (7.692\%$ of $1391 + 6029) \div 6.5$

$\Rightarrow ? = \left(\dfrac{1}{13}\times 1391 + 6029\right) \div 6.5$

$\therefore ? = \dfrac{6136 \times 2}{13} = 472 \times 2 = 944.$ Choice (B)

2. Given, $? \times 7$ of $9 \div 32 = \dfrac{24 + 480}{16 + 240} = \dfrac{504}{256} = \dfrac{63}{32}$

$\Rightarrow ? \times \dfrac{63}{32} = \dfrac{63}{32} \Rightarrow ? = 1.$ Choice (C)

3. $11\ \dfrac{3}{5}\times\left(1\dfrac{4}{29}\div 1\dfrac{41}{58}\right) \div 3\dfrac{8}{9} = \dfrac{58}{5}\times\left(\dfrac{33}{29}\div\dfrac{99}{58}\right) \div \dfrac{35}{9}$

$= \dfrac{58}{5} \times \left(\dfrac{33}{28}\times\dfrac{58}{99}\right) \div \dfrac{35}{9}$

$= \dfrac{58}{5}\times\dfrac{2}{3}\div\dfrac{35}{9} = \dfrac{58}{5}\times\dfrac{2}{3}\times\dfrac{9}{35}$

$= \dfrac{58\times 2\times 3}{175} = \dfrac{348}{175} = 1\dfrac{173}{175}.$ Choice (B)

4. $\frac{3}{4}$ of $30\ [46 + 2 \times \{150 \div 167 \times 20 + (40 - 8)\}]$

$= \frac{3}{4}$ of $30\ [46 + 2 \times \{9 \times 20 + 32\}]$

$= \frac{3}{4}$ of $30\ (46 + 2 \times 212)$

$= \frac{3}{4} \times 30\ (46 + 424) = \frac{3}{4} \times 30 \times 470 = 10575.$

Choice (C)

5. $3 \times [3 + \{3 \times (3 + (3^3 \div 3))\}]$

$= 3 \times [3 + \{3 \times (3 + 9)\}]$

$= 3 \times [3 + (36)] = 39 \times 3 = 117.$ Choice (A)

6. $60 + 5 \times 12 \div (180 \div 3)$

$= 60 + 5 \times 12 \div 60 = 60 + 1 = 61.$ Choice (D)

7. $8118 \times 5 - ? \times 1850 = 7290$

$\Rightarrow 40590 - ? \times 1850 = 7290$

$\Rightarrow ? = \dfrac{40590 - 7290}{1850} = \dfrac{33300}{1850} = 18$

Choice (C)

8. $\dfrac{?^2 \times 20 \times 14}{169 - 29} = 4 \Rightarrow ? = \sqrt{2}.$ Choice (C)

9. $12 - \left(\dfrac{3}{2}\times\dfrac{1}{4}\right)\times\dfrac{2}{7} + \dfrac{7}{2}\times\dfrac{1}{16}$

$= 12 - \dfrac{3}{28} + \dfrac{7}{32} = 12 + \dfrac{25}{224} = 12\dfrac{25}{224}.$ Choice (C)

10. $30.9 \times 3000 - 10.1 \times 1100 + 8298 - 4302 \simeq ? \times 1000$

$? \times 1000 = 31 \times 3000 - 10 \times 1100 + 8300 - 4300 = 85000$

$\Rightarrow ? = 85.$ Choice (D)

11. $13 + \dfrac{1}{26} \times 182 - 15 \times 2 = 13 + 7 - 30 = -10.$

Choice (A)

12. $421 \times 1 + 13000 + 10000 = 23500 = ? \times 100$

$\Rightarrow ? = 235.$ Choice (B)

13. $32.92 \times 3.5 + 6.41 \div 0.4 \simeq 33 \times 3.5 + 6.4 \div 0.4$

$\Rightarrow 115.5 + 16 \Rightarrow 131.5.$ Choice (C)

14. $? 32.01 \approx 32$ and $499.9 \approx 500$

$\Rightarrow ?$ % of $1200 = 32 \times 250 + 500 \times 38$

$\Rightarrow ? \times 12 = 500\ (16 + 38)$

$\Rightarrow ? \times 12 = 500 \times 54$

$\Rightarrow ? = \dfrac{500 \times 54}{12} = 2250.$ Choice (B)

15. $\dfrac{3.04}{8}\times\dfrac{2.01}{7}\times 90 \simeq \dfrac{3}{8}\times\dfrac{2}{7} \times 90 = \dfrac{270}{28} \approx 10.$

Choice (D)

16. 6% of $? + \dfrac{2}{7} \times 715 = 288$

$\Rightarrow \dfrac{6}{100} \times ? + 204 = 288 \quad \{\because 715 \approx 714\}$

$\Rightarrow \dfrac{6}{100} \times ? = 84 \Rightarrow ? = 1400.$ Choice (B)

17. 12.5% of $(752) = 1/8 \times 752 = 2 \times ?$

$\Rightarrow ? = 47.$ Choice (C)

18. $5 - [3/4 + \{2 - 1/42\}] = 2\dfrac{23}{84}.$ Choice (C)

19. $\dfrac{192\times 9\times\left(56^2 - 2^2\right)}{54\times 58} = ?^3 \Rightarrow \dfrac{192\times 9(54)\,(58)}{54\times 58} = \dfrac{1728}{(12)^3}$

$\Rightarrow ? = 12.$ Choice (B)

20. $3/4 \times 13/3 \times 5/2 - 100/7$

$= \dfrac{65\times 7 - 100\times 8}{56} = -345 / 56.$ Choice (C)

21. $? = \dfrac{11}{20}\times 260 + \dfrac{3}{4}\times 268 + 44$

$\therefore$? = 143 + 201 + 44 = 388. Choice (D)

22. $? = 24.4 + \frac{5.6}{1/20}$ i.e. 24.4 + 5.6 × 20 = 136.4. Choice (B)

23. ? =78 × 5 –24 × 2
$\Rightarrow$? = 390 – 48 $\Rightarrow$? = 342. Choice (B)

24. 38 × 50 + 10% of 1500 i.e. 1900 + 150 = 2050.
Choice (D)

25. 12.48% of 1140 – 19.83 × 2.99 $\simeq \frac{1}{8}$ × 1140 – 20 × 3
= 142.5 – 60 = 82.5. Choice (A)

26. $(16\frac{2}{3}\%$ of 602 + $33\frac{1}{3}\%$ of 480) ÷ $(\overline{12 + 12} \times 5)$
$\simeq \left(\frac{1}{6} \times 600 + \frac{1}{3} \times 480\right)$ ÷ (24 × 5) i.e. 260/125 $\simeq$ 2.
Choice (C)

27. (81 + 9 + 4) × 14.87 $\simeq$ 94 × 15 = 1410. Choice (B)

28. $? = 840 \div \overline{30\% \text{ of } 50 - \frac{10}{3}}$
$= 840 \div \overline{15 - \frac{10}{3}} = 840 \div \left(35/3\right) = 72$ Choice (A)

29. 0.003 × ? × 0.0003 = 0.000000271
$\Rightarrow$ 0.003 × ? × 0.0003 = 0.00000027
$\therefore$? = 0.3 . Choice (C)

30. $\frac{?}{100} = \left(\frac{17}{100} \times 400\right) - \left(\frac{40}{100} \times 160\right)$
$\Rightarrow$? [68 – 64] × 100
? = 400. Choice (C)

Speed Enhancement Test – 1

Solutions for questions 1 to 5:

1. The sum is 21464.

2. The sum is 24442.

3. By adding two digits (in tens digit and units digit) at a time, and then adding two digits 9thousand digit and hundreds digit) at a time, the sum of 3542 and 6843 is 10385. Now adding both the numbers, with negative sign, the sum of 7156 and 2188 is 9344.
10385 – 9344 = 1041.

4. The sum of the four positive numbers is 107257
107257 – 6543 = 100714

5. The sum of the three negative numbers is 8626 and 7849 – 8626 is –777.

Solutions for questions 6 to 10:

6. 84 × 126 = 126 × (80 + 4) = 126 (80) + 126 (4)
= 10080 + 504 = 10584

7. 644 × 72 = 644 × 8 × 9 = 5152 × (10 – 1)
= 51520 – 5152 = 46368

8. 981 × 922 = (1000 – 19) × (1000 – 8) = $(1000)^2$
– (19 +) 1000 + (–19) (–8) = 973152

9. $473^2 = (470 + 3)^2 = 470^2 + (2)\ (470)\ (3) + 3^2$
= 220900 + 2820 + 9 = 223729

10. $213 \times 148 = 213 \times \left(\frac{300}{2} - 2\right)$ = 31950 – 426 = 31524

Solutions for questions 11 to 15:

11. 114 = 38 × 3
190 = 38 × 5
As 38 divides 114 and 190 exactly, it is the HCF of 38, 114 and 190.
The LCM of 38, 144 and 190
= LCM (38, 38 × 3, 38 × 5) = 38 × LCM (1, 3, 5)
= 38 × 15 = 570

12. 26 = 2 × 13
44 = 2 × 22
64 = 2 × 32
HCF (26, 44, 64) = HCF (2 × 13, 2 × 22, 2 × 32)
= 2 × HCF (13, 22, 32) = 2.
LCM (26, 44, 64)
= LCM (2.13, 2.22, 2.32) = 2LCM (13, 22, 32)
= 2(13.11.32) = 9152

13. 70 = 14 × 5
112 = 14 × 8
168 = 14 × 12
HCF (70, 112, 168)
= HCF (14 × 5, 14 × 8, 14 × 12) = 14 × HCF (5, 8, 12) = 14
LCM (70, 112, 168)
= LCM (14 × 5, 14 × 8, 14 × 12) = 14 × LCM (5, 8, 12)
= 14 × LCM (5, LCM (8, 12))
= 14 × LCM (5, 24) = 14 × 120 = 1680

14. As 120 is divisible by 20 HCF (20, 120, 144)
= HCF (20, 144) = HCF (4 × 5, 4 × 36)
= 4 × HCF (5, 36) = 4
As 120 is divisible by 20, LCM (20, 120, 144)
= LCM (120, 144)
= LCM (24 × 5, 24 × 6)
= 24 × LCM (5, 6) = 24 × 30 = 720

15. HCF (280, 350, 490)
= HCF (70 × 4, 70 × 5, 70 × 7)
= 70 × HFC (4, 5, 7) = 70 × 1 = 70
LCM (280, 350, 490)
= LCM (70 × 4, 70 × 5, 70 × 7) = 70 × LCM (4, 5, 7)
When two or more numbers have an HCF of 1, their LCM is given by their product.
Hence, LCM (4, 5, 7) = 140.
LCM (280, 350, 490) = 70 × 140 = 9800

Solutions for questions 16 to 20:

16. 11% can be considered as 10% + 1%
$\therefore$10% of 341 = 34.1
1% of 341 = 3.41
$\therefore$11% of 34 = (34.1) + (3.4) = 37.51

17. 18% = 20% – 2%
20% of 83 = 16.6
–2% of 83 = 1.66
18% of 83 = (16.6) – (1.66) = 14.94

18. Let x% of 151 = 71
$x = \frac{71}{151} \times 100$
Since 71 and 151 or 100 and 151 do not have any common factors, 10% method has to be used.
151 is a three digit number and 71 is a two digit number 10% of 151 = 15.1
15.1 goes 4 times in 71
15.1 × 4 = 60.4
4 will be in the ten's place of the quotient.
71 – 60.4 = 10.6
1% of 151 = 1.51
1.51 goes in 10.67times
1.51 × 7 = 10.57
$\therefore$7 will be in the units place of the quotient
10.67 – 10.57 = 0.1
0.1% of 151 = 0.151
0.151 does not go in 0.1 even one times.
The answer is 47%.

19. $\frac{569}{1234}$ is the given fraction

10% of 1234 = 123.4
123.4 goes 4 times in 569
Therefore 4 will be in the ten's place of the quotient.
$569 - (4 \times 123.4) = 75.4$
1% of 1234 = 12.34
12.34 goes 6 times in 75.4
Therefore 6 will be in the units place of the quotient.
$(75.4) - (6 \times 12.34) = 1.36$
0.1% of 1234 = 1.234 1.234 goes 1 time in 1.36
Therefore 0.1 will be in the one-tenth's place of the quotient.
The required answer is 46.1%

20. 12.5% = 1/8

The required answer is $\frac{1}{8} \times 968 = 121$

Solutions for questions 21 to 25:

21. $\frac{14}{16} + \frac{18}{32} + \frac{31}{48}$

$= \frac{14}{16} + \frac{9}{16} + \frac{31}{48} = \frac{(14+9)\times 3 + 31}{48} = \frac{100}{48} = \frac{25}{12}$

22. $\frac{160 + 115 + 152}{190} = \frac{427}{190}$

23. $\frac{(7\times 21) + (11\times 14) + (23\times 6)}{(6\times 7\times 3\times 2)}$

$\frac{147 + 154 + 138}{252} = \frac{439}{252}$

24. $\frac{(8\times 35) + (12\times 14) + (17\times 10)}{13\times 2\times 5\times 7}$

$= \frac{280 + 168 + 170}{910} = \frac{618}{910} = \frac{309}{455}$

25. $\frac{(13\times 9) + (27\times 6) - (16\times 4)}{9\times 4\times 9} = \frac{117 + 162 - 64}{324} = \frac{215}{324}$

Speed Enhancement Test – 2

Solutions for questions 1 to 5:

1. Adding the last two digits of all the numbers, we have (84 + 95 + 75 – 45 – 46) = 163
Adding the remaining two digits of all the numbers, we have 33 + 72 + 82 – 68 – 53 = 66
∴ The required sum is (66 + 1)
i.e. 6763

2. 13880

3. 2841

4. 31576

5. 649

Solutions for questions 6 to 10:

By using the method of calculating the product of two 3-digit numbers, we can arrive at the answer quickly

6. 167832

7. 273064

8. 197209

9. 244647

10. 402822

Solutions for questions 11 to 15:

By using 10%, 1% concept we can calculate the percentage

11. 63 is 44.36% of 142

12. 85 is 35.42% of 240

13. 78 is 10.91% of 715

14. 69 is 11.33% of 609

15. 53 is 19.63% of 270

Solutions for questions 16 to 20:

16. Only $\frac{12}{21}$ is less than 0·6. All other fractions are greater than or equal to 0.6

17. All fractions except $\frac{42}{111}$ are greater than (0·4) or $\left(\frac{2}{5}\right)$.

18. $\frac{26}{48}$ is close to $\frac{1}{2}$, all other fractions are greater than $\frac{2}{3}$.
Answer is $\frac{26}{48}$

19. $\frac{95}{79}$ is less than $\frac{5}{4}$ and, all other fractions are greater than $\frac{5}{4}$.

20. Whenever there is a constant difference between the numerator and the denominator, then if all fractions are less than 1, then the fraction with the lowest numerator is the lowest
Ans is $\frac{14}{23}$

Solutions for questions 21 to 25:

21. 16 + 3(12 – 4) = 40. Choice (B)

22. 9 (8 – 20 ÷ 2 + 42) = 9 (8 – 10 + 42) = 360. Choice (D)

23. $\frac{1}{7}(48 - 6 + 112 - 7)) = \frac{1}{7}(147) = 21$. Choice (A)

24. $\frac{1}{6}(216) - 412 \div 4 = 36 - 103 = -67$. Choice (C)

25. $\frac{5}{6}(36) \times 5 - 707 + ? = -557$
? = 557 – 557 = 0 Choice (C)

Speed Enhancement Test – 3

Solutions for questions 1 to 5:

By using the rule for multiplying two 3 digit numbers we can say.

1. 266072

2. 45903

3. 215488

4. 56153

5. 450870

Solutions for questions 6 to 10:

6. 15.3% of 285 = 15% of 285 + 0.3% of 285
$= \frac{3}{20} \times 285 + 3 \times 0.285 = 42.75 + 0.855 = 43.605$

7. 26.78% of 896 = 14.28% of 896 + 12.5% of 896

$= \frac{1}{7} \times 896 + \frac{1}{8} \times 896 = 128 + 112 = 240$

8. 84.33% of 666 = 83.33% of 666 + 1% of 666

$= \frac{5}{6} \times 666 + 6.66 = 555 + 6.66 = 561.66 \cong 561.6$

9. 57.15% of 7280 = 57.14% of 7280 + 0.01% of 7280

$= \frac{4}{7} \times 7280 + 0.728 = 4160 + 0.728 = 4160.728$

10. 10% of 243 is 24.3
Now, 30 – 24.3 i.e. 5.7 is more than 2% of 243 i.e. 4.86.
∴ 5.7 – 4.86 = 0.84
0.84 is close to 0.35% of 243
∴ The required answer is 12.3%

Solutions for questions 11 to 13:

11. $\frac{15}{34} = \frac{1}{\frac{34}{15}} = \frac{1}{2+\frac{4}{15}}$

$\frac{16}{38} = \frac{2}{2+\frac{6}{16}}, \frac{17}{39} = \frac{1}{2+\frac{5}{17}}$

$\frac{40}{96} = \frac{1}{2+\frac{16}{40}}, \frac{25}{63} = \frac{1}{2+\frac{13}{25}}$

4/15 is the lowest among

$\frac{4}{15}, \frac{6}{16}, \frac{5}{17}, \frac{16}{40}, \frac{13}{25}$

∴ 15/34 is the highest

12. Only 19/72 is greater than 1/4 all the remaining are less than 1/4.

13. $\frac{91}{76} = 1+\frac{15}{76}, \frac{87}{70} = 1+\frac{17}{70}$

$\frac{63}{57} = 1+\frac{6}{57}, \frac{74}{69} = 1+\frac{5}{69}$

Clearly 17/70 is the highest.
∴ 87/70 is the highest.

Solutions for questions 14 and 15:

14. $\frac{27}{82} < \frac{1}{3}$

$\frac{28}{83} > \frac{1}{3}$

$\frac{37}{111} = \frac{1}{3}$

∴ $\frac{37}{111}$ is neither the highest nor the least.

15. $\frac{19}{78} = \frac{1}{4+\frac{2}{19}}$

$\frac{67}{277} = \frac{1}{4+\frac{9}{67}}$

$\frac{33}{134} = \frac{1}{4+\frac{2}{33}}$

9/67 > 2/19 > 2/33
∴ 19/78 is neither the highest nor the least.

Solutions for questions 16 to 20:

16. LCM = 2016, HCF = 24

17. LCM = 2142, HCF = 1

18. LCM = 62100, HCF = 3

19. LCM = 26520, HCF = 1

20. LCM = 1716, HCF = 2

Solutions for questions 21 to 25:

By using the rule of adding two digits at a time and adding all the positive terms first and then the negative terms and subtracting one from the other, we get the answer.

