Class VIII Session 2023-24
Subject - Maths
Sample Question Paper - 8

Time Allowed: 3 hours   **Maximum Marks: 80**

Section A

1. Find $\frac{3}{5} + \left(-\frac{5}{12}\right) + \left(-\frac{7}{15}\right) + \frac{5}{20}$ **[1]**

    a) $\frac{-1}{30}$ b) -1

    c) 30   d) $\frac{1}{30}$

2. Solve: $2y + \frac{5}{3} = \frac{26}{3} - y$ **[1]**

    a) $\frac{7}{3}$ b) 7

    c) 3   d) None of these

3. ABCD is a rhombus whose one angle is 60°. The ratio of the lengths of its diagonals is   **[1]**

    a) 3 : 1   b) 2 : 1

    c) $\sqrt{3}$: 1   d) $\sqrt{2}$: 1

4. Area of a square field is 22500 m^2. A man cycles along its boundary at 15 km/ hr. The time will be taken by a   **[1]**
    man to return to starting point, is

    a) 5 mins   b) 4 mins

    c) 3 min 12 sec   d) 2 min 24 sec

5. In the five digit number 1b6a3, a is the greatest single digit perfect cube and twice of it exceeds b by 7. Then the   **[1]**
    sum of the number and its cube root is _____.

    a) 19710   b) 18700

    c) 11862   d) 25320

6. A trader marks his goods 25% above the cost price and gives a discount of 20% on the marked price. His gain or   **[1]**
    loss per cent is

    a) 5% gain   b) 0% gain or loss

    c) 5% loss   d) 10% gain

7. 3p $\times$ (4p^2 + 5p + 7) =?   **[1]**

    a) $12p^3 + 15p^2 + p$ b) $21p^2 + 12p - 2$

    c) $12p^3 + 15p^2 + 21p$ d) $12p^3 + p^2 + 21p$

8. The number 4325×10^{-4} written in standard form is   **[1]**

    a) 432.5×10^{-3} b) 0.4325

9. A hostel had provisions for 75 students for 30 days. After 5 days, 15 more students come to the hostel. How long will the remaining provisions last at the same rate? **[1]**

    a) 18

    b) 25

    c) 15

    d) 20

10. If the rent for grazing 40 cows for 20 days is ₹ 370, how many cows can graze for ₹ 111 for 30 days? **[1]**

    a) 8

    b) 60

    c) 30

    d) 25

Section B

11. Tell what property allows you to compute $\frac{1}{3} \times \left(6 \times \frac{4}{3}\right) \ as \ \left(\frac{1}{3} \times 6\right) \times \frac{4}{3}$ **[2]**

12. Find out if 10648 is a perfect cube? **[2]**

13. Find the value of x^{-3}, if x = $(100)^{1-4} \div (100)^{0}$ **[2]**

14. A train is moving at a uniform speed of 75 km/hour. How far will it travel in 20 minutes? **[2]**

15. Factorise $(x + y)^4 - (x - y)^4$ using the identity $a^2 - b^2 = (a + b) (a - b)$. **[2]**

16. As part of his science project, Prithvi was supposed to record the temperature every hour on Saturday from 6 am to midnight. At noon, he was taking lunch and forgot to record the temperature. At 8:00 pm, his favourite show came on and so forgot again. He recorded the data so collected on a graph sheet as shown below. **[2]**
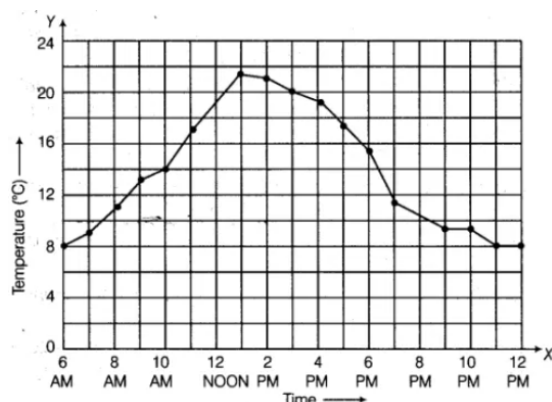
    a. Why does it make sense to connect the points in this situation?

    b. Describe the overall trend, or pattern, in the way the temperature changes over the time period shown on the graph.

    c. Estimate the temperature at noon and 8 pm.

