TOPIC 3: DECIMALS

A. Meaning of Places:

Each digit position has a value ten times the place to its right. The part to the left of the point is the whole number part.

example: 324.519

$$= (3 \times 100) + (2 \times 10) + (4 \times 1)$$

$$+ \left(5 \times \tfrac{1}{10}\right) + \left(1 \times \tfrac{1}{100}\right) + \left(9 \times \tfrac{1}{1000}\right)$$

Problems 1-5: Which is larger?

1. .59 or .7
2. .02 or .03
3. .2 or .03
4. 1.9 or 1.09
5. .5 or .49

Answers

1. .7
2. .03
3. .2
4. 1.9
5. .5

Problems 6-8: Arrange in order of size from smallest to largest:

6. .02, .2, .19, .0085
7. .45, .449, .451, .5
8. 4.5, 5.4, 4.49, 5.41

Repeating decimals are shown with a bar over the repeating block of digits:

example: $.\overline{3}$ means .333333333…

example: $.\overline{43}$ means .4343434343…

example: $.4\overline{3}$ means .4333333333…

Problems 9-10: Arrange in order, large to small:

9. $.\overline{3}$, .3, .34

10. .6, $.\overline{67}$, .67, $.67\overline{7}$, $.\overline{6}$

Answers

6. .0085, .02, .19, .2
7. .449, .45, .451, .5
8. 4.49, 4.5, 5.4, 5.41
9. .34, $.\overline{3}$,.3
10. $.6\overline{7}$, $.\overline{67}$, .67, $.\overline{6}$, .6

B. Fraction-decimal conversion:

Fraction to decimal: divide the top by the bottom:

example: $\frac{3}{4} = 3 \div 4 = 0.75$

example: $\frac{20}{3} = 20 \div 3 = 6.\overline{6}$

example: $3\frac{2}{5} = 3 + \frac{2}{5} = 3 + (2 \div 5)$

$= 3 + .4 = 3.4$

Problems 11-14: Write each as a decimal. If the decimal repeats, show the repeating block:

11. $\frac{5}{8} =$

12. $\frac{3}{7} =$

13. $4\frac{1}{3} =$

14. $\frac{3}{100} =$

Non-repeating decimals to fractions: say the number as a fraction, write the fraction you say; reduce if possible:

example: .4 = four tenths $= \frac{4}{10} = \frac{2}{5}$

example: 3.76 = three and seventy six hundredths $= 3\frac{76}{100} = 3\frac{19}{25}$

Answers

11. $.625$
12. $.\overline{428571}$
13. $4.\overline{3}$
14. $.03$

Problems 15-18: Write as a fraction:

15. .01 =	17. 4.9 =
16. .38 =	18. 1.25 =

Comparison of fractions and decimals: usually it is easiest to convert fractions to decimals, then compare:

example: Arrange from small to large: .3, $\frac{2}{5}$, $.\overline{3}$, $\frac{2}{7}$

Answers

15. $\frac{1}{100}$
16. $\frac{19}{50}$
17. $4\frac{9}{10} = \frac{49}{50}$
18. $1\frac{1}{4} = \frac{5}{4}$

As decimals these are: .3, .4, .33333…, $.\overline{285714}$…
So the order is: $.\overline{285714}$, .3. $.\overline{3}$, .4, or $\frac{2}{7}$, .3, $.\overline{3}$, $\frac{2}{5}$

Problems 19-21: Arrange in order, small to large:

19. $\frac{2}{3}$, .6, .67, $.\overline{67}$

20. $\frac{7}{8}$, 0.87, $\frac{13}{16}$, 0.88

21. $\frac{1}{100}$, .01, $.00\overline{9}$, $\frac{5}{500}$

Adding and subtracting decimals: like places must be combined (line up the points):

example: $4 + .3 = 4.3$

example: $3.43 + .791 + 12$:

$$\begin{array}{r} 3.430 \\ .791 \\ \underline{12.000} \\ 16.221 \end{array}$$

example: $8 - 4.96$:

$$\begin{array}{r} 8.00 \\ \underline{-4.96} \\ 3.04 \end{array}$$

example: $6.04 - (2 - 1.4) = 6.04 - .6 = 5.44$

Answers

19. $.6, \frac{2}{3}, .67, .\overline{67}$

20. $\frac{13}{16}, .87, \frac{7}{8}, .88$

21. all equal $\frac{1}{100}$

Problems 22-30: Calculate:

22. $5.4 + .78 =$
23. $1.36 - 0.63 =$
24. $4 - .3 + .001 - .01 + .1 =$
25. $\$3.54 - \$1.68 =$
26. $\$17 - \$10.50 =$
27. $17.5 - 10 =$
28. $4 + .3 + .02 + .001 =$
29. $8.3 - 0.92 =$
30. $4.7 + 47 + 0.47 =$

Answers

22. 6.18
23. .73
24. 3.791
25. $1.86
26. $6.50
27. 7.5
28. 4.321
29. 7.38
30. 52.17