21. 672 + 893 + 5640 + 3753 = 10958
10958 – 1254 = 9704

22. 20778

23. 190820

24. 76174

25. 11445

Speed Enhancement Test – 4

Solutions for questions 1 to 5:

1. $16.002 \times 14.998 - 12.01 \times 4.980 = ?$
$= 16 \times 15 - 12 \times 5 = ? = 240 - 60 = 180.$ Choice (B)

2. $24.998 \div 5.001 + 3.98 \times 2.01$
$25 \div 5 + 4 \times 2 = 5 + 8 = 13.$ Choice (D)

3. $\sqrt{35.57} \times \sqrt{49.01} + 5.10 \times 3.9$
$\cong \sqrt{36} \times \sqrt{49} + 5 \times 4 = 6 \times 7 + 20 = 62$ Choice (C)

4. $213.98 \div 106.9 + 8.03 \div 3.97$
$\cong 214 \div 107 + 8 \div 4 \cong 2 + 2 = 4$ Choice (C)

5. $323.14 + 417.01 - 624.9$
$\cong 323 + 417 - 625 = 115$ Choice (A)

Solutions for questions 6 to 10:

6. LCM of denominators = 7 x 9 x 4 = 252
∴ The answer is $\frac{(7x21)+(9x9)+(3x14)}{252} = 270/252 = \frac{15}{14}$

7. $\frac{8}{36} + \frac{8}{48} + \frac{14}{27} = \frac{2}{9} + \frac{1}{6} + \frac{14}{27}$

LCM of denominators is 54 = $\frac{12+9+28}{54} = \frac{49}{54}$

8. LCM of denominators is 540

$\frac{7}{12} + \frac{5}{27} + \frac{4}{15} = \frac{315+100+144}{540}$

$= \frac{559}{540}$

9. Inversion and comparison of fractions, gives a clearer picture.

$\frac{17}{5} = 2+\frac{2}{5}, \frac{23}{7} = 3+\frac{2}{7}$

$\frac{29}{9} = 3+\frac{2}{9}, \frac{51}{14} = 3+\frac{9}{14}$

Clearly 9/14 is the highest.
∴ $\frac{14}{51}$ is the smallest

10. $\frac{67}{155}=\frac{1}{2.3}$

$\frac{39}{141}=\frac{1}{23.6}$

$\frac{71}{152}=\frac{1}{2.1}$

$\frac{83}{206}=\frac{1}{2.5}$

$\frac{47}{142}=\frac{1}{3}$

The descending order is $\frac{39}{141},\frac{47}{142},\frac{83}{206},\frac{67}{155},\frac{71}{152}$

Solutions for questions 11 to 15:

11. Adding the last two digits, we have
29 + 84 + 45 + 64 + 53 = 275
Adding the remaining digits, we get
87 + 71 + 33 + 47 + 52 = 290
∴ The required sum is 29275.

12. 25135

13. 22060

14. 6259

15. 256

Solutions for questions 16 to 20:

16. 19.81% of 2400
= 20% of 2400 – 0.2% of 2400 + 0.01% of 2400
= 480 – 4.8 + 0.25 = 475.44

17. 28% of 844 = 30% of 844 – 2% of 844
= 253.2 – 16.88 = 236.32

18. 4.44% of 1512 = $\frac{4}{90}\times 1512 = \frac{4\times 168}{10}$ = 67.2

19. 92.5% of 3364 = 67.5% of 3364 + 5% of 3364
= $\frac{7}{8}\times 3364+\frac{1}{20}\times 3364$ = 2943.5 + 168.2 = 3111.7

20. $\frac{1}{5}$ of 685 = 137
Now, 152 – 137 i.e. 15 is more than 2% of 685 which is 13.7. The difference between 15 and 13.7 i.e. 1.3 is almost 0.2% of 685.
Hence the required answer is 22.2%

Solutions for questions 21 to 25:

By using the method of multiplying two 3 digit numbers. We get the following solutions for 11-15

21. 217728

22. 496422

23. 58283

24. 104218

25. 237307

Speed Enhancement Test – 5

Solutions for questions 1 to 5:

1. $56^2/_3$% can be calculated as ($66^2/_3$ – 10)% of 720
$66^2/_3$% of 720 = 2/3 x 720 = 480
10% of 720 = 72
480 – 72 = 408.

2. 57.5% of 350 = (62.5% – 5%) of 350 = 201.25

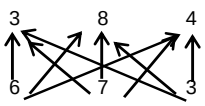
3. 98.5% of 775 = 775 – (1.5% of 775) = 763.375

4. 90.66% of 840 = (92.66 – 2)% of 840 = 761.54

5. 34.33% of 570 = (33.33 + 1)% of 570 = 195.68

Solutions for questions 6 to 10:

6. 384 × 673 :



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18 + (21 + 48 i.e. 69) + (9 + 56 + 24 i.e. 89) + (24 + 28 i.e. 52) + (12)
∴ The required product is 258432.

7. $175 \times 425 = (300 - 125)(300 + 125)$
$= 90000 - 15625 = 74375$

8. $513 \times 1008 = 513 \times (1000 + 8)$
$513000 + 4104 = 517104$

9. 352504

10. $666 \times 777 = 6 \times 7 \times 111 \times 111 = 42 \times 12321 = 517482$

Solutions for questions 11 to 15:

11. $\frac{19}{35} = \frac{1}{1.84}$
$\frac{21}{39} = \frac{1}{1.85}$
$\frac{23}{45} = \frac{1}{1.96}$
$\frac{25}{51} = \frac{1}{2.04}$
$\therefore$ The order is $\frac{25}{51} < \frac{23}{45} < \frac{21}{39} < \frac{19}{35}$.

12. $\frac{56}{47} = 1.19 \Rightarrow \frac{47}{56} = \frac{1}{1.19}$
$\frac{82}{73} = 1.12 \Rightarrow \frac{73}{82} = \frac{1}{1.12}$
$\frac{76}{65} = 1.16 \Rightarrow \frac{65}{76} = \frac{1}{1.16}$
$\frac{92}{81} = 1.13 \Rightarrow \frac{65}{92} = \frac{1}{1.13}$
$\therefore \frac{73}{82} > \frac{81}{92} > \frac{65}{76} > \frac{47}{56}$

13. $x = \frac{612 \times 181}{353} = \left(\frac{353 + 259}{353}\right)181 = \left(1 + \frac{259}{353}\right)181$
$\simeq (1 + 0.7337)$ 181 = 181 + 132.80 = 313.8.

14. The fractions to be arranged in ascending order are $\frac{34}{55}, \frac{41}{66}, \frac{48}{77}$
The denominator of $\frac{48}{77}$ is 1·4 times the denominator of $\frac{34}{55}$
(34) (1·4) = 47.6 which is less than 48
Hence $\frac{34}{55} < \frac{48}{77}$
When there are two fractions $\frac{a}{b}$ and $\frac{c}{d}$, then $\frac{a+c}{b+d}$ always lies between those two.
Hence $\frac{34 + 48}{55 + 77} = \frac{41}{66}$
Always lies between $\frac{48}{77}$ and $\frac{34}{55}$
Hence. $\frac{48}{77} > \frac{41}{66} > \frac{34}{55}$

15. Whenever two or more fractions have the difference between their numerators and denominators equal, the largest fractions will be that with the greatest denominator
Hence $\frac{40}{79} < \frac{42}{81}$ and $\frac{41}{80} < \frac{43}{82}$
Applying the concept given in the note in the previous solutions,
$\frac{40}{79} < \frac{41}{80} < \frac{42}{81}$ and $\frac{41}{80} < \frac{42}{80} < \frac{43}{82}$
Hence $\frac{40}{79} < \frac{41}{80} < \frac{42}{81} < \frac{43}{82}$

Solutions for questions 16 to 20:

16. Adding the last two digits of all the numbers, we have
$84 + 26 + 23 - 65 + 66 = 134$
Adding the remaining digits, we have
$15 + 19 + 23 - 45 + 6 = 18$
$\therefore$ The required sum is 1934

17. 7429

18. 91852

19. 3106

20. $6852 + 9634 + 5762 + 4358 - 7243$
$= 6800 + 52 + 9600 + 34 + 5100 + 62 + 4300 + 58 - 7200 - 43$
$= (6800 + 9600 + 5700 + 4300 - 7200) + (52 + 34 + 62 + 58 - 43)$
$= 19200 + 163 = 19363$

Solutions for questions 21 to 25:

21. $32 = 2^5$, $42 = 2 \times 3 \times 7$
$72 = 2^3 \times 3^2$
HCF = 2
LCM = $2^5 \times 3^2 \times 7 = 2016$

22. $36 = 2^2 \times 3^2$, $54 = 3^3 \times 2$
$81 = 3^4$
HCF = 3^2
LCM = $3^4 \times 2^2 = 324$

23. $48 = 2^4 \times 3$, $63 = 3^2 \times 7$
$99 = 3^2 \times 11$
HCF = 3
LCM = $2^4 \times 3^2 \times 7 \times 11 = 11088$

24. $77 = 11 \times 7$, $187 = 11 \times 17$
$110 = 11 \times 2 \times 5$
HCF = 11
LCM = $11 \times 7 \times 2 \times 5 \times 17 = 13090$

25. $18 = 3^2 \times 2$, $48 = 3 \times 2^4$
$72 = 3^2 \times 2^3$
HCF = $3 \times 2 = 6$
LCM = $3^2 \times 2^4 = 144$

Speed Enhancement Test – 6

Solutions for questions 1 to 5:

By the method of multiplying two 3 digit number, we get the answer.

1. 53013

2. 453438

3. 710249

4. 342 x 631 = 215802
621 x 334 = 207414

8388
---

5. 213 x 414 = 88182
316 x 203 = 64148

24034

Solutions for questions 6 to 10:

By using the principle of adding two digits at a time, we get.

6. 17340

7. 27280

8. 3141

9. 37803

10. 57099

Solutions for questions 11 to 15:

11. 80% of 1578 = 946.8
5% of 1578 = 78.98
0.4% of 1578 = 6.31
65.4% of 1578 = 1032.012

12. 20% of 841 = 168.2
1% of 841 = 8.41
0.8% of 841 = 6.73
21.8% of 841 = 183.34

13. 48.8% – 50% – 12%
50% of 1247 = 623.50
Less 1% of 1247 = 12.47
611.03
Less 0.2% of 1247 = 2.49
48.8% of 1247 = 608.54.

14. Required to find $\frac{463}{1134}\times 100$
40% of 1134 = 453.6
463 – 453.6 = 9.4
0.1% of 1134 = 1.134
0.8% of 1134 = 9.072
The answer is 40.8%.

15. 100%of 384 = 384.0
40% of 384 = 153.6
6% of 384 = 23.04
146% of 384 = 560.64
The answer is 146%.

Solutions for questions 16 to 20:

16. By observation $\frac{5}{9}$ is the least as it is 0.55.

As $\frac{73}{85}\cong\frac{13}{15}$, but not exactly equal to $\frac{13}{15}$, it is less than $\frac{13}{15}$.

Out of $\frac{13}{15}$, $\frac{8}{9}$ i.e. $\frac{16}{18}$ and $\frac{17}{19}$

As the difference between numerator and denominator is same, $\frac{13}{15}$ is the smallest, $\frac{8}{9}>\frac{13}{15}$ and $\frac{17}{19}>\frac{8}{9}$

$\therefore$ The ascending order is $\frac{5}{9},\frac{73}{85},\frac{13}{15},\frac{8}{9},\frac{17}{19}$,

17. $\frac{9}{7}\cong 1+\frac{2}{7}$ i.e. 1.28

$\frac{13}{11}\cong 1+\frac{2}{11}$ i.e. 1.18

$\frac{23}{21}\cong 1+\frac{2}{21}$ i.e. 1.09

$\frac{49}{45}\cong 1+\frac{4}{45}$ i.e. 1.08

$\frac{89}{85}\cong 1+\frac{4}{85}$ i.e. 1.04

$\therefore\ \frac{9}{7}>\frac{13}{11}>\frac{23}{21}>\frac{49}{45}>\frac{89}{85}$

18. $\frac{9}{7}\cong\frac{47}{141}$ i.e. $\frac{1}{3}$

$\therefore \frac{47}{140}=\frac{x}{237}\implies\frac{1}{3}\simeq\frac{x}{237}$

$\therefore$ x = 79.6

19. $\frac{21}{36}+\frac{2}{3}-\frac{25}{48}$

i.e. $\frac{7}{12}+\frac{2}{3}-\frac{25}{48}=\frac{28+32-25}{48}=\frac{35}{48}$

20. $\frac{323}{675}-\frac{37}{75}+\frac{118}{225}=\frac{323-333+354}{675}=\frac{344}{675}$

Solutions for questions 21 to 25:

21. Whenever two numbers have opposite parity their HCF is 1.
Hence HCF (77, 182) = 1.
Therefore, HCF (77, 182, 286) = HCF (77, 182), 286) = 1
77 = 7 x 11
182 = 2 x 91 = 2 x 7 x 13
286 = 2 x 143 = 2 x 11 x 13
LCM (77,182,286) = 2 x 7 x 11 x 13 = 2 (1001) = 2002

22. 208 = 8 x 26
312 = 8 x 39
416 = 8 x 52
HCF (208, 312, 416)
= HCF (8 x 26, 8 x 39, 8 x 52)
= 8 x HCF (26, 39, 52)
= (8) x (13) = 104
LCM (204, 312, 416) = LCM (8 x 26, 8 x 39, 8 x 52)
= LCM (8 x 2 x 13, 8 x 3 x 13, 8 x 4 x 13)
= 8 x 13 x LCM (2, 3, 4) = 104 (12) = 1248.

23. 408 = 8 x 51
204 = 4 x 51
816 = 8 x 102 = 16 x 51
HCF (408, 204, 816)
= HCF (8 x 51, 4 x 51, 16 x 51)
= 51 x HCF (8, 4, 16) = 51 x (4) = 204
LCM (408, 204 816)
= LCM (8 x 51, 4 x 51, 16 x 51)
= 51 x LCM (8, 4, 16) = 51 (16) = 816

24. 506 = 2 x 253
759 = 3 x 253
HCF (253, 506, 759) = 253
LCM (253, 506, 759)
= LCM (253, 253 (2) 253 (3)) = 253
LCM (1, 2, 3) = 253 (6) = 1518

25. HCF $\left(\frac{306}{23},\frac{187}{2},\frac{198}{31}\right)=\frac{\text{HCF}(306,187,198)}{\text{LCM}(23,20,31)}$

As two numbers of opposite parity have a HCF of 1,
HCF (306,187) = 1
Hence HCF ((306, 187), 198) = 1
HCF of the given fractions

$=\frac{1}{\text{LCM (the prime numbers given)}}$.

As LCM (prime numbers) would always be their product, HCF of given fractions

$=\frac{1}{(23)(2)(31)}=\frac{1}{1426}$ LCM of given fractions

$=\frac{\text{LCM}(306,187,198)}{\text{HCF}(23,2,31)}=\frac{\text{LCM}(6\text{x}3\text{x}17,17\text{x}11,6\text{x}3\text{x}11)}{1}$

$=\frac{6\text{x}3\text{x}11\text{x}17}{1}=\frac{6\text{x}33\text{x}17}{1}$

= 198 x 17 = 198 (20 – 3) = 3366.

Speed Enhancement Test – 7

Solutions for questions 1 to 5:

By the concept of ten percent and one percent we can find the percentage values.

1. 630 is 86.42% of 729

2. 242 is 27.5% of 880

3. 81 is 14.75% of 549

4. 156 is 23.08% of 676

5. 562 is 56.26% of 999

Solutions for questions 6 to 10:

By using the method of multiplying two 3-digit numbers, we get.

6. 78474

7. 150381

8. 497652

9. 41376

10. 12992

Solutions for questions 11 to 15:

By adding two digits at a time additions can be done faster.

11. 16982

12. 13887

13. 26219

14. 58191

15. 50397

Solutions for questions 16 to 20:

16. $\frac{73}{96}+\frac{17}{24}-\frac{31}{36}=\frac{219+204-248}{288}=\frac{175}{288}$

17. $\frac{13}{85}-\frac{19}{51}+\frac{21}{34}=\frac{78-190+315}{510}=\frac{203}{510}$

18. $\frac{21}{10}$ = 2.1 l

$\frac{31}{15}$ = 2.06

$\frac{41}{20}$ = 2.05

$\frac{81}{40}$ = 2.025

$\frac{61}{30}$ = 2.03

$\therefore \frac{81}{40}<\frac{61}{30}<\frac{41}{20}<\frac{31}{15}<\frac{21}{10}$

19. $\frac{101}{186}=\frac{1}{1.84}$

$\frac{7}{147}=\frac{1}{2}$

$\frac{19}{27}=\frac{1}{1.4}$

$\frac{43}{67}=\frac{1}{1.5}$

$\frac{39}{53}=\frac{1}{1.3}$

The descending order is $\frac{39}{53},\frac{19}{27},\frac{43}{67},\frac{101}{186},\frac{71}{147}$

20. The numerators of the fractions $\frac{31}{73}$ and $\frac{67}{91}$ are 31 and 67

$\frac{67}{31}>2$

The denominators are 73 and 91

$\frac{91}{73}<2$

Since the numerator $\frac{67}{91}$ is more than twice the numerator in $\frac{31}{73}$. But the denominator is $\frac{67}{91}$, less than twice the denominator of $\frac{31}{73}$

$\frac{67}{91}>\frac{31}{73}$

(b) $\frac{131}{348}>\frac{1}{3}$

$\frac{159}{528}<\frac{1}{3} \Rightarrow \frac{131}{348}>\frac{159}{528}$

Solutions for questions 21 to 25:

21. $\frac{5}{10}+\frac{7}{28}+\frac{8}{12}-\frac{6}{18}$

$=\frac{1}{2}+\frac{1}{4}+\frac{2}{3}-\frac{1}{3}=\frac{3}{4}+\frac{1}{3}=\frac{9+4}{12}=\frac{13}{2}=1.083.$

Choice (C)

22. $\frac{3^2\times2^4+5\times3\times16}{24}=\frac{16[9+15]}{24}=16.$ Choice (D)

23. 843.25 + ? – 243.75 = 436.50 + 624.25
$\Rightarrow$? = 452.25. Choice (A)

24. 2187 – 3142 + 4286 – 3265 = 66. Choice (B)

25. 2346 + 5421 + 7289 + 6453 – 2321 = 19188.
Choice (D)

Speed Enhancement Test – 8

Solutions for questions 1 to 5:

1. $249\times261=249\times(251+10)=249\times251+249\times10$
$(250-1)(200+1)+2490$
$62500-1+2490=64989$

2. $1421\times179=(1250+171)\times179$
$1250\times179+171\times179$
$\frac{5000}{4}\times179+(175^2-4^2)$
$(5000\times44.75)+(30625-16)$
$(50\times4475)+(30609)$
$223750+30609=254359$

3. By using the method of multiplying two three digit numbers the product is 269114.

4. $8\times111\times5\times111=(8\times5)(111\times111)$
$=40\,(12321)=492840$

5. $347\times373=(360-13)(360+13)$
$=(360)^2-(13)^2=129600-169=129431$

Solutions for questions 6 to 10:

6. 10% of 3564 = 356.4
40% of 3564 = 1425.6
4% of 3564 = 142.56
$\therefore$44% of 3564 = 1568.16

7. $76^2/_3$% of 786
$66^2/_3$% of 786 + 10% of 786
$=\frac{2}{3}\times786+78.6$
$=524+78.6=602.6$

8. 67% of 387 = $66\frac{2}{3}$% of 387 + $\frac{1}{3}$% of 387

$= \frac{2}{3} \times 387 + \frac{1}{300} \times 387 = 258 + 1.29 = 259.29$

9. 27% = 30% – 3%
$\therefore$ 30% of 834 = 250.2
3% of 834 = 25.02
27% of 834 = 225.18

10. 20% of $\frac{25}{79} = \frac{1}{5} \times \frac{25}{79} = \frac{5}{79} = 0.063$

Solutions for questions 11 to 15:

11. $\frac{8}{31} \cong \frac{1}{3.88}$

$\frac{9}{40} \cong \frac{1}{4.4}$

$\frac{23}{100} \cong \frac{1}{4.3}$

$\frac{57}{160} \cong \frac{1}{2.8}$

$\frac{9}{40} < \frac{23}{100} < \frac{8}{31} < \frac{57}{160}$

12. $\frac{9}{32} \cong \frac{1}{3.5}$

$\frac{10}{41} \cong \frac{1}{4.1}$

$\frac{24}{101} \cong \frac{1}{4.2}$

$\frac{58}{161} \cong \frac{1}{2.7}$

$\therefore \frac{58}{161} > \frac{9}{32} > \frac{10}{41} > \frac{24}{101}$

13. $\frac{17}{90} + \frac{8}{45} - \frac{2}{135}$

$= \frac{51 + 48 - 4}{270} = \frac{95}{270} = \frac{19}{54}$

14. The LCM is 48

$\frac{13}{24} + \frac{7}{16} + \frac{1}{8} + \frac{11}{48} + \frac{3}{4}$

$\frac{26 + 21 + 6 + 11 + 36}{48}$

$= \frac{100}{48} = 2^{1}/_{12}$

15. $\frac{12}{131} = \frac{1}{11}$

$\frac{15}{173} = \frac{1}{11.5}$

$\frac{11}{127} = \frac{1}{11.1}$

$\frac{17}{203} = \frac{1}{11.9}$

$\frac{19}{238} = \frac{1}{12.5}$

The descending order of the fractions is

$\frac{12}{131}, \frac{11}{127}, \frac{15}{173}, \frac{17}{203}$ and $\frac{19}{238}$

Solutions for questions 16 to 20:

16. HCF (260, 65, 195)
= HCF (65 x 4, 65, 65 x 3)
= 65 $\times$ HCF (4, 1, 3) = 65 x (1) = 65
LCM (260, 65, 195) = 65 x LCM (4, 1, 3)
= 65 x 12 = 780

17. HCF (238, 357,187)
= HCF (17 x 14, 17 x 21, 17 x 11)
= 17 x HCF (14, 21, 11) = 17 x 1 = 17
LCM (238, 357,187)
= 17 x LCM (14, 21, 11)
= 17 x LCM (LCM (14, 21) 11)
= 17 x 42 x 11 = 462 x 17 = 7854.