Section C

17. Solve the equations and check your result: x = $\frac{4}{5}(x + 10)$ **[3]**

18. ABCD is a parallelogram. The bisector of angle A intersects CD at X and bisector of angle C intersects AB at Y. Is AXCY a parallelogram? Give reason. **[3]**

19. Find the least number which must be subtracted from 3250 so as to get a perfect square. Also find the square root of the perfect square so obtained. **[3]**

20. An article was purchased for ₹1239 including GST of 18%. Find the price of the article before GST was added. **[3]**

21. The product of two expressions is $x^5 + x^3 + x$. If one of them is $x^2 + x + 1$, find the other. **[3]**

22. Four times the area of the curved surface of a cylinder is equal to 6 times the sum of the areas of its bases. If its height is 12 cm, find its curved surface area. **[3]**

[3]

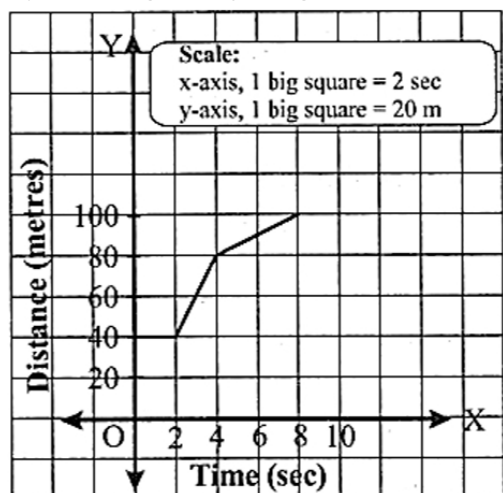23. Find the value of : $\left(\frac{1}{2}\right)^{-2} + \left(\frac{1}{3}\right)^{-2} + \left(\frac{1}{4}\right)^{-2}$

24. Observe the following table and find if the variables (here x and y) are in inverse proportion. **[3]**

x	100	200	300	400
y	60	30	20	15

Section D

Question No. 25 to 28 are based on the given text. Read the text carefully and answer the questions: **[4]**

By observing the adjoining distance versus time graph, find:

25. Speed between 0 to 2 seconds.

      a) 4   b) 0

      c) 5   d) 2

26. Speed between 2 to 4 seconds.

      a) 20 m/s   b) 10 m/s

      c) 5 m/s   d) 0

27. Speed between 4 to 8 seconds.

      a) 10 m/sec   b) 5 m/sec

      c) 20 m/sec   d) 15 m/sec

28. Average speed between 0 to 8 seconds.

      a) 12.5 m/s   b) 11.5 m/s

      c) 9.0 m/s   d) 7.5 m/s

29. ABCD is a trapezium such that AB ∥ CD, ∠A: ∠D = 2: 1, ∠B = ∠C = 7: 5. Find the angles of the trapezium. **[4]**

30. If 60% people in a city like cricket, 30% like football and the remaining like other games, then what per cent of the people like other games? If the total number of people are 50 lakh, find the exact number who like each type of game. **[4]**

31. The difference between compound Interest on a certain sum of money at 10% per annum for 2 years is ₹ 500. Find the sum, if the interest is compounded annually. **[4]**

32. Simplify: (a + b)(2a – 3b + c) – (2a – 3b)c **[4]**

33. Factorise the expression and divide them as directed: $39y^3 (50y^2 - 98) \div 26y^2(5y + 7)$ **[4]**

Question No. 34 to 38 are based on the given text. Read the text carefully and answer the questions: [5]

Read the following pie chart carefully:
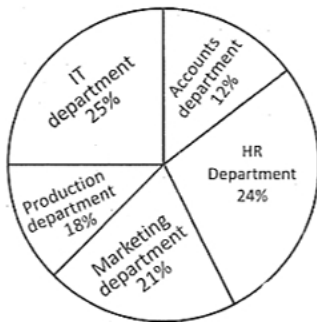
Percentage of Employees in different departments of an organization = 3600

