

CHAPTER – 5

APPROXIMATIONS

FINDING THE VALUE OF X :

Approximations can be done in two ways. The first one is cross multiplication. The following example shows how to solve an approximation problem using cross multiplication.

Eg.1 Find the value of x.

$$\frac{38}{154} = \frac{x}{190}$$

Sol. $x = \frac{38 \times 190}{154} = \frac{19}{77} \times 190 \approx \frac{1}{4} \times 190 \approx 47.5$

The second method is to find the approximate ratio of the numerators or denominators and arrive at the solution. This is illustrated in the following two examples.

Eg.2 Find the value of x.

$$\frac{54}{238} = \frac{11}{x}$$

Sol. $5.4 \times 2 = 10.8$

$$11 - 10.8 = 0.2 \approx \frac{1}{3} \times 0.54$$

$$\text{So, } 11 = 5.4 \times 2 + \frac{1}{3} \times 0.54$$

$$\therefore x = 23.8 \times 2 + \frac{1}{3} \times 2.38 \\ = 47.6 + 0.8 = 48.4$$

Eg.3 Find the value of x

$$\frac{125}{220} = \frac{175}{x}$$

175 is 40% more than 125

$\therefore x$ is 40% more than 220, i.e. 308.

Exercise – 5(a)

Time: 45 min

Questions 1 to 45: Find the value of x.

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

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

3. $\frac{x}{360} = \frac{192}{432}$

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

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

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

7. $\frac{231}{64} = \frac{33}{x}$

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

9. $\frac{848}{x} = \frac{729}{3645}$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$32. \frac{279}{391} = \frac{x}{2549}$$

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

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

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

$$36. \frac{63}{93} = \frac{x}{41}$$

$$37. \frac{39}{x} = \frac{x}{121}$$

$$38. \frac{312}{x} = \frac{966}{47}$$

$$39. \frac{123}{279} = \frac{267}{x}$$

$$40. \frac{27}{89} = \frac{39}{x}$$

$$41. \frac{456}{625} = \frac{x}{688}$$

$$42. \frac{146}{259} = \frac{x}{783}$$

$$43. \frac{x}{72} = \frac{542}{103}$$

$$44. \frac{812}{2765} = \frac{x}{850}$$

$$45. \frac{43}{243} = \frac{x}{293}$$

Exercise – 5(b)

Time: 45 min

Questions 1 to 30: Find the value of x.

$$1. \frac{53}{128} = \frac{x}{246}$$

$$2. \frac{1234}{x} = \frac{567}{989}$$

$$3. \frac{63}{x} = \frac{102}{371}$$

$$4. \frac{179}{231} = \frac{33}{x}$$

$$5. \frac{29}{191} = \frac{71}{x}$$

$$6. \frac{x}{321} = \frac{173}{439}$$

$$7. \frac{263}{147} = \frac{60}{x}$$

$$8. \frac{293}{x} = \frac{4295}{6329}$$

$$9. \frac{245}{x} = \frac{312}{333}$$

$$10. \frac{x}{25} = \frac{107}{237}$$

$$11. \frac{213}{284} = \frac{113}{x}$$

$$12. \frac{76.9}{110} = \frac{x}{9167}$$

$$13. \frac{1728}{x} = \frac{252}{294}$$

$$14. \frac{172}{58} = \frac{512}{x}$$

$$15. \frac{x}{225} = \frac{460}{692}$$

$$16. \frac{144}{49} = \frac{x}{588}$$

$$17. \frac{12321}{x} = \frac{111}{88}$$

$$18. \frac{684}{923} = \frac{x}{112}$$

$$19. \frac{x}{174} = \frac{361}{838}$$

$$20. \frac{729}{297} = \frac{x}{11}$$

$$21. \frac{961}{x} = \frac{217}{14}$$

$$22. \frac{841}{x} = \frac{290}{55}$$

$$23. \frac{193}{x} = \frac{34}{413}$$

$$24. \frac{136}{x} = \frac{41}{1603}$$

$$25. \frac{233}{710} = \frac{x}{43}$$

$$26. \frac{784}{x} = \frac{113}{28}$$

$$27. \frac{539}{x} = \frac{1617}{1236}$$

$$28. \frac{1272}{x} = \frac{848}{1431}$$

$$29. \frac{x}{729} = \frac{361}{171}$$

$$30. \frac{646}{x} = \frac{102}{114}$$

Key

Exercise – 5(a)

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|------------|-------------|-------------|------------|------------|
| 1. 21.58 | 10. 220.79 | 19. 69.1 | 28. 239.52 | 37. 68.69 |
| 2. 118.825 | 11. 709.46 | 20. 19.39 | 29. 225.8 | 38. 15.18 |
| 3. 160 | 12. 66.79 | 21. 335.004 | 30. 39.7% | 39. 606.1 |
| 4. 312 | 13. 630.42 | 22. 166.31 | 31. 418 | 40. 128.55 |
| 5. 203 | 14. 279.38 | 23. 411.87 | 32. 1830 | 41. 501.96 |
| 6. 13.95 | 15. 81.25 | 24. 252.68 | 33. 1337.2 | 42. 441.38 |
| 7. 9.14 | 16. 1281.36 | 25. 436.62 | 34. 25.94 | 43. 378.87 |
| 8. 144 | 17. 95.46 | 26. 16.83 | 35. 123 | 44. 249.62 |
| 9. 4240 | 18. 7.822 | 27. 78.11 | 36. 27.77 | 45. 51.84 |

Exercise – 5(b)

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|--------------------------------|-------------|------------|-------------|
| 1. 101.86 | 7. 33.5 | 15. 149.57 | 23. 2344.46 |
| 2. 2152.4 | 8. 431.75 | 16. 1728 | 24. 5317.6 |
| 3. 229.15 | 9. 261.49 | 17. 9768 | 25. 14.111 |
| 4. 42.59 | 10. 11.29 | 18. 82.99 | 26. 194.26 |
| 5. $\frac{13561}{29}$ or 467.6 | 11. 150.66 | 19. 74.95 | 27. 412 |
| | 12. 6408.56 | 20. 27 | 28. 2146.5 |
| | 13. 2016 | 21. 62 | 29. 1539 |
| 6. 126.5 | 14. 172.75 | 22. 159.5 | 30. 722 |