18. HCF $\left(\frac{665}{138}, \frac{399}{253}, \frac{532}{299}\right)$

$= \frac{\text{H.C.F}(665, 399, 532)}{\text{L.C.M}(138, 253, 299)}$

$= \frac{\text{H.C.F}(35 \text{ x } 19, 21 \text{ x } 19, 28 \text{ x } 19)}{\text{L.C.M}(6 \text{ x } 23, 11 \text{ x } 23, 13 \text{ x } 23)}$

$= \frac{19 \text{ x H.C.F}(35, 21, 28)}{23 \text{ x L.C.M}(6, 11, 13)} = \frac{19 \text{ x } 7}{23 \text{ x } 2 \text{ x } 3 \text{ x } 11 \text{ x } 13}$

LCM $\left(\frac{665}{138}, \frac{399}{253}, \frac{253}{299}\right)$

$= \frac{19 \text{ x L.C.M}(35, 21, 28)}{23 \text{ x H.C.F}(6, 11, 13)} = \frac{19 \times 7 \times 5 \times 3 \times 2^2}{23}$

19. HCF (58, 69, 174)
= HCF (58, 69, 174) = 1
LCM (58, 69, 174)
= LCM (LCM (58, 174), 69)
= LCM (174, 69)

$= \frac{174 \times 69}{\text{HCF}(174, 69)} = \frac{174 \times 69}{\text{HCF}(3 \times 58, 3 \times 23)}$

$= \frac{174 \times 69}{3} = 58 \times (70 - 1) = 4002$

20. HCF (186, 279, 372) = HCF (31 $\times$ 6, 31 $\times$ 9, 31 $\times$ 12)
= 31 $\times$ HCF (6, 9, 12) = 31 $\times$ 3 = 93
LCM (186, 279, 372) = LCM (31 $\times$ 6, 31 $\times$ 9, 31 $\times$ 12)
= 31 $\times$ 36 = 1116.

Solutions for questions 21 to 25:

21. 22543

22. 59785

23. 5517

24. 57933

25. 7765

Speed Enhancement Test – 9

Solutions for questions 1 to 5:

1. $\frac{4}{35} + \frac{2}{15} - \frac{8}{105}$

$= \frac{12 + 14 - 8}{105} = \frac{18}{105} = \frac{6}{35}$

2. $\frac{5}{144} - \frac{7}{288} + \frac{1}{48}$

$= \frac{10 - 7 + 6}{288} = \frac{9}{288} = \frac{1}{32}$

3. $x = \frac{452 \times 685}{323}$

$\cong 1.4 \times 685 = 959$

4. $\frac{8}{21} \cong \frac{1}{2.5}$; $\frac{11}{32} \cong \frac{1}{2.90}$

$\frac{17}{48} \cong \frac{1}{2.82}$; $\frac{19}{58} \cong \frac{1}{3.05}$

$\frac{22}{65} \cong \frac{1}{2.95}$

$\therefore \frac{19}{58} < \frac{22}{65} < \frac{11}{32} < \frac{17}{48} < \frac{8}{21}$

5. $\frac{28}{19} \cong 1.47$; $\frac{43}{22} \cong 1.95$

$\frac{87}{43} \cong 2.02$; $\frac{18}{11} \cong 1.63$

$\frac{120}{67} \cong 1.79$

$\therefore$ The required order is

$\frac{87}{43} > \frac{43}{22} > \frac{120}{67} > \frac{18}{11} > \frac{28}{19}$

Solutions for questions 6 to 10:

By using the principle of adding two digits at a time, additions can be calculated faster.

6. 29057

7. 553

8. 13779

9. 47657

10. 22055

Solutions for questions 11 to 15:

By method of multiplication of two 3-digit numbers, we get the answers.

11. 144456

12. 372586

13. 370818

14. 122301

15. 7998

Solutions for questions 16 to 20:

16. 41·66% of 372 = (401 + 1.66%) of 3.72

$= \frac{5}{12} \times 372 = 155$

17. 63·52% of 888 = (60% + 3.52%) of 888 = 564·05

18. 24·91% of 780 = (25 – 0·09)% of 780

$= \left(\frac{1}{4} - \frac{0 \cdot 09}{100}\right) 780 = 194 \cdot 29$

19. 77·20 of 531

$= (75 + 2 + 0 \cdot 2) \times \frac{531}{100} = 409 \cdot 93$

20. 81% of 777 = $(80 + 1) \times \frac{777}{100} = 629 \cdot 37$

Solutions for questions 21 to 25:

21. $\left(27 \div [4 \text{ of } 5 - \overline{16-4} + 2 \times 4 - 7]\right) \div$

$36 + 3[17 - \{32 - \overline{34-6}\} - 2(5 + 6) - 2]$

$= (27 \div [20 - 12 + 8 - 7] = 27 \div 9) \div (36 + 3[17 - \{32 - 28\} - 22 - 2]) = 3 \div 3 = 1.$ Choice (C)

22. $18 \div 3$ of $6 - 321 + 8 \times 40 = 18 \div 18 - 321 + 320$ is zero.
Hence, the answer is zero. Choice (B)

23. $\left(60^2 - 54 \times 33\right) + \left(6^2 + 27 \times 66\right)$

$= \left((33 + 27)^2 - 2 \times 27 \times 33\right) + \left((33 - 27)^2 + 2 \times 27 \times 33\right)$

$= 1818 + 1818 = 3636.$ Choice (C)

24. $\left[\frac{(33+27)^2 + (33-27)^2}{2}\right] \div 303 = 6.$ Choice (D)

25. The given expression is of the form

$= \frac{a^3 + b^3 + c^3 - 3abc}{a^2 + b^2 + c^2 - ab - bc - ca}$

(Where a = 16.5, b = 17.5 and c = 18.5) which equals a + b + c. Hence the given expression equals 52.5.
Choice (B)

Speed Enhancement Test – 10

Solutions for questions 1 to 5:

1. 20% of 792 is 158.4
Now, 165 – 158.4 i.e. 6.6 is less than 1% of 792. and 6.6 is 0.83% of 792.
$\therefore$ The required answer is 20.83%

2. 87% of 4564 = 75% of 4564 + 10% of 4564 + 2% of 4564
= 3423 + 456.4 + 91.28 = 3970.68

3. 38.38% of 990 = 11.11% of 990 + 27.275 of 990

$= \frac{1}{9} \times 990 = \frac{3}{11} \times 990 = 110 + 270 = 380$

4. 44% of 32.96 = 50% of 32.96 – 5% of 32.96 – 1% of 32.96
= 16.48 – 1.648 – 0.3296 = 14.5024

5. 10% of 708 = 70.8
78 – 70.8 = 7.2
7.2 ≅ 1.0% of 708
72 = 11.0% of 708

Solutions for questions 6 to 10:

6. $30 = 2^1 \times 3^1 \times 5^1$
$160 = 2^5 \times 5^1$
$75 = 3^1 \times 5^2$
$LCM = 2^5 \times 3^1 \times 5^2 = 2400$
$HCF = 5^1 = 5$ (As it the only common power)

7. LCM = 5940 and HCF = 1

8. LCM = 4032 and HCF = 4

9. LCM = 3315 and HCF = 1

10. LCM = 10800 and HCF = 2

Solutions for questions 10 to 15:

11. LCM of denominators
$72 = 2^3 \times 3^2$, $27 = 3^3$, $144 = 2^4 \times 3^2$
$LCM = 2^4 \times 3^3 = 432$

$\therefore$ Total = $\frac{(11x6) + (4x2^4) + (5x3)}{2^4 \times 3^3} = 145/432$

12. $\frac{(7x10)+(4x8)-(13x3)}{360}$ = 63/360

$= \frac{7}{40}$

13. $\frac{4}{15}+\frac{3}{5}-\frac{1}{3}=\frac{4+9-5}{15}=\frac{8}{15}$

14. Inverting the fractions, we can observe

$\frac{34}{9}=4-\frac{2}{9},\frac{38}{10}=4-\frac{2}{10}$

$\frac{42}{11}=4-\frac{2}{11},\frac{48}{13}=4-\frac{4}{13}$

$\frac{48}{13}<\frac{34}{9}<\frac{38}{10}<\frac{42}{11}$

$\frac{11}{42}<\frac{10}{38}<\frac{9}{34}<\frac{13}{48}$

c < b < a < d

15. $\frac{88}{31}$ = 2.8

$\frac{113}{48}$ = 2.56

$\frac{97}{40}$ = 2.4

$\frac{263}{112}$ = 2.34

$\therefore$ $\frac{263}{112}$ is the smallest.

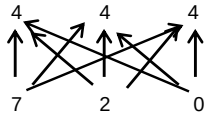
Solutions for questions 16 to 20:

16. $1004 \times 972 = (1000 + 4) \times 972$
= 972000 + 3888 = 975888

17. $496 \times 375 = \frac{496 \times 1500}{4}$
= 124(1000 + 500) = 124000 + 62000 = 186000

18. $1828 \times 59 = 1828 (50 + 10 – 1)$
= 91400 + 18280 – 1828 = 107852

19. 444×720 :



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28 + (8 + 28 i.e. 36) + (0 + 8 + 28 i.e. 36) + (0 + 8 i.e. 8) + 0
$\therefore$ The required product is 319680.

20. $1123 \times 43 = 1123 (50 – 5 – 2)$
= 56150 – 5615 – 2246 = 48289

Solutions for questions 21 to 25:

21. Adding the last two digits, we have
44 + 69 – 82 – 64 = –33
Adding the remaining digits, we have 8 + 5 – 2 – 4 = 7
$\therefore$ The required sum is 700 – 33 i.e. 667.

22. 9454

23. 502933

24. 2482

25. 11137

Speed Enhancement Test – 11

Solutions for questions 1 to 5:

1. Adding the last two digits of all the numbers, we have
92 + 34 + 45 – 63 + 23 = 131
Adding the remaining digits, we have
85 + 68 + 38 – 72 + 27 = 146
$\therefore$ The required sum is 14731

2. –607.7

3. 21462

4. – 3605.33

5. 6827

Solutions for questions 6 to 10:

6. LCM = 480 and HCF = 4

7. LCM = 12600 and HCF = 3

8. LCM = 420 and HCF = 7

9. LCM = 396 and HCF = 1

10. LCM = 540 and HCF = 9

Solutions for questions 11 to 15:

11. Considering reciprocals of the given fractions, we have the following.

$\frac{85}{38}=2+\frac{9}{38};\frac{92}{41}=2+\frac{10}{41}$

$\frac{57}{23}=2+\frac{11}{23};\frac{97}{47}=2+\frac{3}{47}$

$\frac{71}{36}=1+\frac{35}{36}$

As $\frac{71}{36}$ < 2, it is the smallest and of the remaining,

As $\frac{11}{23}$ is the greatest of $\frac{9}{38},\frac{10}{41},\frac{11}{23}$ and $\frac{3}{47},\frac{57}{23}$ is the greatest.

Hence $\frac{23}{57}$ is the smallest.

12. Consider the fractions in the following way:

$\frac{16}{53} \cong \frac{1}{3.3}$; $\frac{230}{427} \cong \frac{1}{1.8}$

$\frac{78}{163} \cong \frac{1}{2.08}$; $\frac{49}{101} \cong \frac{1}{2.06}$

$\frac{93}{222} \cong \frac{1}{2.3}$

$\therefore \frac{230}{427}>\frac{78}{163}>\frac{49}{101}>\frac{93}{222}>\frac{16}{53}$.

13. x = $\frac{260 \times 162}{87}=\frac{260 \times 54}{29}$ = 484.13

14. $\frac{25}{104}+\frac{17}{156}-\frac{43}{624}=\frac{150+68-43}{624}=\frac{175}{624}$

15. $\frac{23}{72} \cong \frac{1}{3.13}$; $\frac{36}{103} \cong \frac{1}{2.86}$

$\frac{55}{168} \cong \frac{1}{3.05}$; $\frac{84}{225} \cong \frac{1}{2.67}$

$\frac{5}{18} \cong \frac{1}{3.6}$

$\frac{84}{225}>\frac{36}{103}>\frac{55}{168}>\frac{23}{72}>\frac{5}{18}$

Solutions for questions 16 to 20:

16. 33% of 784 = 30% of 784 + 3% of 784
= 235.2 + 23.52 = 258.72

17. 3.57% of 560 = $\frac{14.25\% \text{ of } 560}{4} = \frac{\frac{1}{7}\times 560}{4} = 20$

18. 54.16% of 480 = 41.66% of 480 + 12.5% of 480
$= \frac{5}{12}\times 480 + \frac{1}{8}\times 480$
= 200 + 60 = 260

19. 85% of 16 = 80% of 16 + 5% of 16
$= \frac{4}{5}\times 16 + \frac{1}{20}\times 16 = \frac{4}{5}\times 17 = 13.6$

20. 20% of 320 = 64
5 i.e. 69 – 64 is 1.56% of 320
∴ The required answer is 21.56%

Solutions for questions 21 to 25:

21. $325 \times 425 = 325 \times (325 + 100)$
$= (325)^2 + 32500$
= 105625 + 32500 = 138125

22. $645 \times 15 = 645\ (10 + 5)$
6450 + 3225 = 9675

23. $625 \times 375 = (500 + 125)(500 - 125)$
$= (500)^2 - (125)^2$
= 250000 – 15625
= 234375

24. 984×988

1000	–16
1000	–12

1000000 – 160002 – 12000 + 192 = 972192

25. 152×153 :

150	2
150	3

22500 + 300 + 450 + 6 = 23256

Speed Enhancement Test – 12

Solutions for questions 1 to 5:

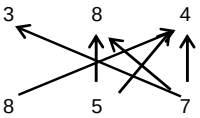
1. $480 \times 620 = (550 - 70)(550 + 70) = 550^2 - 70^2$
= 302500 – 4900 = 297600.

2. $144 \times 1728 = 1728 \times (200 - 50 - 6)$
34560 – 86400 – 10368 = 248832

3. $93 \times 97 = 93 \times (100 - 3)$
= 9300 – 279 = 9021

4. $135 \times 490 = 135 \times (500 - 10)$
= 67500 – 1350 = 66150

5. 384×857



+ (21 + 40 + 32 i.e. 93) + (20 + 56 i.e. 76) + (28)
i.e. 9(37) + (6 + 2) + 8
∴The required thousand's digit is 9 + 0 i.e.9

Solutions for questions 6 to 10:

6. $58\frac{1}{3}\%$ of 1926
$= \frac{7}{12} \times 1926 = 1123.5$

7. 40.08% of 2400 = 40% of 2400 + 0.08% of 2400
$\Rightarrow \frac{2}{5} \times 2400 + \frac{4}{5}\times\frac{1}{1000} \times 2400$
$\Rightarrow$ 960 + 1.92 = 961.92

8. $4\frac{1}{2}\%$ of 856 = 5% of 856 $-\frac{1}{2}\%$ of 856
$= \frac{10\% \text{ of } 856}{2} - \frac{1\% \text{ of } 856}{2}$
= 42.8 – 4.28 = 38.52

9. $\frac{48}{104} = \frac{6}{13} \cong 46.15$

10. $\frac{128}{1850} = \frac{64}{925} = 6.9\%$

Solutions for questions 11 to 15:

11. $\frac{11}{23} \cong \frac{1}{2.09}$; $\frac{17}{40} \cong \frac{1}{2.35}$
$\frac{21}{62} \cong \frac{1}{2.95}$; $\frac{39}{125} \cong \frac{1}{3.2}$
$\frac{25}{92} \cong \frac{1}{3.68}$
∴ $\frac{11}{23}$ is the greatest and $\frac{25}{92}$ is the smallest.
∴ $\frac{11}{23} - \frac{25}{92} = \frac{19}{92}$

12. $\frac{3}{249} + \frac{17}{166} - \frac{4}{83}$
$= \frac{1}{83} + \frac{17}{166} - \frac{4}{83}$ i.e. $\frac{17}{166} - \frac{3}{83} = \frac{17-6}{166} = \frac{11}{166}$

13. $\frac{4}{95} + \frac{5}{76} - \frac{7}{114}$
$\frac{48+75-70}{1140} = \frac{53}{1140}$

14. $x = \frac{837 \times 91}{67}$
$\cong 12.5 \times 91 = 1137$

15. $\frac{421}{300}$

Solutions for questions 16 to 20:

16. Adding the last two digits of all the numbers, we have, 47 + 52 + 63 + 85 – 38 = 209
Adding the remaining digits, we have,
63 + 95 + 82 + 78 – 4 = 314
∴ The required sum is 314 + 2(carried)
i.e. 31609

17. 14051

18. 5072

19. 15823

20. –1055

Solutions for questions 21 to 25:

21. $32 = 2^5$; $60 = 2^2 \times 3^1 \times 5^1$
$72 = 2^3 \times 3^2$
∴ LCM $= 2^5 \times 3^2 \times 5^1 = 1440$
HCF $= 2^2 = 4$

22. LCM = 1764 and HCF = 7

23. LCM = 8624 and HCF = 7

24. LCM = 520 and HCF = 13

25. LCM = 225 and HCF = 15

Speed Enhancement Test – 13

Solutions for questions 1 to 5:

1. $\frac{18}{3} - 43 = -37.$ Choice (B)

2. $483 + 281 - 825 + 72 = 11.$ Choice (D)

3. $\left[\frac{7}{9}(81) + 31 - 8\right] \div ? = (63 + 31 - 8) \div ?$

$= \frac{86}{?} = 2 \Rightarrow ? = 43.$ Choice (C)