34. What is the number of employees of accounts department?

   a) 362   b) 432

   c) 512   d) 482

35. The ration of the number of employees of Production department to HR Department is _____.

   a) 4 : 7   b) 3 : 8

   c) 3 : 4   d) 7 : 12

36. If 400 new employees are hired in the marketing department, then find the ratio of number of employees of the marketing department to the number of employees in the IT department.

   a) 19 : 16   b) 17 : 196

   c) 17 : 15   d) 289 : 225

37. If 300 employees are shifted from HR department to production department, then new ratio of number of employees of HR department to the production department is _____.

   a) 91 : 37   b) 97 : 29

   c) 38 : 17   d) 28 : 59

38. If 200 new employees are hired in accounts department and 100 employees of IT department left the organization, then new ratio of number of employees of IT department to accounts department is _____.

   a) 79 : 100   b) 81 : 100

   c) 85 : 97   d) 77 : 97

Question No. 39 to 43 are based on the given text. Read the text carefully and answer the questions: [5]

Three metal cubes of sides 6 cm, 8 cm and 10 cm are melted and recast into a big cube.
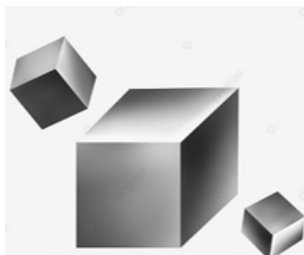
39. Volume of the cube with side 6 cm is _____.

40. Find the Volume of the cube with side 8 cm.

    a) 384 cm^3 b) 512 cm^3

    c) 256 cm^3 d) 64 cm^3

41. Find the Volume of the cube with side 10 cm.

    a) 100 cm^3 b) 400 cm^3

    c) 1000 cm^3 d) 600 cm^3

42. Find the Volume of the big cube?

    a) 1872 cm^3 b) 1782 cm^3

    c) 1600 cm^3 d) 1728 cm^3

43. The side of big cube is 14cm.

    a) True   b) False

Solution

Section A

1. **(a)** $\frac{-1}{30}$

   Explanation: $\left[\frac{3}{5} + \left(\frac{-5}{12}\right)\right] + \left[\left(\frac{-7}{15}\right) + \frac{5}{20}\right]$

   $= \left[\frac{3 \times 12 + (-5) \times 5}{60}\right] + \left[\frac{-7 \times 4 + 3 \times 5}{60}\right]$

   $= \left[\frac{36 - 25}{60}\right] + \left[\frac{-28 + 15}{60}\right]$

   $= \frac{11}{60} + \left(\frac{-13}{60}\right)$

   $= \frac{11 - 13}{60}$

   $= \frac{-2}{60}$

   $= \frac{-1}{30}$

2. **(a)** $\frac{7}{3}$

   Explanation: $2y + \frac{5}{3} = \frac{26}{3} - y$

   or, 2y + y = $\frac{26}{3}$ - $\frac{5}{3}$

   or, 3y = $\frac{21}{3}$

   or, 3y = 7

   or, y = $\frac{7}{3}$

3.
   (c) $\sqrt{3} : 1$

   Explanation: Let ABCD be the Rhombus where $\angle$BAD = 60°

   $\triangle$ABD is Isosceles triangle

   $\Rightarrow \angle$ABD = $\angle$ADB

   Then by angle sum property

   $\angle$A = $\angle$1 = $\angle$2 = 60°

   $\Rightarrow \triangle$ABCD is an equilaterl triangle

   Let BD = x

   Then by phthagorus theorem in $\triangle$ABO

   $(AO)^2 = AB^2 - OB^2$

   $= x^2 - \left(\frac{x}{2}\right)^2 = \frac{\sqrt{3}}{2}x$

   AC = $2 \times$ OA = $2 \times \frac{\sqrt{3}}{2}x = \sqrt{3x}$

   $\Rightarrow$ AC : BD = $\sqrt{3}x : x = \sqrt{3} : 1$

4.
   (d) 2 min 24 sec

   Explanation: Let the side of square field = 'a' m

   $\therefore$ Area of square field = a^2 sq. m

   a^2 = 22500 m^2

   $\Rightarrow$ a = 150 m

   Speed of cycling = 15 km / hr

   $= \frac{15 \times 1000}{60 \times 60} = \frac{25}{6}$ m/s.