4. $\frac{1}{12}(4836) \div 2 - 24$

$= \frac{406}{2} - 24 = 179.$ Choice (B)

5. $43 - 83 + 729 \div 9 \times 2$
$= -40 + 81 \times 2 = 122.$ Choice (A)

Solutions for questions 6 to 10:

6. $\frac{855}{2736} = \frac{95}{304}$
10% of 304 is 30.4
Thrice of it is 91.2
Now, 95 – 91.2 is 3.8 slightly more than 1% of 304 and it is 1.25% of 304.
∴ The required answer is 31.25%

7. 10% of 951 = 95.1
Now, 159 – 95.1 = 63.9
1% of 951 is 9.51
Six times of 9.51 is 57.06
The difference of 59.9 and 57.06.
i.e. 5.84 is very close to 0.7% of 951.
∴ The required answer is 16.7%

8. 22.5% of 832 = (25% – 2.5%) of 832
$= \frac{832}{4} - \frac{832}{40} = 208 - 20.8 = 187.2$

9. 69.23% of 1443 = $\frac{9}{13} \times 1443 = 999$

10. 37% of 625 = (40% + 1% – 4%) of 625
= 250 – 25 + 6.25 = 231.25

Solutions for questions 11 to 15:

11. Adding the last two digits of all the numbers, we have (84 + 95 + 75 – 45 – 46) = 163
Adding the remaining two digits of all the numbers, we have 33 + 72 + 82 – 68 – 53 = 66
∴ The required sum is (66 + 1)
i.e. 6763

12. 13880

13. 2841

14. 31576

15. 649

Solutions for questions 16 to 20:

By using the method of calculating the product of two 3-digit numbers, we can arrive at the answer quickly

16. 167832

17. 273064

18. 197209

19. 244647

20. 402822

Solutions for questions 21 to 25:

21. $5\frac{1}{9} \times 1\frac{4}{17} \div 1\frac{5}{37} \div 1\frac{5}{18}$
$= \frac{46}{9} \times \frac{21}{17} \div \frac{42}{37} \div \frac{23}{18}$
$= \frac{46}{9} \times \frac{21}{17} \times \frac{37}{42} \times \frac{18}{23} = \frac{74}{17}$

22. $\frac{17}{20} = 0 \cdot 85$
$\frac{17}{20} = \frac{17(15 \cdot 6)}{20(15 \cdot 6)} = \frac{17(15 + 0 \cdot 6)}{312}$
$= \frac{265 \cdot 2}{312} > \frac{265}{312}$
As $17 \times 399 < 340 \times 20$,
$\frac{17}{20} < \frac{340}{399}$
As $61 \times 312 < 265 \times 72$,
$\frac{61}{72} < \frac{265}{312}$
Hence $\frac{61}{72} < \frac{265}{312} < \frac{17}{20} < \frac{340}{99}$

23. $x = \frac{693}{297} \times 399 = \frac{99 \times 7}{99 \times 3} \times 399 = 931$

24. $\frac{141}{125} = \frac{141(0 \cdot 6)}{125(0 \cdot 6)} = \frac{84 \cdot 6}{75} = \frac{83}{75}$
$\frac{83}{75} = \frac{83(2)}{75(2)} = \frac{166}{150}$
As the numerator of this fraction exceeds the numerator of $\frac{165}{151}$ and it's denominator of $\frac{165}{15}, \frac{166}{150} > \frac{165}{151}$
$\frac{37}{33} = 1 + \frac{4}{33} = 1 \cdot 1$
$\frac{141}{125} = 1 \cdot 2$
Hence $\frac{141}{125}$ is the greatest of the given fractions $\frac{165}{151}$ is the least of the given fractions.

25. $x = \frac{501}{792}(12) = \frac{501}{66}$

Speed Enhancement Test – 14

Solutions for questions 1 to 5:

1. The LCM of 25.50 and 25 has to be found
$75 = 3 \times 5^2$
$50 = 2 \times 5^2$
$25 = 5^2$
The LCM is $2 \times 3 \times 5^2$ = which is 150

$$\frac{13}{75}+\frac{12}{50}+\frac{11}{25}$$
$$=\frac{(2\times13)+(3\times12)+(6\times11)}{150}$$
$$=\frac{128}{150}=\frac{64}{75}$$

2. $6\frac{6}{25}+4\frac{37}{50}+4\frac{26}{125}+4\frac{31}{100}$
$=(6+4+4+4)+\frac{6}{25}+\frac{37}{50}+\frac{26}{125}+\frac{31}{100}$
$=18+\frac{6}{25}+\frac{37}{50}+\frac{26}{125}+\frac{31}{100}$

The LCM of 25, 50 and 100 is100
The LCM of 125 and 100 is 500
$\frac{6}{25}+\frac{37}{50}+\frac{26}{125}+\frac{31}{100}$
$=\frac{1200+370+104+155}{500}=\frac{749}{500}=1\frac{249}{500}$
$18+1\frac{249}{500}=19\frac{249}{500}$

3. $\frac{7}{180}+\frac{11}{60}+\frac{13}{90}=\frac{22}{60}=\frac{11}{30}$

4. $\frac{4}{57}+\frac{1}{12}=\frac{35}{228}$

5. $7\frac{1}{3}+5\frac{1}{6}+5\frac{1}{2}+4\frac{1}{6}-7\frac{5}{6}$
$=(7+5+5+4-7)+\frac{1}{3}+\frac{1}{6}+\frac{1}{2}+\frac{1}{6}-\frac{5}{6}$
$=14+\frac{2+1+3+1-5}{6}=14\frac{1}{3}$

Solutions for questions 6 to 10:

6. $\text{HCF}\left(\frac{17}{25},\frac{13}{35},\frac{11}{45}\right)=\frac{\text{HCF}\ (17,13,11)}{\text{LCM}\ (25,35,45)}=\frac{1}{1575}$

$\text{LCM}\left(\frac{17}{25},\frac{13}{35},\frac{11}{45}\right)=\frac{\text{LCM}\ (17,13,11)}{\text{HCF}\ (25,35,45)}=\frac{17\times13\times11}{5}$

$=\frac{\text{LCM}\ (17,13,11)}{\text{HCF}\ (25,35,45)}=\frac{17\times13\times11}{5}=\frac{2431}{5}$

7. $234=13\times18$
$156=13\times12$
$273=13\times21$
HCF (234, 156, 273)
$=13\times$ HCF (18, 12, 21) $=13\times3=39$
LCM (234, 156, 273)
$=13\times$ LCM (18, 12, 21)
$=13\times$ LCM$(2^1\times3^2,\ 2^2\times3,\ 3\times7)$
$=13\times2^2\times3^2\times7$

8. $255=5\times51$
$425=5\times85$
$595=5\times119$
HCF (255, 425, 595) = 85
LCM (255, 425, 595)
$=17\times3\times5^2\times7$.

9. $270=18\times15$
$540=18\times30$
$216=18\times12$
HCF (270, 540, 216) = 54
LCM (270, 540) = 540
Hence LCM (270, 540, 216)
= LCM (540, 216) = 1080.

10. $360=36\times10$
$324=36\times9$
$288=36\times8$
HCF (360, 324, 288) = 36
LCM (360, 324, 288)
$=36\times$ LCM (10, 98) $=36\times360=12960$.

Solutions for questions 11 to 15:

11. $738\times84 \quad 7\ 3\ 8$
$\Rightarrow\ 0\ 8\ 4$

(56 + 5) + (28 + 24 + 0 + 7) + (12 + 64 + 3) + 2
---
i.e. 61992

12. $945\times1055=(1000-55)(1000+55)$
$=(1000)^2-(55)^2=1000000-3025=996975$

13. $101\times909=101\times(900+9)=91809$

14. $984\times108=106272$ (using the procedure shown in Q No. 1)

15. $728\times772=(750-22)\times(750+22)$
$=(750)^2-(22)^2=562016$

Solutions for questions 16 to 20:

16. (50% – 2%) of 8420 = 4210 – 168.4 = 4041.6

17. 16.5% of 784 = (15% + 1.5%) of 784
= 117.6 + 11.76 = 129.36

18. 20.63% of 1890
$\cong$ 42.85% of 1890 – 22.22% of 1890
$=\frac{3}{7}\times1890-\frac{2}{9}\times1890$
= 810 – 420 = 390

19. $\frac{423}{2285}\times100=18.51\%$

20. $\frac{648}{1344}\times100=48.21\%$

Alternately, $\frac{1344}{2}$ = 672 i.e. 50%
672 – 648 = 24
10% of 1344 is 13.44 and 2% is 26.88.
As 24 is close to 2688, it is close to 2%.
$\therefore$ Required answer is 50 – 2 = 48%

Solutions for questions 21 to 25:

By adding two digits at a time, we can do additions in a faster way.

21. 33251

22. 29558

23. 75244

24. 59602

25. 682

Speed Enhancement Test – 15

Solutions for questions 1 to 5:

1. $42=2^1\times3^1\times7^1$; $70=2^1\times5^1\times7^1$
$105=3^1\times5^1\times7^1$
$\therefore$ LCM $=2^1\times3^1\times5^1\times7^1=210$
HCF = 7

2. LCM = 900 and HCF = 3

3. LCM = 312 and HCF = 26

4. LCM = 675 and HCF = 15

5. LCM = 264 and HCF = 2

Solutions for questions 6 to 10:

6. $58\frac{1}{3}\%$ of 1926

$= \frac{7}{12} \times 1926 = 1123.5$

7. 40.08% of 2400 = 40% of 2400 + 0.08% of 2400

$\Rightarrow \frac{2}{5} \times 2400 + \frac{4}{5} \times \frac{1}{1000} \times 2400$

$\Rightarrow 960 + 1.92 = 961.92$

8. $4\frac{1}{2}\%$ of 856 = 5% of 856 $- \frac{1}{2}\%$ of 856

$= \frac{10\% \text{ of } 856}{2} - \frac{1\% \text{ of } 856}{2}$

$= 42.8 - 4.28 = 38.52$

9. $\frac{48}{104} = \frac{6}{13} \cong 46.15$

10. $\frac{128}{1850} = \frac{64}{925} = 6.9\%$

Solutions for questions 11 to 15:

11. Adding the last two digits of all the numbers, we have 56 + 72 – 73 – 95 + 96 = 56
Adding the other digits, we have
38 + 49 – 52 – 82 + 77 = 30
∴ The required sum is 3056.

12. 27611

13. 1788

14. 9833

15. 9931

Solutions for questions 16 to 20:

16. $x = \frac{12}{649} \times 507$

which is less than $\frac{12}{648} \times 507 = \frac{12 \times 504}{12 \times 54}$

$= 9\frac{7}{18}$ which is approximately 9·39.

x is more than $\frac{12}{650} \times 507 = \frac{12 \times 13 \times 39}{13 \times 50} = 9 \cdot 36$

Hence 9.36 < x < 9.39.
Only choice (C) satisfies this condition. Choice (C)

17. $x = \frac{153 \times 53}{47}$

$= \frac{(100 + 53) \times 53}{47} = \frac{8103}{47} = 172{\cdot}4$

18. $\frac{23}{87} = \frac{1}{3}\left[\frac{23}{29}\right]$

$\frac{25}{93} = \frac{1}{3}\left[\frac{25}{31}\right]$

As the difference between the numerator and denominator in the fractions $\frac{23}{29}$ and $\frac{25}{31}$ is constant, the fraction with the larger denominator i.e. $\frac{25}{31}$ is greater.

$\frac{7}{26} = \frac{1}{3}\left[\frac{21}{26}\right] = \frac{1}{3}\left[1 - \frac{5}{26}\right]$

$\frac{25}{93} = \frac{1}{3}\left[1 - \frac{6}{31}\right]$

The numerator of $\frac{6}{31}$ is 1.2 times the numerator of $\frac{5}{26}$. 1·2 times the denominator of $\frac{5}{26}$ is 31·2. As this is greater than denominator of $\frac{6}{31}$, $\frac{5}{26} < \frac{6}{31}$. Hence $\frac{7}{26} > \frac{25}{93}$. Similarly $\frac{13}{48} > \frac{7}{26}$.

Hence $\frac{23}{87} < \frac{25}{93} < \frac{7}{26} < \frac{13}{48}$

19. $\frac{\left(1 \cdot 75^2 + 1 \cdot 85^2 + 1 \cdot 95^2 + 3 \cdot 5 \times 1 \cdot 85 + 3 \cdot 7 \times 1 \cdot 95 + 3 \cdot 9 \times 1 \cdot 75\right)}{5 \cdot 55}$

is in the form of $\frac{a^2 + b^2 + c^2 + 2ab + 2bc + 2ca}{a + b + c}$

Where a = ·75, b = 1·85 and c = 1·95.

As $\frac{a^2 + b^2 + c^2 + 2ab + 2bc + 2ca}{a + b + c}$ has a value of a + b + c, the given expression has a value of 5·55.

20. $\frac{5}{39} + \frac{7}{65} + \frac{3}{2} = \frac{677}{390}$

Solutions for questions 21 to 25:

21. $993 \times 96 = 993 \times (100 - 4)$
$= 99300 - 3972 = 95328$

22. $68 \times 132 = (70 - 2) \times (130 + 2)$
$= 9100 - 260 + 140 - 4 = 8976$

23. $209 \times 231 = (220 - 11) \times (220 + 11)$
$= 48400 - 121 = 48279$

24. $486 \times 243 = 2 \times (243)^2$ i.e. $2 \times 3^{10} = 118098$

25. $994 \times 1008 = 994 \times (1000 + 8)$
$= 994000 + 7952 = 1001952$

Speed Enhancement Test – 16

Solutions for questions 1 to 5:

1. 54.16% of 1320
= 16.66% of 1320 + 37.5% of 1320
$= \frac{1}{6} \times 1320 + \frac{3}{8} \times 1320 = 220 + 495 = 715$

2. 52.8% of 2499 ≅ 52.8% of 2500
$\cong 52.8 \times 25 \cong \frac{52.8 \times 100}{4} \cong 1320$

3. 42.44% of 3690
= 44.44% of 3690 – 2% of 3690
$\Rightarrow \frac{4}{9} \times 3690 - 2(36.9)$
$\cong 1640 - 73.8 = 1566.2 \cong 1566$

4. $\frac{1}{4}(888) = 222$

234 – 222 = 12
1% of 888 is 8.88
Difference between 12 and 8.88
i.e. 3.12 is 0.35% of 888
∴ 234 is (25 + 1 + 0.35)% of 888
i.e. 26.35%

5. 1% of 1849 ≅ 1% of 1850
i.e. 18.5
Now, 18.5 – 16 i.e. 2.5 is 0.13% of 1850
∴ 16 is (1 – 0.13)%. i.e. 0.87% of 1849

Solutions for questions 6 to 10:

By adding two digits at a time, we get the answers very fast.

6. 26972

7. 7906

8. –12135

9. 30548

10. –9220

Solutions for questions 11 to 15:

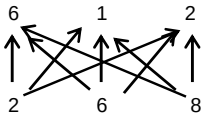
11. $307 \times 333 = (320 - 13)(320 + 13)$
$= 102400 - 169 = 102231$

12. $93 \times 1024 = 1024 \times (90 + 3)$
$= 92160 + 3072 = 95232$

13. 997×994 :
1000 –3
1000 –6
1000000 – 3000 – 6000 + 18 = 991018

14. $538 \times 492 = 538 \times (500 - 8) = 269000 - 4304 = 264696$

15. $612 \times 268 \Rightarrow$



(12 + 4 i.e. 16) + (48 + 6 + 4 i.e. 58) + (8 + 12 i.e. 20)
+ cf4 +cf2 +cf–1
+ (16)
= 164016

Solutions for questions 16 to 20:

16. $24 = 3 \times 2^3$, $39 = 13 \times 3$
$65 = 13 \times 5$
HCF = 1, LCM = $13 \times 5 \times 3 \times 2^3 = 1560$

17. $9 = 3^2$, $29 = 29$, $99 = 3^2 \times 11$
HCF = 1
LCM = $3^2 \times 29 \times 11 = 2871$

18. $44 = 11 \times 2^2$, $64 = 2^6$, $24 = 2^3 \times 3$
HCF = $2^2 = 4$
LCM = $2^6 \times 3 \times 11 = 2112$

19. $42 = 2 \times 3 \times 7$, $72 = 3^2 \times 2^3$
$12 = 3 \times 2^2$
HCF = $2 \times 3 = 6$
LCM = $2^3 \times 3^2 \times 7 = 504$.

20. $16 = 2^4$, $54 = 3^3 \times 2$, $88 = 11 \times 2^3$
HCF = 2
LCM = $11 \times 3^3 \times 2^4 = 4752$

Solutions for questions 21 to 25:

21. $\frac{395}{38} = 10\frac{15}{38}$
$\frac{447}{43} = 10\frac{17}{43}$
$\frac{343}{33} = 10\frac{13}{33}$
$\frac{52}{5} = 10\frac{2}{5}$.

As $15 \times 43 < 38 \times 17$, $\frac{15}{38} < \frac{17}{43}$.

Hence $\frac{395}{38} < \frac{447}{43}$.

Similarly $\frac{13}{33} > \frac{17}{43}$ and hence $\frac{343}{33} > \frac{447}{43}$.

As $\frac{15}{38} = \frac{\frac{13+17}{2}}{\frac{33+43}{2}} = \frac{13+17}{33+43}$, it must lie in between $\frac{13}{33}$ and $\frac{17}{43}$.

Hence $\frac{343}{33} < \frac{395}{38} < \frac{447}{43}$.

Similar to the method shown above, $\frac{17}{43} < \frac{2}{5}$.

Hence $\frac{447}{43} < \frac{52}{5}$.

Hence, $\frac{343}{33} < \frac{395}{38} < \frac{447}{43} < \frac{52}{5}$

22. $x = \frac{131}{205} \times 123 = \frac{131 \times 41 \times 3}{41 \times 5}$

$= \frac{3}{5} \times 131 = 78 \cdot 6$

23. $x = \frac{282}{825} \times 100 = \frac{282}{25 \times 33} \times 25 \times 4$

$= \frac{3 \times 94}{33} \times 4 = \frac{376}{11} = 34\frac{2}{11}$

= 34·2 to one decimal place.

24. LCM of 33, 55 and 165 is 165.
$\frac{5}{33} + \frac{7}{55} + \frac{19}{165} = \frac{5(5) + 7(3) + 19}{165} = \frac{13}{55}$

25. $\frac{200}{101} = \left|\frac{99}{101}\right.$

$\frac{20002}{10201} = \left|\frac{9801}{10201}\right. = \left|\left(\frac{99}{101}\right)^2\right.$

$\frac{2000600}{1030301} = \left|\frac{970299}{1030301}\right. = \left|\left(\frac{99}{101}\right)^3\right.$

Any proper fraction has the values of its square and its cube less than itself. The value of the cube of any proper fraction

is less than is square. As $\frac{99}{101}$ is a proper fraction, $\frac{99}{101} > \left(\frac{99}{101}\right)^2 > \left(\frac{99}{101}\right)^3$.

Hence $\frac{200}{101} > \frac{20002}{10201} > \frac{2000600}{1030301}$

Speed Enhancement Test – 17

Solutions for questions 1 to 5:

1. 16.78% = 14.28% + 2.5%

14.28% of 567 $= \frac{1}{7} \times 567 = 8\%$

2.5% of 568 = 14.175

16.78% of 567 = 81 + 14.175 = 95.1

2. 35.33% = 33.33% + 2%

33.33% of 780 $= \frac{1}{3} \times 780 = 260$ 2% of 780 = 15.6

35.33% = 260 + 15.6 = 275.6

3. 71.66% = 70% + 1.66%

70% of 12.36 = 865.2

1.66% of 1236 $= \frac{1}{60} \times 1236 = 20.6$

71.66% of 1236 = 865.2 + 20.6 = 885.8

4. The required percentage is $\frac{861}{1354} \times 100$

10% of 1354 = 135.4

60% of 1354 = 812.4

3% of 1354 = 40.62

0.5% of 1354 = 6.77

63.5% of 1354 = 859.79

0.1% of 1354 = 1.354

63.6% of 1354 = 861.144

The answer is 63.6%

5. 1823 – 1151 = 672

$\frac{672}{1823} \times 100$ is the required percentage

30% of 1823 = 546.9

6% of 1823 = 109.36

0.8% of 1823 = 14.584

36.8% of 1823 = 670.844

The answer is 36.9%

Solutions for questions 6 to 10:

6. Adding the last two digits of all the numbers, we have,
23 + 53 + 85 + 89 i.e. 250
Adding the next two digits, we have 39 + 04 + 96 + 38 i.e. 177
Adding the first digit, we have 7 + 8 + 1 + 2 i.e. 18
∴ The required sum is 197950.

7. 27247

8. 5645

9. 1234

10. 21282

Solutions for questions 11 to 15:

By using the principle of multiplication of 2 three-digit numbers we can calculate the values.

11. 34705

12. 224448

13. 38220

14. 176596

15. 28182

Solutions for questions 16 to 20:

16. $\frac{59}{41} = 1\frac{18}{41}$

$\frac{67}{49} = 1\frac{18}{49}$

$\frac{17}{11} = 1\frac{6}{17}$

$\frac{25}{19} = 1\frac{6}{19}$.

On multiplying both numerator and denominator of $\frac{6}{11}$ and $\frac{6}{19}$ by 3, they become $\frac{18}{33}$ and $\frac{18}{57}$ respectively. As

$\frac{18}{57} < \frac{8}{49} < \frac{18}{41} < \frac{18}{33}$,

$\frac{60}{19} < \frac{18}{49} < \frac{18}{41} < \frac{6}{11}$

Hence $\frac{25}{19} < \frac{67}{49} < \frac{59}{41} < \frac{17}{11}$

17. $\frac{15}{11} = 1\frac{4}{11}$

$\frac{13}{9} = 1\frac{4}{9}$

The integer part of $\frac{15}{11}$ and $\frac{13}{9}$ are equal. Comparing the fractional parts of both fractions, $\frac{4}{9} > \frac{4}{11}$. Hence $\frac{13}{9} > \frac{15}{11}$.

$\frac{444}{301}$ i.e. 1·48.

As $\frac{4}{9} = 0 \cdot 44$.

Approximately, $\frac{13}{9} = 1 \cdot 44$.

Hence $\frac{444}{301} > \frac{13}{9} > \frac{15}{11}$.

Numerator and denominator of $\frac{764}{505}$ by 5, it becomes $\frac{152 \cdot 8}{101}$.

As this is slightly less than $\frac{152 \cdot 8}{100}$ i.e. 1·528,

$\frac{764}{505} > \frac{444}{301} > \frac{13}{9} > \frac{15}{11}$.

18. x = $\frac{16}{215} \times 12 = \frac{192}{215}$ which is slightly more than $\frac{192}{216} = \frac{8}{9} = 0.\bar{8}$.

Among the choices, 0.89 is the only choice more than $0.\bar{8}$

Choice (D)

19. x = $\frac{247}{2197} \times \frac{221}{187}$

= $\frac{19 \times 13}{13^3} \times \frac{17 \times 13}{17 \times 11}$ = $\frac{19}{143}$

20. $\frac{69}{73}=\frac{1}{1.05}$

$\frac{41}{51}=\frac{1}{1.2}$

$\frac{88}{103}=\frac{1}{1.17}$

$\frac{58}{93}=\frac{1}{1.6}$

$\frac{69}{73},\frac{88}{103},\frac{41}{51}\text{and}\frac{58}{93}$

Solutions for questions 21 to 25:

21. $112 = 2^4 \times 7^1$; $77 = 7^1 \times 11^1$

$175 = 7^1 \times 5^2$

LCM $= 2^4 \times 5^2 \times 7^1 \times 11 = 30800$

22. $726 = 66 \times 11$ i.e. $2^1 \times 3^1 \times 11^2$

$1155 = 11^1 \times 3^1 \times 5^1 \times 7^1$

$1386 = 11^1 \times 3^2 \times 2 \times 7^1$

$\therefore$ GCD $= 3^1 \times 11^1 = 33$

23. 288

24. 6

25. By prime factorisation,

$564 = 2^2 \times 3 \times 47$

$705 = 3 \times 5 \times 47$

$282 = 2 \times 3 \times 47$

LCM $= 2^2 \times 3 \times 5 \times 47 = 2820$

HCF $= 3 \times 47 = 141$

Speed Enhancement Test – 18

Solutions for questions 1 to 5:

By using the method of multiplying two – 3 digit numbers we can calculate the answers quickly

1. 212382

2. 90036

3. 81528

4. 131072

5. 116848

Solutions for questions 6 to 10:

6.

40% of 1640	= 656
7% of 1640	= 114.8
47% of 1640	= 770.8
0.2% of 1640	= 3.28
47.2%of 1640	= 774.08
less 0.01% of 1640	= 0.164
47.19% of 1640	= 773.916

7. $25\%\text{ of }580=\frac{1}{4}\text{x }580=145$

1% of 580	= 5.8
0.8% of 580	= 4.64
26.8% of 580	= 155.44

8.

40% of 760	= 304.00
Less 04% of 760	= 3.04
39.6% of 760	= 300.96

9. 100% of 534 = 534

70% of 534 = 373.8

7% of 534 = 37.38

177% of 534 = 945.18

Plus 0.7% of 534 = 3.738

177.7% of 534 = 948.98

The answer is 177.7%

10. 461 – 138 = 323

$\frac{323}{461}$x100 is the required percentage

70% of 461 = 322.7

The answer is 70%

Solutions for questions 11 to 15:

11. Adding the last two digits of all the numbers, we have 72 + 45 – 69 + 24 + 37 = 109

Adding the remaining digits, we have 7 + 8 + 5 + 4 = 24

$\therefore$ The required sum is (24 + 1) 09 i.e. 2509

12. 12761

13. 14481

14. 56449

15. 8412

Solutions for questions 16 to 20:

16. Multiplying each of the fractions $\frac{41}{55},\frac{48}{65},\frac{63}{85}\text{and}\frac{71}{95}$

by 5, they become $\frac{41}{11},\frac{48}{13},\frac{63}{17}\text{and}\frac{71}{19}$ respectively

$\frac{41}{11}=3\frac{8}{11},\frac{48}{13}=3\frac{9}{13},\frac{63}{17}=3\frac{12}{17},\frac{71}{19}=3\frac{14}{19}$

As $(8)\times(19)<(11)\times(14)$,

$\frac{8}{11}<\frac{14}{19}$

As $(8)\times(17)>(11)\times(12)$

$\frac{8}{11}>\frac{12}{17}$

As $\frac{9}{13}$ is less than 0·7 and

$\frac{8}{11},\frac{12}{17}\text{and}\frac{14}{19}$ are all more than 0·7,

$\frac{48}{13}<\frac{63}{17}<\frac{41}{11}<\frac{71}{19}$

Hence $\frac{48}{65}<\frac{63}{85}<\frac{41}{55}<\frac{71}{95}$

17. Each of the fractions can be expressed as. As the denominators of $\frac{38}{66},\frac{43}{76},\frac{48}{86}\text{and}\frac{53}{96}$ are in descending order, $\frac{38}{66}>\frac{43}{76}>\frac{48}{86}>\frac{53}{96}$

18. $x=\frac{684}{225}(102)$

Multiplying and dividing the numerator and denominator by 4, x = $\frac{684\ (102)(4)}{900}$ = (76) (4) (1 + .02) = 310.1

19. $x=\frac{89}{235}\times(48)$. Dividing numerator and denominator by 5, x

$=\frac{17.8\times(48)}{47}$

As $\frac{48}{47}>1, x>17\cdot8$. Only choice (4) exceeds 17.8.

Choice (D)

20. $x=\frac{127^2-19^2}{216}\times(108)=\frac{(127-19)(127+19)}{216^2}\times108$

$=\frac{(108)(146)}{(216)^2}\times108=36.5$

Solutions for questions 21 to 25:

21. $\frac{15(40)-6(51)}{42(2)-7(-9)} = \frac{600-306}{84+63} = \frac{294}{147} = 2.$ Choice (A)

22. $\left(13\times\frac{40}{26}-19\times\frac{44}{76}-35\times\frac{1}{5}=20-11-7\right)\times$
$\left(-7+\{18-35\div7-3\}=-7+18-5-3=3\right) = 16\times3$
$= 48.$ Choice (D)

23. $\left(\frac{2}{100}\times\frac{3}{100}\times\frac{4}{100}\times\frac{5}{100}\times\frac{10000000}{12}\right)-$
$\left(38\times42\div7-\frac{(326+128)}{2}\right) = 228-227 = 1.$ Choice (C)

24. $\left(\frac{8}{100}\times\frac{20}{100}\times\frac{15}{100}\times\frac{25}{100}\times\frac{10}{100}\times\frac{(100)^3}{60}\right)\div$
$\left(186-[192+\{-41+90 \text{ of } \frac{1}{3}\}]\right)$
$1\div\{186-\{192-41+30\}\} = 1/5.$ Choice (A)

25. $\left(3-5-\{21-\overline{35-6}\} \text{ of } \frac{7}{8}\right)\times\left(\frac{540(10^4-2\times400+4^3)}{(108)^3-2400\times108}\right)$
$=\left(-2-\{21-29\}\times\frac{7}{8}\right)\times\left(\frac{5(100+8)(100^2-100\times8+8^2)}{(100+8)^3-3.100.8(100+8)}\right)$
$= 5\times5 = 25.$ Choice (B)

Speed Enhancement Test – 19

Solutions for questions 1 to 3:

1. The LCM of the denominators of the fractions added is 192.
In order to express the fractions $\frac{13}{24}, \frac{5}{48}$ and $\frac{7}{96}$ with a denominator of 192, the denominators 24, 48 and 96 have to be multiplied by 8, 4 and 2 respectively. The numerators would also have to multiplied by the same numbers.
$\frac{13}{24}+\frac{5}{48}+\frac{7}{96}+\frac{19}{192} = \frac{13(8)+5(4)+7(2)+19}{192} = \frac{157}{192}$

2. $\frac{7}{54}+\frac{5}{36}=\frac{29}{108}$ (Using a similar method as explained in the previous solution)

3. $\frac{9}{28}=\frac{1}{7}\left(\frac{9}{4}\right)=\frac{1}{7}(2\cdot25)$
$\frac{16}{49}=\frac{1}{7}\left(\frac{16}{7}\right)=\frac{1}{7}(2\cdot85)$
$\frac{23}{70}=\frac{1}{7}\left(\frac{23}{10}\right)=\frac{1}{7}(2\cdot3)$
$\frac{30}{91}=\frac{1}{7}\left(\frac{30}{13}\right)=\frac{1}{7}(2\cdot307)$
As $2.25 < 2.85 < 2.3 < 2.307$, $\frac{9}{28}<\frac{16}{49}<\frac{23}{70}<\frac{30}{91}$

Solutions for questions 4 and 5:

4. $X=\frac{375}{621}\times201 = \frac{125}{207}\times201 = \frac{125}{69}\times67$
$= 125\left(\frac{69-2}{69}\right) = 125-\frac{250}{69} = 125-3.62$
$X = 121.38$

5. $X=\frac{231}{123}\times419 = \frac{77}{41}\times419$
$= 77\left(\frac{410}{41}+\frac{9}{41}\right) = 770+\frac{693}{41} = 770+16.9$
$X = 786.9$

Solutions for questions 6 to 10:

6. LCM of 64, 56 and 72
$=$ LCM $(8\times8, 8\times7, 8\times9)$
$= 8\times$ LCM $(8, 7, 9)$
$= 8\times\frac{8\times7\times9}{\text{HCF}(8,7,9)} = \frac{8\times8\times63}{1}$
$= 64\,(64-1) = 64^2-64 = 4032.$

7. LCM of 27 and 108 is 108. LCM of 27,108 and 162 is LCM of 108 and 162 = LCM $(18\times6, 18\times9) = 18\times$ LCM $(6, 9)$ $= 18\times18 = 324.$

8. HCF (108, 144, 96)
$=$ HCF $(12\times9, 12\times12, 12\times8)$
$= 12\times$ HCF $(9, 12, 8) = 12\times1 = 12$
LCM (108, 144, 96)
$= 12\times$ LCM (LCM (9, 12), 8)
$= 12\times$ LCM (36, 8) $= 12\times72 = 864$

9. HCF (170, 255, 425)
$=$ HCF $(17\times10, 17\times15, 17$ x $25)$
$= 17$ HCF $(10, 15, 25) = 17\times5 = 85$
LCM (170, 255, 425)
$= 17$ LCM (10, 15, 25)
$= 17\times150 = 2550$

10. As 1212, 1236 and 1284 have their last two digits divisible by 4, they are divisible by 4.
As 1212, 1236 and 1284 have the sum of their digits divisible by 3, they are divisible by 3.
Hence 1212, 1236 and 284 are divisible by both 4 and 3 and hence by 4×3 i.e. 12. Dividing 1212, 1236 and 1284 by 12, the quotients obtained are 101, 103 and 107 respectively.
HCF (1212, 1236, 1284)
$=$ HCF $(12\times101, 12\times103, 12\times107)$
$= 12\times$ HCF $(101, 103, 107) = 12\times1 = 12.$
LCM (1212, 1236, 1284)
$= 12\times$ LCM $(101, 103, 107)$
$= 12\times101\times103\times107$ as 101, 103 and 107 are prime numbers $= 2^2\times3\times101\times103\times107.$

Solutions for questions 11 to 15:

Using the method of multiplying two 3 digit numbers, we can find out the answers very quickly.

11. 411607

12. 336870

13. 79112

14. 327522

15. 27153

Solutions for questions 16 to 20:

By using the rule of adding 2 digits at a time, we get

16. 22439

17. 3254

18. 8104

19. 11706

20. 2779

Solutions for questions 21 to 25:

21. 38.38% = 36.36% + 2.02%

36.36% of 836 = $\frac{4}{11}\times 836 = 304$

2% of 836 = 16.72
0.02% of 836 = 0.1672
38.38% of 836 = 320.8

22. 14.85% = 15% - 0.15%
10% of 548 = 54.8
5% of 548 = 27.4
15% of 548 = 82.200
Less 0.15% of 548 = 0.822
14.85% of 548 = 81.378 or 81.4

23. The answer is 887.7.

24. Required to find
$\frac{1548}{3891}\times 100$
10% of 38791 = 389.1
40% of 3891 = 1556.40
Less 0.2% of 3891 = 7.78
39.8% of 3891 = 1548.62
The answer is 39.8% approximately

25. 5971 – 4128 = 1843

The required percentage is $\frac{1843}{4128}\times 100$

10% of 4128 = 412.8
40% of 4128 = 1651.2
4% of 4128 = 165.12
0.6% of 4128 = 24.77
44.6% of 4128 = 1841.09
0.05% of 4128 = 2.06
44.65% = 1843.15
The answer is 44.65%

Speed Enhancement Test – 20

Solutions for questions 1 to 5:

1. 262656

2. 888122

3. 139968

4. 504504

5. 551754

Solutions for questions 6 to 10:

6. $\frac{27}{100}+\frac{43}{125}-\frac{89}{250}=\frac{135+172-178}{500}=\frac{129}{500}$

7. $\frac{23}{112}+\frac{85}{168}-\frac{93}{140}=\frac{345+850-1116}{1680}=\frac{79}{1680}$

8. As $\frac{257}{640}=\frac{x}{525}$

$\Rightarrow x = \frac{257\times 525}{640}$

$\Rightarrow x \cong \frac{257\times 525}{640}$

$\Rightarrow x = \frac{525}{2.5} = 210$

9. $y = \frac{459}{152}(380)$

$= \frac{459}{19\,(8)}19\,(20)$

$= \frac{20}{8}(459) = 1147.5$

10. $y = \frac{39}{1\cdot 8}(271)$

$= \frac{39}{18}(270+1) = \frac{39}{18}(270)+\frac{39}{18}$

$= 29(15)+2+\frac{1}{6} = 587\frac{1}{6}$

Solutions for questions 11 to 15:

11. $12 = 2^2\times 3^1$
$45 = 3^2\times 5^1$
$36 = 2^2\times 3^2$
$\therefore$ The required LCM is 180 and HCF is 3.

12. LCM = 720 and HCF = 8

13. LCM = 150 and HCF = 5

14. LCM = 720 and HCF = 12

15. LCM = 1125 and HCF = 5

Solutions for questions 16 to 20:

16. 127.5% = 125% + 2.5%
125% of 1232 + 2.5% of 1232
$= \frac{5}{4}\times 1232+\frac{1}{40}\times 1232$ = 1540 + 30.08 = 1570.8

17. 13.28% = 14.28% – 1%
14.28% of 638 – 1% of 638
$= \left(\frac{1}{7}\times 638 - 6.38\right)$ = 91.13 – 6.38
= 84.75 (Approximately)

18. 40% of 279 = 111.6
1% of 279 = 2.79
0.6% of 279 = 1.674
41.6% of 279 = 116.064

19. Required to find $\frac{197}{237}\times 100$
10% of 237 = 213.7
80% of 237 = 189.6
3% of 237 = 7.11
0.1% of 2137 = 0.237
83.1%of 237 = 1986.947
The answer is 83.1%

20. 30% of 348 = 104.4
1% of 348 = 3.48
0.4% of 348 = 1.392
31.4% of 348 = 109.272
The required answer is 348 + 109.2 = 457.23

Solutions for questions 21 to 25:

By using the rule of adding two digits at a time additions can be calculated faster.

21. 3604

22. 32467

23. 22290

24. 52588

25. 382

Speed Enhancement Test – 21

Solutions for questions 1 to 5:

1. 10% of 738 = 73.8
20% of 738 = 147.6
3% of 738 = 22.14
0.1% of 738 = 0.737
23.1% of 738 = 170.478

2. 49.4% = 50% – 0.6%
50% of 479 = 239.500
0.6% of 479 = 2.874
49.4% of 479 = 236.626

3. 10% of 672 = 67.2
40% of 672 = 268.8
1% of 672 = 6.72
0.25% of 672 = 1.68
41.25% of 672 = 277.20

4. Required to find $\frac{237}{371} \times 100$
10% of 371 = 37.1
60% of 371 = 222.6
3% of 371 = 11.13
0.8% of 371 = 2.968
63.8% of 371 = 236.698
The answer is 63.8%

5. Let $\frac{x}{100} \times 561 = 329$
$x = \frac{329}{561} \times 100$
10% of 561 = 56.1
50% of 561 = 280.5
9% of 561 = 49.49
59% of 561 = 329.99
The answer is 58.6%

Solutions for questions 6 to 10:

6. $34 = 2 \times 17$
$51 = 3 \times 17$
$85 = 5 \times 17$
LCM of 34, 51 and 85
$= 2 \times 3 \times 5 \times 17 = 510$
GCD = 17

7. $24 = 2^3 \times 3$
$60 = 2^2 \times 3 \times 5$
$80 = 2^4 \times 5$
LCM = $2^4 \times 3 \times 5 = 240$
GCD = $2^2 = 4$

8. $48 = 2^4 \times 3$
$36 = 2^2 \times 3^2$
$90 = 2 \times 5 \times 3^2$
LCM = $2^4 \times 3^2 \times 5 = 720$
GCD = $2 \times 3 = 6$

9. $63 = 3^2 \times 7$
$54 = 2 \times 3^3$
$72 = 2^3 \times 3^2$
LCM = $2^3 \times 3^3 \times 7 = 1512$
GCD = $3^2 = 9$

10. $121 = 11 \times 11$
$88 = 2^3 \times 11$
$66 = 2 \times 3 \times 11$
LCM = $2^3 \times 3 \times 11 \times 11 = 2904$
GCD = 11

Solutions for questions 11 to 15:

11. Adding the last two digits of all the numbers, we have
23 + 84 – 15 + 38 + 25 – 16 = 139
Adding the remaining digits, we have
2 + 7 – 9 + 6 + 4 – 7 = 3
∴ The required sum is 439.