   Now, total distance to be covered along the boundary = 4 $\times$ 150 = 600 m

   $\because \frac{25}{6}$ m is covered in 1 sec.

   $\therefore$ 600 m is covered in $\frac{600}{25} \times 6$ = 144 sec = 2 min 24 sec.

5. **(a)** 19710

   Explanation: The given five digit number is 1b6a3

We know that, the greatest single digit perfect cube is 8.

$\therefore$ a = 8

Also, b = 2 × (8) - 7 = 9

So, the five digit number = 19683

Now, 19683 + $\sqrt[3]{19683}$ = 19683 + 27 = 19710

6.

(b) 0% gain or loss

Explanation: Let CP of goods be ₹x.

$\therefore$ MP = $x \times \frac{125}{100} = \frac{5x}{4}$

SP = MP $\times \frac{100 - \text{discount \%}}{100}$

= $\frac{5x}{4} \times \frac{80}{100}$ = x

SP = CP

$\therefore$ Neither profit nor loss i.e., profit or loss = 0%

7.

(c) $12p^3 + 15p^2 + 21p$

Explanation: 3p × ($4p^2$ + 5p + 7)

$3p(4p^2 + 5p + 7)$

Open the brackets we get,

$12p^3 + 15p^2 + 21p$

8.

(c) 4.325×10^{-1}

Explanation: Standard form of 4325×10^{-4}

= $4.325 \times 10^3 \times 10^{-4}$

= 4.325×10^{-1}

9.

(d) 20

Explanation: Total number of students = (75 + 15) = 90 students

Number of days left = (30 - 6) days = 24 days

For 75 students the remaining food would be continued for 24 days

For 1 student the remaining food would be continued for (24 × 75) days

For 90 students the remaining food would be continued for (24 $\times \frac{75}{90}$) days = (24 $\times \frac{5}{6}$) days = (4 × 5) days = 20 days

10. **(a)** 8

Explanation:

Rent (in ₹)	No. of days	No. of cows
370	20	40
111	30	x

Rent is in inverse variation with number of days but rent is indirect variation with number of cows

$\left.\begin{array}{l} 370 : 111 \\ 30 : 20 \end{array}\right\} :: 40 : x$

x = 40 $\times \frac{111}{370} \times \frac{20}{30}$ = 8.

Section B

11. Since $a \times (b \times c) = (a \times b) \times c$ shows the associative property of multiplications.

therefore, $\frac{1}{3} \times \left(6 \times \frac{4}{3}\right) = \left(\frac{1}{3} \times 6\right) \times \frac{4}{3}$

Shows the associative property of multiplication.

12.

2	10648
2	5324
2	2662
11	1331
11	121
	11

By prime factorisation,

10648 = 2 × 2 × 2 × 11 × 11 × 11 [grouping the factors in triplets]

= $2^3 \times 11^3$ [by laws of exponents]

= $(2 \times 11)^3$

= 22^3 which is a perfect cube.

Therefore, 10648 is a perfect cube.

13. Given, x = $(100)^{1-4} \div (100)^0$

$\Rightarrow$ x = $(100)^{-3} \div (100)^0$

$\Rightarrow$ x = $(100)^{-3-0}$ [$\because a^m \div a^n = (a)^{m-n}$]

$\Rightarrow$ x = $(100)^{-3}$

So, $x^{-3} = [(100)^{-3}]^{-3} = (100)^9$ [$\because (a^m)^n = (a)^{mn}$]

14. Let the distance travelled (in km) in 20 minutes be x.

Time = 20 min = $\frac{20}{60}$ hr

Speed = 75 km/hr

Now, distance = speed × time

x = $75 \times \frac{20}{60}$ = 25

So, the train will cover a distance of 25 km in 20 minutes.