12. 35192

13. 10147

14. 15144

15. 18574

Solutions for questions 16 to 20:

16. The numbers multiplied are two three digit numbers with the same hundred's digit. The last two digits of each number add up to 100. The logic for multiplying two such three digit numbers is given below. Let x be the hundred's digit in each number. Let p be the last two digits in any one of the numbers. The last two digits in the other number would be 100 – p. The product of the numbers would be (100x + p) (100 x + 100 – p)
= (100x + p) (100x – p + 100)
= (100x + p) (100x – p) + 100 (100x + p)
= $(100x)^2 – p^2 + 100 (100x + p)$
Taking x = 1, p = 26, the product of 126 and 174 becomes $(100611)^2 – 26^2 + 100 (126) = 21924$.

17. The numbers multiplied are two three digit numbers with the same hundred's digit. The ten's and unit's digits in 182 are ten's complements of the ten's and unit's digit in 128. The logic for multiplying two such three digit numbers is given below. Let x be the hundred's digit in each number. The last two digits of both numbers odd up to 110. Let p be the last two digits in any one of the numbers. The last two digits in the other number would be 110 – p. the product of the numbers would be (100x + p) (100x + 110 – p)
= $(100x)^2 – p^2 + 110 (100x + p)$
Taking x = 1, p = 28 the product of 182 and 126 becomes $(100 (1))^2 – 28^2 + 110 (128) = 23296$.

18. The numbers multiplied have the same ten's digit. The hundred's digit in each number is equal to the unit's digit in the other and is the ten's complement of the unit's digit in itself. The logic for multiplying two such three digit numbers is given below.
Let one of the three digit numbers be 100x + 10y + 10 – x = 99x + 10y + 10. The other three digit number would then be 100 (10 – x) + 10y + x = 1000 – (99x – 10y).
The product of both numbers = (99x + 10y + 10) (1000 – 99x – 10y) = 1000 (99x + 10y) – 10 (99x – 10y) + 10,000 – $((99x)^2 – (10y)^2)$
Taking x = 1, and y = 6, the product of 169 and 961 becomes 1000 (99 (1) + 10(6)) – 10 (99 (1) – 0 (6)) + 10,000 – $((99 (1))^2 – (10 (1))^2 = 162409$.

19. The numbers multiplied have the ten's digits as ten's complements of each other. The hundred's digit in each other. The hundred's digit in each number equals the unit's digit in the other and is the ten's complement of the unit's digit in itself. Using a similar logic as explained in the previous solution, 426 × 684 works out to be 291384.

20. $136 \times 464 = (100 + 36) \times (400 + 64)$
$= 100 \times 400 + 100 \times 64 + 400 \times 36 + 36 \times 64$
$= 400000 + 6400 + 14400 + 6^2 \times 8^2$
$= 60800 + (6 \times 8)^2 = 63104$

Solutions for questions 21 to 25:

21. $1432 \times \frac{1}{13} \times 5.62 – 59.99 = ?$
$\Rightarrow 110 \times 6 – 60 = ? \Rightarrow ? = 600.$ Choice (B)

22. The given expression is in the form of
$a^3 + b^3 + 3a^2b + 3ab^2 = (a + b)^3$
Where a = 3.14, b = 5.26
$(a + b)^3 = (3.14 + 5.26)^3 = (8.4)^3$
$\therefore$? = 592.704. Choice (B)

23. $\sqrt{?} = 0.000228 \times 10^6$
$\sqrt{?} = 228 \Rightarrow ? = (228)^2$
$\therefore$? = 51984 Choice (D)

24. $? \times 20 = 24 \times 15$
$\Rightarrow ? = \frac{360}{20} = 18$. Choice (A)

25. $\frac{972}{54} \times 123 + 236 - 134 \approx ?$
$\Rightarrow$? = 2214 + 102 = 2316. Choice (A)

Speed Enhancement Test – 22

Solutions for questions 1 to 5:

1. 314736

2. 280448

3. 290736

4. 517032

5. 74088

Solutions for questions 6 to 10:

Using the method of adding two digits, at a time we can calculate the additions very quickly

6. 190693

7. 14967

8. 20098

9. 11293

10. 987

Solutions for questions 11 to 15:

11. $\frac{15}{29} = \frac{1}{1.93}$; $\frac{17}{39} = \frac{1}{2.29}$

$\frac{21}{49} = \frac{1}{2.33}$; $\frac{41}{69} = \frac{1}{1.68}$

$\frac{41}{69} > \frac{15}{29} > \frac{17}{39} > \frac{21}{49}$

12. $\frac{11}{60} \cong \frac{1}{5.4}$; $\frac{15}{83} \cong \frac{1}{5.5}$

$\frac{17}{90} \cong \frac{1}{5.29}$; $\frac{13}{70} \cong \frac{1}{5.38}$

$\frac{15}{83} < \frac{11}{60} < \frac{13}{70} < \frac{17}{90}$

13. $x = \frac{221 \times 274}{411} \Rightarrow x = \frac{221}{1.5} \cong 147.$

14. $\frac{71}{193} = \frac{1}{2.7}$
$\frac{93}{201} = \frac{1}{2.1}$
$\frac{57}{139} = \frac{1}{2.4}$
$\frac{63}{161} = \frac{1}{2.5}$
$\frac{89}{206} = \frac{1}{2.3}$
The descending order is $\frac{93}{201}, \frac{89}{206}, \frac{57}{139}, \frac{63}{161}$ and $\frac{71}{193}$

15. $\frac{27}{6(11)} + \frac{31}{6(17)} = \frac{27(17) + 31(11)}{6(11)(17)} = \frac{800}{6(187)} = \frac{800}{1122}$

Solutions for questions 16 to 20:

16. Let the number formed by first two digits of the number be p^2. Let the number formed by last two digits of the number be q^2. The number would then be 100 $(p^2) + q^2$.

As p^2 is a two-digit number it must be a minimum of 16. As the number has no zeros, it must be greater than 1600. As the square root of the number is less than 60, the number is of the form $(50 \pm a)^2$ where a is a single digit number.
$100 (p^2) + q^2 = (50 \pm a)^2 = 100 (25 \pm a) + a^2$
Hence $p^2 = 25 \pm a$
As $a \le 9$, $16 \le p^2 \le 34$
Hence p^2 must be 16.
When $p^2 = 16$, $a = 9$ and $q^2 = a^2 = 81$.
Hence the number is 1681.

17. Let the number squared and the number cubed be a and b respectively.
$a^3 + b^3 = 793$
As b is a natural number, b > 0
As $a^2 > 0$, $b^3 < 793$ in order to satisfy the above equation.
Hence $b < \sqrt[3]{793}$ i.e., $b \le 9$.

Substituting each possible value of b in the above equation, a happens to be a natural number
When b has values of 9 and 4 a has values of 8 and 27 respectively. As difference of a and b is prime, a = 27, and b = 4 and a + b = 31.

18. Let the number squared and the number cubed be p and q respectively.
$p^2 - q^3 = 9$
$p = \sqrt{9 + q^3}$ --- (1)
As q is a single digit natural number $1 \le q \le 9$. Substituting all possible values of 9 in equation (1), when q = 6, p happens to be a natural number having value of 15.
p + q = 21.

19. As the last two digits of 49284 is divisible by 4, 49284 is divisible by 4. Dividing 49284 by 4, the quotient is 1232!
$\sqrt{49284} = \sqrt{4(12321)} = 2\sqrt{12321} = 2 \times 111$
(please refer speed enhancement test solutions problem 9)
= 222.

20. The cube root of Q number is divided into groups of 3 starting from the right. If the last part contains only one or two digits, it is considered as a separate group. The number of groups gives the number of digits in the cube root. Denoting the cube root of a general number whose cube root is to be found by xyz, x must satisfy the condition that x must be the largest number such that x^3 is less than the last group. Z^3 must end with the last digit in the number. $3yz^2$ must end with the ten's digit of the excess of the number over z^3. the

number when grouped into groups of 3 from the right becomes 1, 092, 727. Denoting its cube root by xyz, $x^3 \le 1$ i.e., $x \le 1$.
As x must be a minimum of 1, x = 1.
Z^3 must end with a 7. Hence z must be 3.
$3yz^2$ must have an end digit of ten's digit of 1092727 – 27 = 10927 00i.e 0.
This is only possible when y = 0.
Hence $\sqrt[3]{1092727} = 103$.

Solutions for questions 21 to 25:

21. 35% of 870 is (30% + 5%) of 870 = 304·5

22. 62% of 442 is (60% + 2%) of 442 = 274·04

23. 57% of 670 is (50% + 7%) of 670 = 381·90

24. 23% of 1024 is (20% + 3%) of 1024 = 235·52

25. 18% of 1008 is (20% – 2%) of 1008 = 181·44

Speed Enhancement Test – 23

Solutions for questions 1 to 5:

1. 367 x 123 = 45141
45141 – 1234 = 43907

2. 378 x 12 = 4536
4536 – 234 = 4302

3. (6 + 342 + 1296)3 = 1644 x 3 = 4932
4932 – (2364/4) = 4932 – 591 = 4341

4. (281 x 362) = 101722
101722 + 1237 = 102959

5. The given expression is in the form of
$$\frac{a^3 + b^3}{a^2 - ab + b^2}$$
$$\frac{(a+b)(a^2 - ab + b^2)}{(a^2 - ab + b^2)}$$
= a + b
= 15.38 + 14.62 = 30

Solutions for questions 6 to 10:

Using "ten percent – one percent" concept we can find the values of the required percentages

6. 42% of 436 = $(40 + 2) \times \frac{436}{100} = 183.12$

7. 63% of 231 = $(60 + 3) \times \frac{231}{100} = 145.53$

8. 28% of 431
= $(30 - 2) \times \frac{431}{100} = 120.68$

9. 72% of 888
= (70 + 2)% of 888 = 639.36

10. 56% of 784
= (50 + 5 + 1)% of 784 = 439.04

Solutions for questions 11 to 15:

11. $21 = 7 \times 3$, $35 = 7 \times 5$, $42 = 2 \times 3 \times 7$
LCM = $2 \times 3 \times 5 \times 7 = 210$
HCF = 7

12. $8 = 2^3$, $24 = 2^3 \times 3$, $36 = 2^2 \times 3^2$
LCM = $2^3 \times 3^2 = 72$
HCF = $2^2 = 4$

13. $22 = 11 \times 2$
$88 = 11 \times 2^3$
$121 = 11 \times 11$
LCM = $11^2 \times 2^3 = 968$
HCF = 11

14. $26 = 13 \times 2$, $65 = 13 \times 5$
$78 = 13 \times 2 \times 3$
HCF = 13
LCM = $13 \times 2 \times 3 \times 5 = 390$

15. $28 = 7 \times 2^2$, $63 = 7 \times 3^2$
$77 = 7 \times 11$
HCF = 7,
LCM = $7 \times 11 \times 3^2 \times 2^2 = 2772$

Solutions for questions 16 to 20:

16. 163726

17. 86668

18. –9713

19. 38434

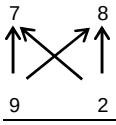
20. 1833

Solutions for questions 21 to 25:

21. 613×34 : Proceeding in the same way as in question No. 7, Answer is 20842

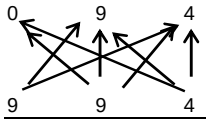
22. $499 \times 8230 = (500 - 1) \times 8230$
= 4115000 – 8230 = 4106770.

23. 78×92 =



63 + (14 + 72 i.e. 86) + (16)
∴ The product is 7176.

24. 94×994



0 + (81) + (81 + 36 i.e. 107) + (36 + 36 i.e. 72) + (16)
∴ The required product is 93436

25. $235 \times 265 = (250 - 15)(250 + 15)$
$= (250)^2 - (15)^2$
= 62500 – 225 = 62275

Speed Enhancement Test – 24

Solutions for questions 1 to 5:

1. The result is 18345

2. The result is 5041

3. The result is 89

4. The result is 759

5. The result is 4000.

Solutions for questions 6 to 10:

6. (A) $(3050 \div 25 - 2) \div 15 + 50 \times 60 \div 300 \times 5 - 30$

$= (122 - 2) \div 15 + 50 \times \frac{60}{300} \times 5 - 30 = 8 + 50 - 30 = 28$

(B) $210 \div 14 + 5 - 16 + 50 \div 25 + 70 \div 5$
$= 15 + 5 - 16 + 2 + 14 = 20$

(C) $16 \times 12 + 100 \div 10 + 15 - 197$
$= 16 \times 12 + 10 + 15 - 197$
$= 192 + 10 + 15 - 197 = 20$

(D) $(25 \times 12 - 150 \times 2 \div 3) \div 50 + 16$

$= \left(25 \times 12 - \frac{150 \times 2}{3}\right) \div 50 + 16$

$= \frac{300 - 100}{50} + 16 = 4 + 16 = 20$ Choice (A)

7. (A) $12 \times 28 \div 36 - 42 + 46 \div 12 + 257 \div 6$

$= 12 \times \frac{28}{36} - 42 + \frac{46}{12} + \frac{257}{6}$

$= \frac{28}{3} + \frac{23}{6} + \frac{257}{6} - 42 = \frac{56 + 23 + 257}{6} - 42$

$= 56 - 42 = 14$

(B) $34 \times 17 \div 68 + 14 - 32 \div 96 - 49 \div 6$

$= 34 \times \frac{1}{4} + 14 - \frac{1}{3} - \frac{49}{6}$

$= \frac{17}{2} - \frac{1}{3} - \frac{49}{6} + 14 = \frac{51 - 2 - 47}{6} + 14$

$= 0 + 14 = 14$

(C) $12 \times 15 - 125 \div 75 + 15 - 21 \div 63 - 179 - 178$

$= 12 \times 15 - \frac{5}{3} + 15 - \frac{1}{3} - 1 - 178$

$= 180 - 2 + 15 - 1 - 178 = 192 - 178 = 14$

(D) $22 \times 24 \div 52 \times 26 + 27 \div 54 - 219$

$= 22 \times \frac{24}{52} \times 26 + \frac{27}{54} - 219$

$= 11 \times 24 + \frac{1}{2} - 219$

$= 264 + \frac{1}{2} - 219 = 45\frac{1}{2}$ Choice (D)

8. (A) $320 - 145 - 90 = 85$
(B) $420 - (245 - 90) = 265$
(C) $225 - 50 - 90 = 85$
(D) $280 - (105 + 90) = 85$ Choice (B)

9. (A) $\frac{5}{12} + \frac{1}{2} = \frac{11}{12}$

(B) $\frac{2}{3} + \frac{3}{4} - \frac{1}{2} = \frac{11}{12}$

(C) $\frac{7}{6} - \frac{3}{12} - \frac{1}{12} = \frac{5}{6}$

(D) $\frac{13}{12} - \frac{1}{6} = \frac{11}{12}$ Choice (C)

10. (A) 4% of 40 + 400% of 4 + 40% of 1 = 1.6 + 16 + 0.4 = 18
(B) 1.8% of 1000 = 18
(C) 2% of 100 + 200% of 8 = 18
(D) 23% of 20 + 12% of 120 = 4.6 + 14.4 = 19
Choice (D)

Solutions for questions 11 to 15:

11. $9819 \times 181 = (10000 - 181) \times 181$
$= 1810000 - (180 + 1)^2 = 1777239$

12. $324^2 + 576^2 + 324 \times 576$
$= 324^2 + 576^2 + 2 \times 324 \times 576 - 324 \times 576$
$= (324 + 576)^2 - (18^2 \times 24^2) = 900^2 - 432^2$
$= (900 + 432) \times (900 - 432) = 1332 \times (400 + 60 + 8)$
$= 623376$

13. $786 \times 224 = (1010 - 224) \times 224$
$= 224 \times (100 + 10) - 224^2$
$= 226240 - (4 \times 56)^2$
$= 226240 - 4^2 \times 3136$
$= 226240 - 4 \times 4 \times 3136$
$= 226240 - 4 \times 12544 = 176064$

14. $156 \times 166 = (150 + 6) \times (160 + 6)$
$= (150)(160) + 6(150 + 160) + 6 \times 6 = 25896$

15. $172 \times 179 = 172 \times (178 + 1)$
$= 30616 + 172 = 30788$

Solutions for questions 16 to 20:

16. 80% of 737 = 589.60

17. 72% of 432 = (70 + 2)% of 432 = 311.04

18. 65% of 678 = (60 + 5)% of 678 = 440.70

19. 95% of 870 = (100% – 5%) of 870 = 826.5

20. 53% of 943 = (50% + 3%) of 943 = 499.79

Solutions for questions 21 and 25:

21. $\frac{31}{131} = \frac{1}{42}$

$\frac{51}{151} = \frac{1}{2.9}$

$\frac{61}{161} = \frac{1}{2.6}$

$\frac{71}{171} = \frac{1}{2.4}$

$\frac{81}{181} = \frac{1}{2.2}$

The descending order is $\frac{81}{181}, \frac{71}{171}, \frac{61}{161}, \frac{51}{151}, \frac{31}{131}$

22. The fractions $\frac{48}{57}$ and $\frac{39}{47}$ can be compared by cross multiplication.
(48) (47) > (39) (57)

Hence $\frac{39}{47} < \frac{48}{57}$

Similarly $\frac{32}{39} < \frac{39}{47}$

Hence $\frac{32}{39} < \frac{39}{47} < \frac{48}{57}$

23. $\frac{22}{35}$ and $\frac{28}{45}$ can be written as $\frac{1}{5}\left[\frac{22}{7}\right]$ and $\frac{1}{5}\left[\frac{28}{9}\right]$ respectively.

$\frac{22}{7} = 3\frac{1}{7}$ and $\frac{28}{9} = 3\frac{1}{9}$

As $\frac{1}{7} > \frac{1}{9}, \frac{22}{7} : \frac{22}{9}$

Hence $\frac{22}{35} > \frac{28}{45}$

$\frac{28}{45}$ and $\frac{17}{27}$ can be written as $\frac{1}{9}\left[\frac{28}{5}\right]$ and $\frac{1}{9}\left[\frac{17}{3}\right]$ respectively

$\frac{28}{5} = 5 \cdot 6$ and $\frac{17}{3} = 5 \cdot \bar{6}$

Hence $\frac{17}{3} > \frac{28}{5}$. Hence $\frac{28}{45} < \frac{17}{27}$

As 22 x 27 < 35 x 17,

$\frac{22}{35} < \frac{17}{27}$

Hence $\frac{28}{45} < \frac{22}{35} < \frac{17}{27}$

24. $\frac{27}{6(11)} + \frac{31}{6(17)} = \frac{27(17) + 31(11)}{6(11)(17)} = \frac{800}{6(187)} = \frac{800}{1122}$

25. $\frac{9 \cdot 95^2 + 6 \cdot 25^2}{1 \cdot 85^2 + 8 \cdot 10^2} + \frac{3}{4} - \frac{5}{6}$

Hence the first part is in the form of

$\frac{(b+a)^2 + (b-a)^2}{b^2 + a^2}$

Where a and b are real numbers which is equal to 2.

$\therefore 2 + \frac{3}{4} - \frac{5}{6} = \frac{23}{12}$.

Speed Enhancement Test – 25

Solutions for questions 1 to 5:

1. $4182 \times 2814 = 4182 \times (2800 + 14)$
$4182 \times 14 = 4182 \times (10 + 4) = 58548$
$4182 \times 2800 = 5182 \times 14 \times 200 = 58548 \times 200 = 11709600$
$5182 \times 2814 = 11709600 + 58548 = 11768148$

2. $88888 \times 5555 = 8 \times 11111 \times 5 \times 1111$
$= 8 \times 5 \times\times 1111 = 40 \times 12344321 = 493772840$

3. $547 \times 126 = (500 + 50 - 3) \times 126$
$= 63000 + 6300 - 378 = 68922$

4. $748 \times 528 = (750 - 2) \times (500 + 28)$
$= (750) \times (500) + (750) \times (28) - (500 \times (2) \mid (-2) \times (28)$
$= 375000 + 21000 - 1000 - 56 = 394944$

5. $128 \times 74 = 128 \times (70 + 4)$
$= 8960 + 512 = 9472$

Solutions for questions 6 to 10:

6. Prime numbers have an HCF of 1 and LCM equal to their product. As 151, 181 and 191 are prime, their HCF is 1 and LCM is $151 \times 181 \times 191$. i.e., 5220221.

7. $247 = 19 \times 13$
It is observed that 779 and 893 are not divisible by 13. On dividing them by 19, the quotients obtained are 41 and 47 respectively.
Hence HCF (779, 893, 247)
= HCF $(19 \times 41), 19 \times 47) 19 \times 13)$
$= 19 \times$ HCF (41, 47, 13) $= 19 \times 1 = 19$
LCM (779, 893, 247
$= 19 \times$ LCM (41, 47, 13) $= 19 \times 41 \times 47 \times 13$ i.e., 475969.

8. Of the numbers given only 2057 satisfies the divisibility rule for 11. Dividing 2057 by 11, the quotient is 187.
$= 11 \times 17$ Dividing 1904 and 1955 by 17 the quotients obtained are 112 and 115 respectively.
HCF (1904, 1955, 2057) = 17
LCM (1904, 1955, 2057) $= 17 \times 112 \times 115 \times 121$ i.e., 26494160

9. 3020 = (2) (5) (151)
1002 and 2018 are divisible neither by 5 nor by 151.
Hence HCF (1002, 2018, 3020) = 2
$\therefore$LCM $= 2 \times 501 \times 1009 \times 1510$ i.e., 1526637180.

10. $161 = 7 \times 23$
$301 = 7 \times 43$
HCF (161, 301, 1204)
= HCF (7, 1204)
= 7 as will as LCM (161, 301, 1204)
$= 7 \times 23 \times 43 \times 4 = 27692$

Solutions for questions 11 to 15:

11. 37% of 509 = (40 – 3)% of 509 = 188.33

12. 98% of 637
= (100 – 2)% of 637 = 624.26

13. 46% of 368 = 46% of 46 (8)
$= \frac{(46)^2 (8)}{100} = \frac{(2116)(8)}{100} = 169.28$

14. 50% of 154 = 77
73.92 is 3.08 less than 77.
As 3.08 is 2% of 154
73.92 is (50 – 2) = 48% of 154.

15. 25% of 271 = 67.75
62.33 is 5.42 less than 67.75.
1% of 271 = 2.71
2% of 276 = 2 (2.71) = 5·42
Hence 62.33 is (25 – 2) = 23% of 271.

Solutions for questions 16 to 20:

16. 2342 + 3652 + 7465 + 6328 + 8157 = 27944

17. 4215 – 612 + 3649 – 824 + 7168 = 13596

18. Dividing 18181818, 181818, 1818 and 18 by 18, the quotients obtained are 1010101, 10101, 101 and 1 respectively with a remainder of 0in each case.
Hence 181811818 + 181818 + 1818 + 18
= 18 (1010101 + 10101 + 101 + 1)
= 18 (1020304) = 18365472

19. The result is 20296.

20. The result is 2760.

Solutions for questions 21 to 25:

21. $\frac{20 \times 20 \times 20 \times 20 - 20 \times 20}{483 + 14 + 12}$

$\frac{160000 - 400}{483 + 26} = 313.55$ Choice (B)

22. $\sqrt{2.3689} = ?$
= 1.539 Choice (D)

23. $\frac{\sqrt{144} \times \sqrt{25}}{\sqrt[3]{64} \times \sqrt{64}} = \frac{12 \times 5}{4 \times 8} = \frac{15}{8}$

$\left(\frac{\sqrt{144} \times \sqrt{25}}{\sqrt[3]{64} \times \sqrt{64}}\right)$ of $4^3 + 3^2 - 5^3$

$= \left(\frac{15}{8} \times 64\right) + 9 - 25$

$= 120 + 9 - 125 = 4$ Choice (B)

24. $384 \div 4 \times 4 \times 8 + 2^3 \times 10$
$= \frac{384}{4 \times 4 \times 8} + 80 = 3 + 80 = 83.$ Choice (A)

25. $864 \div 9$ of $7 \div \frac{1}{5} \times 2 - 3 + 10$

$= \frac{864 \times 5}{9 \times 7} \times 2 - 3 + 10 = \frac{960}{7} - 3 + 10 = \frac{1009}{7}$

Choice (A)

Speed Enhancement Test – 26

Solutions for questions 1 to 5:

1. L.C.M.(68, 52, 78, 34) = 2652

$? = \frac{1209 + 867 + 1462 - 1638}{2652} \Rightarrow ? = \frac{1900}{2652} = \frac{475}{663}$.

2. L.C.M (55,45,66,9) = 2970

$? = \frac{216 - 462 - 405 + 660}{2970}$

$\Rightarrow ? = \frac{9}{2970} = \frac{1}{330}$.

3. $? = \frac{73}{9} - \frac{29}{4} + \frac{37}{18} + \frac{37}{36}$

$\Rightarrow ? = \frac{584 - 522 + 148 + 74}{72}$

$\Rightarrow ? = \frac{284}{72} = 3\frac{17}{18}$.

4. L.C.M (62, 93, 155, 12) = 1860

$? = \frac{150 - 180 - +72 + 155}{1860}$

$\Rightarrow ? = \frac{197}{1860}$.

5. $? = \frac{20 + 84 + 50}{720} = \frac{154}{720}$. $\Rightarrow ? = \frac{77}{360}$.

Solutions for questions 6 to 10:

6. 3425 + 564 + 6512 + 7415 + 1057 = 18973.

7. 642 + 42 + 564 – 748 – 372 – 91 = 37

8. Adding or subtracting the last two digits of all the numbers, we have,(17 + 84 + 46 – 36 – 47) = 64
Similarly doing the same for the remaining digits, we have, (62 + 73 + 92 – 16 – 82) = 129
∴ The required sum is 12964.

9. 118784

10. 519

Solutions for questions 11 to 15:

11. $27{\cdot}775\%$ of $4500 = 27\frac{775}{1000}\%$ of 4500

$= 27\frac{155}{200}\%$ of $4500 = \frac{5555}{200}\%$ of 4500

$= \frac{1}{2}(55{\cdot}55\% \text{ of } 4500) = \frac{1}{2}\left(\frac{5}{9} \times 4500\right) = 1250$

12. $41{\cdot}66$ of 2436

$= \frac{5}{12} \times 2436 = 5 \times 203 = 1015$.

13. 30% of 2409 = 722.7
698.65 is 24.05 less than 2409.
1% of 2409 is approximately 24.05.
Hence 698.65 forms approximately 29% of 2409.

14. 32 is $\frac{1}{7}$th of 224.

Hence it forms 14.28% of 224.

15. Let x% of 3041 be 95

$\frac{x}{100}$ of 3041 = 95.

$x = \frac{95}{3041} \times 100$ which is slightly less than $\frac{95}{3040} \times 100$

$= \frac{19(5)}{19(160)} \times 100 = \frac{100}{32}\%$.

Hence x is approximately $\frac{100}{32}$ i.e., 3.125%

Solutions for questions 16 to 20:

LCM and HCF

16. $48 = 3 \times 2^4$, $96 = 3 \times 2^5$
$72 = 3^2 \times 2^3$
∴ LCM = $3^2 \times 2^5 = 288$, HCF = $3 \times 2^3 = 24$

17. $21 = 7 \times 3$, $168 = 7 \times 3 \times 2^3$
$196 = 7 \times 2 \times 7 \times 2 = 7^2 \times 2^2$
HCF = 7, LCM = $7^2 \times 3 \times 2^3 = 1176$

18. $42 = 3 \times 2 \times 7$, $48 = 3 \times 2^4$
$36 = 3^2 \times 2^2$
HCF = $3 \times 2 = 6$, LCM = $7 \times 3^2 \times 2^4 = 1008$

19. $63 = 3^2 \times 7$, $36 = 3^2 \times 2^2$
$30 = 3 \times 5 \times 2$
HCF = 3, LCM = $2^2 \times 3^2 \times 5 \times 7 = 1260$

20. $64 = 2^6$, $72 = 3^2 \times 2^3$
$48 = 2^4 \times 3$
∴ HCF = $2^3 = 8$, LCM = $2^6 \times 3^2 = 576$

Solutions for questions 21 to 25:

21. $9983 \times 984 = 9983 \times (1000 - 16)$
$= 9983000 - 9983 \times 4 \times 4$
$= 9983000 - 39932 \times 4$
$= 9983000 - 159728 = 9823272$

22. $432 \times 189 = 432 \times (200 - (20 + 1)$
$= 86400 - 432\ (10 + 1) = 81648$

23. $464 \times 446 = (450 + 14) \times (450 - 4)$
$= (450)^2 + 10\ (450) - 56$
$= 202500 + 4500 - 56 = 206944$

24. $287 \times 427 = (280 + 7)\ (420 + 7)$
$= (280)\ (420) + 700\ (7) + 49$
$= (350 - 70)\ (350 + 70) + 70^2 + 49$
$= 350^2 + 49 = 122549$

25. $813 \times 719 = (800 + 13)$
$(700 + 19) = (800)\ (700) + 800\ (19) + 700\ (13) + (13)\ (19)$
$= 560000 + 1520 + 9100 + 247 = 584547$

Speed Enhancement Test – 27

Solutions for questions 1 to 5:

1. $? = \frac{3}{5} \text{ of } \left\{\left(48 \div 4 \times \frac{1}{6}\right) + \frac{1}{3}\right\}$

$\Rightarrow ? = \frac{3}{5} \times \left\{2 + \frac{1}{3}\right\} = \frac{3}{5} \times \frac{7}{3}$

$\therefore ? = \frac{7}{5}$.

2. $? = \frac{4}{45} \times \frac{3}{28} \times \frac{180}{9} \times \frac{392}{15} \times \frac{12}{7} \Rightarrow ? = \frac{128}{15}$.

3. $? = \frac{12}{17} \text{of} \frac{51}{72} \left\{ \frac{48}{9} \times \frac{18}{3} \right\} \times \frac{7}{8}$

$\Rightarrow ? = \frac{12}{17} \times \frac{51}{72} \times 16 \times \frac{7}{8}$

$\therefore ? = 14.$

4. $? = \frac{9}{16} \text{of} \frac{64}{81} \text{of} \{36\} + (30 - 2)$

$\Rightarrow ? = \frac{9}{16} \times \frac{64}{81} \times 36 + 28 \Rightarrow ? = 44.$

5. $\frac{25}{19} \times \frac{152}{625} \left\{ \frac{1}{2} + \frac{3}{4} \right\} = ? \Rightarrow ? = \frac{8}{25} \times \frac{5}{4} = 2\frac{}{5}$.

Solutions for questions 6 to 10:

6. 51·92% of 520 = (52 – 0·08)% of 520

$= \frac{(52) \times (520) - (0 \cdot 08) \times 520}{1000}$

$= \frac{52^2 (10) - 41 \cdot 6}{1000} = \frac{27040 - 41 \cdot 6}{1000} = 269.98.$

7. 16·75% of 5680 = $\left(10 + 6 + \frac{3}{4}\right)\%$ of 5680

10% of 5680 = 568

6% of 5680 = 340.8

$\frac{3}{4}\%$ of 5680 = 42.6

Hence 16.75% of 5680 = 568 + 340.8 + 42.6 = 951.4.

8. $10\frac{10}{17}\%$ of 68.34 = $\left(10 + \frac{10}{17}\right)\%$ of 68.34

10% of 68.34 = 6.834

$\frac{10}{17}\%$ of 68.34 = $\frac{\frac{10}{17}}{100}$ (68.34) = $\frac{10}{100}(4 \cdot 02) = 0.402$

Hence $10\frac{10}{7}\%$ of 68.34 = 6.834 + 0.402 = 7.236.

9. 10% of 432.1 = 43.2

20% of 4321 = 3×43.21

= 129.63 which is approximately 129.6.

Hence approximately 30% of 4321 is 129.6.

10. 46.44% of 724 = (44.44 + 2)% of 729

44.44% of 729 = approximately $\frac{4}{9} \times 729 = 324$.

2% of 729 = 14.58

Hence 46.44% of 729 = (324 + 14.58)

Approximately = 339. (to the nearest integer).

Solutions for questions 11 to 15:

11. The logic for multiplying two three digit numbers whose unit's digits are complements of each other and the previous digits were equal was explained in solutions for Speed Enhancement Test 17 problem. This logic extends for multiplying two four digit numbers whose unit's digits are complements of each other and previous digits are equal. Hence 2652×2658 will have last two digits of 16. The digits prior to it will be $265 \times 266 = 265 (265 + 1)$

$= \frac{280900}{4} + 265 = 70490.$

Hence the result is 7049016.

12. $735 \times 609 = 7 \times 105 \times 609$

$= 609 \times 7 \times (100 + 5)$

$= 4263 \times (100 + 5) = 447615.$

13. $556 \times 638 = 556 (10 (8 \times 8) - 2)$

$= 5560 \times 8 \times 8 - 556 \times 2$

$= 44480 \times 8 - 1112 = 354728.$

14. The numbers multiplied are three digit numbers whose units digit are the same. Their first two digits add up to 100. Such numbers are multiplied using the following logic. The last two digits of the product will be the square of the unit's digit of either number. For unit's digits whose square is a single digit the last two digits of the product would be 0 followed by square of the unit's digit. The previous digits would be the sum of the product of the first two digits in each number and 10 times the units digit.

Last two digits of 734×274 will be 4^2 i.e. 16. The previous digits of the product will be $73 \times 27 + 4 \times 10$

$= (50 + 23) \times (50 - 23) + 40$

$= 50^2 - 23^2 + 40 = 2011.$

Hence the result is 201116.

15. $9728 \times 10272 = (10{,}000 - 272) \times (10{,}000 + 272)$

$= (10{,}000)^2 - (272)^2 = 99926016$

Solutions for questions 16 to 20:

16. $? = \frac{7}{3} + \frac{19}{6} - \frac{37}{18} + \frac{37}{9} + \frac{61}{15}$

$\Rightarrow ? = \frac{210 + 285 - 370 = 366}{90}$

$\Rightarrow ? = \frac{491}{90} = 5\frac{41}{90}.$

17. $? = \frac{120 - 3 + 4}{528} = \frac{121}{528} = \frac{11}{48}.$

18. $? = \frac{4}{7} + \frac{10}{3} - \frac{1}{21} - \frac{2}{3}$

$\Rightarrow ? = \frac{12 + 70 - 1 - 14}{21} = \frac{67}{21} = 3\frac{4}{21}.$

19. $? = \frac{20 + 6 + 9}{56} = \frac{35}{56} = \frac{5}{8}.$

20. $? = \frac{72 + 81 - 16}{540} = \frac{137}{540}$.

Solutions for questions 21 to 25:

21. Adding the last two digits, we have

74 + 23 + 84 + 23 + 79 = 283

Adding the remaining digits, we have

3 + 9 + 8 + 4 + 1 = 25

$\therefore$ The required sum 2783.

22. 6144

23. 80245

24. 358 + 457 – 522 + 297 – 122

= 815 – 522 + 175 = 293 + 175 = 468

25. 6420 + 7323 – 4566 + 5417 – 3179

= 6000 + 420 + 7000 + 323 – 4000 – 566 + 5000 + 417 – 3000 – 179

= 6000 + 7000 + 5000 – (4000 + 3000) + 420 + 323 + 417 – (566 + 179)

= 11000 + 420 + 740 – 745

= 11420 – 5 = 11415

Speed Enhancement Test – 28

Solutions for questions 1 to 5:

1. Writing all the numbers as product of prime factors, $72 = 2^3 \times 3^2$
$48 = 2^4 \times 3$
$54 = 2 \times 3^3$
HCF of a set of numbers is given by product of each prime factor raised to a power which is the least of the powers it is raised to in the numbers.
Hence HCF of 72, 48 and 54 = $2^1 \times 3^1$-
LCM of a set of numbers is given by product of each prime factor raised to a power which is the highest of the powers it is raised to in the numbers.
Hence LCM of 72, 48 and 54 = $2^4 \times 3^3 = 432$

2. $91 = 13 \times 7$
$77 = 11 \times 7$
$49 = 7 \times 7$
HCF $(13 \times 7, 11 \times 7, 7 \times 7)$
$= 7 \times$ HCF (13, 11, 17) $= 7 \times (1) = 7$
LCM (91, 77, 49)
= LCM $(13 \times 7, 11 \times 7, 7 \times 7)$
= LCM (7, 11, 13)
$= 7 \times 7 \times 11 \times 13 = 7 \times 1001 = 7007$

3. $117 = 13 \times 9$; $104 = 13 \times 8$; $130 = 13 \times 10$
HCF (117, 104, 130) = 13
LCM (117, 104, 130) $= 13 \times 360 = 4680$

4. 432, 504 and 720 have the sum of their digits equal to 9. Hence they are all divisible by 9. As they are all divisible by 4 also, they are divisible by 36. Dividing 432, 504 and 720 by 36, the quotients obtained are 12, 14 and 20.
HCF (432, 504, 720)
HCF $(36 \times 12, 36 \times 14, 36 \times 20)$
$= 36 \times$ HCF (12, 14, 20) $= 36 \times 2 = 72$
LCM (432, 504, 720) $= 36 \times$ LCM (12, 14, 20)
$= 36 \times 420 = 15120$

5. As the last two digits of each number is divisible by 4, all the numbers are divisible by 4. Dividing 448, 1024 and 768 by 4, the quotients obtained are 112, 256 and 192 respectively.
HCF (448, 1024, 768)
= HCF $4 \times 112, 4 \times 256, 4 \times 192)$
$= 4 \times$ HCF $(16 \times 7, 16 \times 16, 16 \times 12)$
$= 4 \times 16 \times$ HCF (7, 16, 12) $= 64 \times 1 = 64$.
LCM (448, 1024, 768)
$= 64 \times$ LCM (7, 16, 12) = 21504.

Solutions for questions 6 to 10:

6. The numbers multiplied are three digit numbers, each number being formed by reversing the other. The logic for multiplying such two digits numbers is given below. Let the two numbers multiplied be 100x + 10y + z and 100z + 10y + x.
$(100x + 10y + z) \times (100z + 10y + x)$
$= 100 (x^2 + y^2 + z^2) + 1010xy + 1010yz + 10001xz$.
Taking x = 8, y = 7 and z = 1, 871×178 can be worked out by substituting x, y and z in the right hand side of the above equation to be 155038.

7. $2025 \times 3025 = (2000 + 25) \times (3000 + 25) = 6125625$.

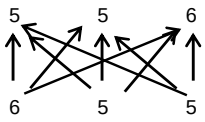
8. $1225 \times 7750 = 1225 \times (8000 - 250)$

$= 1225 \times \left(8000 - \frac{1000}{4}\right) = 1225 \times 8000 - \frac{1225000}{4}$

$= 9493750$

9. $299 \times 899 = (300 - 1) (\times (900 - 1) = 268801$
Note: The numbers multiplied are two three-digit numbers ending with 99. Such numbers always have 01 as the last two digits of their product. When the hundred's digits of both numbers are increased by 1, the results are multiplied and the product is decreased by 1, the first two digits of the product of the two numbers is obtained. The digits in between the first two digits and last two digits of the product of the two numbers is always 2 less than the 100's complement of the sum their hundred's digits.

10. 556×655 = Using the process of multiplication, we have



(30 + 6, i.e. 36) + (25 + 30 + 9, i.e. 64) + (25 + 25 + 36 + 5, i.e., 91) + (25 + 30 + 3 i.e. 58) + 30 = 364180

Solutions for questions 11 to 15:

11. The answer is 3395.

12. The answer is 1386.

13. The answer is 45899.

14. The answer is 577.

15. The answer is 62648

Solutions for questions 16 to 20:

16. $(PQ)^2 = RSTQ$
As the square of the unit's digit of PQ has the same unit's digit as PQ, Q can be 0 or 1 or 5 or 6. As Q is a natural number, Q can only be 1 or 5 or 6.
When Q is 5, $(PQ)^2$ will have the first two digits of the form P (P + 1).
As this can never be a perfect square, Q cannot be 5.
∴ Q of the given Q can be 1 only. Choice (B)

17. As R = 2S, sum of odd digits of SRS equals the even digit. Hence SRS is a perfect square divisible by 11. Hence SRS must be of the form $11^n \times 0$ where n and 0 are natural numbers. As a perfect square has powers of all its prime factors being even, n must be divisible by 2. Hence SRS must be divisible by 11^2 i.e., 121. The only three digit perfect squares divisible by 121are 121 and 121 (4) i.e., 484. Hence S is 1 or 4.

18.
$$\begin{array}{rcccccccc} 123456 \times 11111 = & 1 & 2 & 3 & 4 & 5 & 6 & \\ & & 1 & 2 & 3 & 4 & 5 & 6 \\ & 1 & 2 & 3 & 4 & 5 & 6 & \\ 1 & 2 & 3 & 4 & 5 & 6 & & \\ \hline \end{array}$$

Result: y x
Even if there was a carry of 9 from the digit denoted by x. digit denoted by y would not produce a carry. Hence the left most digit of the product would be 1. Choice (A)

19. EEE = 111 (E) = 37 × 3 (E)
If 37 is one of AB and CD, (3) (E) is the other. In that case 3 (E) must be at least 10 being a two-digit number. Hence $E \geq \frac{10}{3}$.
E must be a minimum of 4 and a maximum of 9. 3 (E) must be a minimum of 12 and a maximum of 27.
In this case as AB > CD, AB = 37 and CD = 3E.
In AB were any multiple of 37, AB must be 74. In that case AB would not be less than 50. The sum of all possible values of CD is 117.

20. 333×9180

$= \left(333\frac{1}{3} - \frac{1}{3}\right) \times 9180$

$= \frac{1000}{3} \times 9180 - \frac{9180}{3} = 3056940$

Hence the product of 333 and 9180 has approximately 3057 thousands.

Solutions for questions 21 to 25:

21. 30% of 414 = 124·2
1% of 414 = 4·14

4% of 414 = 16·56
Hence 34% of 414 = 140·76
144.89 is 4·13 more than 414.
As 4.13 is approximately 1% of 414, 144.89 is approximately 35% of 414.

22. 22.55% of 8877
= (22.22 + 0.33) % of 8877

$$= \left(\frac{2}{9} + \frac{1}{3\times 100}\right)\times 8877$$

$$= 1972\frac{2}{3} + 29\cdot 59 = 2002.26 \text{ approximately.}$$

23. 31.31% of 3100

$$= \frac{3131}{10000}\times 3100 = \frac{31\times 101\times 3100}{100}$$

$$= \frac{31^2\times 101}{100} = 970.61.$$

24. 27% of 1296
= (30 – 3)% of 1296
3% of 1296 = 38.88
30% of 1296 = 10 (38.88) = 388.8.
Hence 27% of 1296
= 388.8 – 38.88 = 349.92

25. 164% of 5672 = (160 + 4)% of 5672
% of 5672 = 226·88
160% of 5672 = 40 × 226.88 = 9075.2
Hence 164% of 5672 = 9075·2 + 226.88 = 9302.08

Speed Enhancement Test – 29

Solutions for questions 1 to 5:

1. The answer is 2636.

2. The answer is 50389.

3. 5671 – (2136 + 2449 + 4167)
= 5671 – (8752) = –3081

4. (5784 + 9146) – (8448 + 4138)
= 14930 – 12586 = 2344

5. By first adding the positive terms and then subtracting the negative terms, we get 57196.

Solutions for questions 6 to 10:

6. (A) 575 ÷ 23 – 14 x 12 + 256 – 23
= 25 – 168 + 256 – 23 = 90
(B) 17 x 18 – 14 x 15 + 96 – 204 ÷ 2
306 – 210 + 96 – 102 = 90
(C) 65 + 153 ÷ 3 x 4 – 512 + 333
= 65 + 51 x 4 – 512 + 333
= 65 + 204 – 512 + 333 = 90
(D) 25 x 6 – 210 ÷ 5 + 62 – 90
= 150 – 42 + 62 – 90 = 80 Choice (D)

7. (A) 55 x 6 – 11 x 22 ÷ 44 x 36 + 13

$$= 330 - 11 \text{ x } \frac{22}{44} \text{ x } 36 + 13$$

$$= 330 - \frac{11\text{x}36}{2} + 13 = 330 - 198 + 3 = 145$$

(B) (45 + 33 ÷11) x 3 + 72 x 5 – 359
= (45 + 3) x 3 + 360 – 359
= 48 x 3 + 1 = 144 + 1 = 145
(C) 144 ÷ 3 + 96 – 29 x 5 + 140
= 48 + 96 – 145 + 140 = 139
(D) 36 + 63 + 193 – 43 x 5 + 204 ÷3
= 36 + 63 + 193 – 215 + 68 = 145 Choice (C)

8. (A) 22 – 158 + 260 ÷ 5 + 26 x 3 + 12
= 22 – 158 + 52 + 78 + 12 = 6
(B) 666 – 333 + 999 ÷ 9 – 88 x 5
= 666 – 333 + 111 – 440 = 4
(C) 840 + 650 – 12 x 8 ÷ 72 x 96 – 1356

$$= 840 + 650 - \frac{12\times 8}{72}\times 96 - 1356$$

= 840 + 650 – 128 – 1356 = 6
(D) 2112 ÷ 16 + 128 x 3 – 170 x 3
= 132 + 128 x 3 – 170 x 3
= 132 + 384 – 510 = 6 Choice (B)

9. (A) 166 × 4 – 52 × 5 + 232 ÷ 8 – 4800 ÷ 12
= 166 × 4 – 52 × 5 + 29 - 400
= 664 – 260 + 29 – 400 = 33.
(B) 112 ÷ 16 × 49 – 295 ÷ 5 – 251
= 7 × 49 – 59 – 251 = 343 – 59 – 251 = 33.
(C) 34 × 6 – 154 – 468 ÷ 26 + 33
= 34 × 6 – 154 – 18 +33 = 204 – 154 – 18+ 33 = 65.
(D) (1855 ÷ 53 + 172) ÷ 3 – 108 ÷ 3
= (35 + 172) ÷ 3 – 108 ÷ 3
= 207 ÷ 3 – 108 ÷ 3 = 69 – 36 = 33. Choice (C)

10. (A) (232 x 6 ÷ 12 – 46) ÷ 10 + 10

$$= \left(\frac{232 \text{ x } 6}{12} - 46\right) \div 10 + 10$$

= (116 – 46) ÷ 10 + 10
= 70 ÷ 10 + 10 = 7 + 10 = 17
(B) (109 + 115)÷ 16 x 6 – 350 ÷ 5
= 224 ÷ 16 x 6 – 350 ÷ 5
= 14 × 6 – 70 = 84 – 70 = 14
(C) ((125 + 378) – 2750 ÷ 22 – 300) ÷ 6 + 1
= (125 + 378 – 125 – 300) ÷ 6 + 1
= 78 ÷ 6 +1 = 13+1 = 14
(D) 360 ÷ 18 + 80 – 43 x 3 + 43
= 20 + 80 – 43 x 3 + 43
= 20 + 80 – 129 + 43 = 14 Choice (A)

Solutions for questions 11 to 15:

11. 1012 × 984 = (1000 + 12) × (1000 – 16) = 995808

12. 991 × 983 = (1000 – 9) × (1000 – 17) = 974153

13. 3725 × 3775 = (3750 + 25) × (3750 – 25)

$$= 3750^2 - 25^2\left(\frac{7500}{2}\right)^2 - 625$$

$$= \frac{56250000 - 625}{4} = 14061875$$

14. 813 × 887 = (800 + 13) × (800 + 87)
= 800² + 100 × 800 + 87 × (10 + 3) = 721131
Note: The numbers multiplied are two three digit numbers with the same hundred's digits are their last two digits are hundred's complement of each other. The last four digits of the product of such numbers will be the product of the last two digits of the numbers. If this product has less than four digits, extra zeros are added in front of the product. The previous digits of the product of such numbers is the product of the hundred's digit in each number and hundred's digit in each number increased by 1.

15. 284 × 516 = (400 – 116)(400 + 116)
= 160000 – 13456 = 146544

Solutions for questions 16 to 20:

16. 68.2% of 687 $= \frac{682}{10}\times(688 - 1) = \frac{(682)(688)}{10} - 1$
(682) (688) will have the last two digits of (2) (8) = 16.
The previous digits will be (68) (69) = 692.

Hence 68.2% of 687 = $\frac{469216-682}{1000}=468.532$

17. 154·5% of 618 = $\frac{618}{4}$% of 618

= $\frac{(103\times6)^2}{400}=\frac{103^2\times6^2}{400}=\frac{10609\times9}{100}=954.81$

18. 83·9% of 539 = $\left(\frac{800+40-1}{1000}\right)$ of 539

= (8) (539) + 0·4 (539) – 5·39 = 452·221

19. 46.8% of 1184 = 46.8% of 1184
= 46.8 (1000 + 100 + 80 + 4)
= 46.8 (1000) + 46.8 (100) + 46.8 (80) + 46.8(4)
= 554.11

20. 18·4% of 184 = $\frac{184}{10}$% of 184

= $\frac{(184)^2}{10(100)}=\frac{(180+4)^2}{1000}=\frac{(180)^2+2(180)(4)+4^2}{1000}$

= 33.856

Solutions for questions 21 to 25:

21. $\frac{124}{284}+\frac{151}{144}=?\Rightarrow 0.4366+1.0486=1.4852$ .Choice (B)

22. $\frac{12}{24}=\frac{x}{44}$;

$\Rightarrow 24x=12\times44$;

$\Rightarrow x=\frac{12\times44}{24}\Rightarrow x=\frac{44}{2}$; $\Rightarrow x=22$ Choice (C)

23. $a=\frac{4}{5},b=\frac{6}{7},c=\frac{2}{3}$

Take the LCM of the denominators and then compare the numerators.
LCM of 5, 7 & 3 = 105.

$\frac{4}{5}=\frac{4\times21}{5\times21}=\frac{84}{105}$

$\frac{6}{7}=\frac{6\times15}{5\times21}=\frac{90}{105}$

$\frac{2}{3}=\frac{2\times35}{3\times35}=\frac{70}{105}$

On comparing, we get $\frac{6}{7}>\frac{4}{5}>\frac{2}{3}$.

∴ Ascending order is $\frac{2}{3},\frac{4}{5},\frac{6}{7}$, i.e., cab. Choice (B)

24. $\frac{5}{122}\times\frac{4}{30}\times\sqrt{25}\div\frac{5}{2}=?$

$\frac{\frac{1}{183}\times5}{\frac{5}{2}}=\frac{2}{183}$ Choice (D)

25. $a=\frac{6}{31},\ b=\frac{4}{23},\ c=\frac{13}{77}$

∴ $\frac{1}{a}=\frac{31}{6}=5\frac{1}{6}$

$\frac{1}{b}=\frac{23}{4}=5\frac{3}{4}$

$\frac{1}{c}=\frac{77}{13}=5\frac{12}{13}$

Clearly $\frac{1}{6}<\frac{3}{4}<\frac{12}{13}$

∴ Descending order is $\frac{6}{31}>\frac{4}{23}>\frac{13}{77}$. Choice (A)

Speed Enhancement Test – 30

Solutions for questions 1 to 5:

1. 71.5% of 2960 = 70% of 2960 + 1.5% of 2960
$= \frac{7}{10} \times 2960$ + 1% of 2960 + 0.5% of 2960
= 2072 + 29.6 + 148 = 2116.4

2. 3.125% of 2576 = $\frac{25\% \text{ of } 2576}{8}$

i.e. $\frac{\frac{1}{4}\text{of } 2576}{8} = \frac{644}{8}$ = 80.5%

3. $\frac{75}{248} \times 100 \cong \frac{3}{10} \times 100 \cong 30\%$

4. $72 = 24 \times 3$
$456 = 24 \times 19$
Hence 72 is $\frac{3}{19}$ th of 456.
Hence 72 is $\frac{3}{19} \times 100 = 15\frac{15}{19}\%$ of 456.

5. 112.5% of 1100 = (110 + 2.5)% of 1100.
110% of 1100 = 1210
2.5% of 1100 = $\frac{\frac{10}{4}}{100} \times 1100$ = 27.5.
Hence 112.5% of 1100 = 1210 + 27.5 = 1237.5.

Solutions for questions 6 to10:

6. The three digit numbers multiplied are of the form xyz and zyx.
$xyz \times zyx = (100x + 10y + z) \times (100z + 10y + x)$
$= 10{,}001xz + 1010xy + 110yz + 100 (x^2 + y^2 + z^2)$.
The ten's digit of their product is the unit's digit of the sum of unit's digit of xy, unit's digit of yz and the ten's digits of xz.
Taking x = 8, y = 1 and z = 9, the ten's digit is the unit's digit is the sum of unit's digit of [$8 \times 1 + 1 \times 9$ + ten's digit of 8×9] i.e. 4. Hence the answer is 751842.

7. The three digit numbers multiplied are of the form xyz and xzy.
$xyz \times xzy = (100x + 10y + z) \times (100x + 10z + y)$
$= 10{,}000x^2 + 10y^2 + 10z^2 + 1100xz + 1100 xy + 101yz$.
The ten's digit of the product is the sum of the unit's digits of y^2, unit's digit of z^2 and ten's digit of yz. Taking x = 1, y = 7 and z = 2, the ten's digit of the product is the unit's digit of sum of unit's digit of 7^2, unit's digit of 2^2 and the ten's digit of 2×7 i.e., 4. Hence the answer is 21844.

8. The three digit numbers multiplied are of the form xyz and yxz. $xyz \times yxz = (100x + 10y + z) \times (100y + 10x + z)$
$= 1000y^2 + 100xy + 100yz + 10yz + 10xz + z$.
The ten's digit of the product is the unit's digit of the sum of the ten's digit of yz, the ten's digit of xz and the ten's digit of z^2.
Taking x = 4, y = 3 and z = 2, the ten's digit of the product is the unit's digit of the ten's digits of 3×2, 4×2, and 2^2 i.e. 4. Hence the answer is 147744.

9. $1158 \times 32 = 1158 \times (30 + 2) = 34740 + 2316 = 37056$.

10. 991×994 :

1000	–9
1000	–6

1000000 – 9000 – 6000 + 54 = 985054.

Solutions for questions 11 to15:

11. $? = \left\{\frac{32}{17} \times \frac{40}{100} \times 340\left[\frac{11}{16}\right]\right\} - \frac{1}{6}$

$\Rightarrow ? = \left\{\frac{32}{17} \times 4 \times 34 \times \frac{11}{16}\right\} - \frac{1}{6} \Rightarrow ? = 176 - \frac{1}{6} = 175\frac{5}{6}$.

Choice (A)

12. $? = 9 \times 15 + 1623 - 121 \times 14$
$\Rightarrow ? = 135 + 1623 - 1694 = 64$. Choice (C)

13. $? = 9 \times 16 + 2678 - 16416 + 30$
$\Rightarrow ? = -13564$. Choice (B)

14. $? = \frac{5}{8} \text{of} \left\{\frac{36}{5} \times 12 \times \frac{1}{4} + \frac{1}{5}\right\} = ?$

$? = \frac{5}{8} \times \frac{109}{5} = \frac{109}{8}$. Choice (D)

15. $? = \frac{4}{325} \times \frac{65}{8}\left\{\frac{144}{26} \times \frac{7}{8} \times \frac{104}{12} + 728\right\}$

$\Rightarrow ? = \frac{1}{10}\{42 + 728\}$
$\therefore ? = 77$. Choice (D)

Solutions for questions 16 to 20:

16. $21 = 7 \times 3$, $28 = 7 \times 4$, $91 = 13 \times 7$
LCM = $7 \times 3 \times 4 \times 13 = 1092$
HCF = 7

17. $46 = 23 \times 2$, $92 = 23 \times 4$
$15 = 23 \times 5$
HCF = 23
LCM = $23 \times 5 \times 4 = 460$

18. $28 = 7 \times 2^2$, $77 = 7 \times 11$, $42 = 7 \times 2 \times 3$
HCF = 7, LCM = $11 \times 7 \times 3 \times 2^2 = 924$

19. $32 = 2^5$, $44 = 11 \times 2^2$, $16 = 2^4$
LCM = $2^5 \times 11 = 352$
HCF = $2^2 = 4$

20. $126 = 7 \times 2 \times 3^2$, $72 = 2^3 \times 3^2$
$90 = 5 \times 2 \times 3^2$
LCM = $3^2 \times 2^3 \times 5 \times 7 = 2520$
HCF = $3^2 \times 2 = 18$

Solutions for questions 21 to 25:

21. (5136 + 6784) – (3249 + 2931)
= 11920 – 6180 = 5740

22. The answer is 1684.

23. 7568 – 213 + 4231 – 264 + 5457
= 7568 + 4231 + 5475 – (213 + 264)
= 7500 + 68 + 4200 + 31 + 5400 + 57 – (200 + 13 + 200 + 64)
= 7500 + 4200+ 5400 + 68 + 31 + 57 – (200 + 200 + 13 + 64)
= 17100 + 156 – (400 + 77) = 17256 – 477 = 16779.

24. 121 – 243 + 1214 – 783 = ?
$\Rightarrow$ 121 – 243 + 1214 – 783 – 122 + 431 = 309.
Choice (C)

25. 5234 + 1234 – 1324 – ? = – 3073
+ 6468 – 1324 – ? = –3073
$\Rightarrow$? = 5143 + 3073 = 8216 Choice (C)