15. We have, $(x + y)^4 - (x - y)^4 = [(x + y)^2]^2 - [(x - y)^2]^2$

= $[(x + y)^2 + (x - y)^2][(x + y)^2 - (x - y)^2]$ using the identity [$a^2 - b^2 = (a + b)(a - b)$]

= $(x^2 + y^2 + 2xy + x^2 + y^2 - 2xy)(x + y + x - y)(x + y - x + y)$ again using the identity [$a^2 - b^2 = (a + b)(a - b)$]

= $(2x^2 + 2y^2)(2x)(2y)$

= $2(x^2 + y^2)(2x)(2y)$

= $8xy(x^2 + y^2)$

16. After observing the graph carefully, it can be concluded that

a. By doing this, it is simpler to understand a change in the temperature.

b. Initially, the temperature at 6 AM: 8°C

This temperature started increasing strictly till 1 PM and after that, it decreased to 8°C till 12 PM.

c. At 12 PM, 19°C and also at 8 PM, 10°C.

Section C

17. x = $\frac{4}{5}(x + 10)$

5x = 4(x + 10) ... [Multiplying both sides by 5]

$\therefore$ 5x = 4x + 10

$\therefore$ 5x – 4x = 40 ... [Transposing 4x to L.H.S.]

$\therefore$ x = 40 this is the required solution.

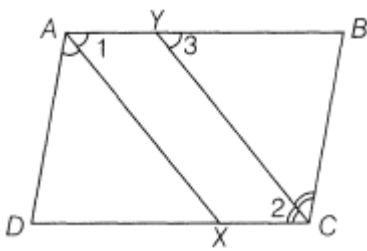Verification

L.H.S. = 40

R.H.S. = $\frac{4}{5}(x + 10)$

$\frac{4}{5} = (40 + 10) = \frac{4}{5}(50)$ = 4(10) = 40

Therefore, L.H.S. = R.H.S.

18. Given, ABCD is a parallelogram.

So, $\angle$A = $\angle$C [$\because$ opposite angles of a parallelogram are equal]

∴ $\frac{\angle A}{2} = \frac{\angle C}{2}$ [dividing both the sides by 2]

∠1 = ∠2 [alternate angles]

But ∠2 = ∠3 [∵ AB ∥ CD and CY is the transversal]

∴ ∠1 = ∠3

But they are pair of corresponding angles.

∴ AX ∥ YC ....(i)

AY ∥ XC [∵ AB ∥ DC] ...(ii)

From Eqs. (i) and (ii), we get

AXCY s a parallelogram.

19.

This shows that 57^2 is less than 3250 by 1. This means, if we subtract the remainder from the number, we get a perfect square, So, the required least number is 1.

Therefore, the required perfect square is 3250 – 1 = 3249

Hence, $\sqrt{3249}$=57.

20. Given,

GST = 18%

Cost with GST included = ₹ 1239

Let cost without GST = x

So, Cost before GST + GST = Cost with GST

x + $\left(\frac{18}{100} \times x\right)$ = 1239

x + $\left(\frac{9x}{50}\right)$ = 1239

x = 1050

Thus, price before GST = 1050 rupees

21. We have, product of two expressions $x^5 + x^3 + x$ and one is $x^2 + x + 1$

Let the other expression be A. Then, A·$(x^2 + x + 1) = x^5 + x^3 + x$

$\Rightarrow \quad A = \frac{x^5+x^3+x}{x^2+x+1} = \frac{x\left(x^4+x^2+1\right)}{x^2+x+1}$

$\Rightarrow \quad A = \frac{x\left(x^4+2x^2-x^2+1\right)}{x^2+x+1} = \frac{x\left(x^4+2x^2+1-x^2\right)}{x^2+x+1}$ [adding and subtracting x^2 in numerator term

$= \frac{x\left[\left(x^4+2x^2+1\right)-x^2\right]}{x^2+x+1} = \frac{x\left[\left(x^2+1\right)^2-x^2\right]}{x^2+x+1}$

$= \frac{x\left(x^2+1+x\right)\left(x^2+1-x\right)}{x^2+x+1}$ [using the identity, $a^2 - b^2 = (a + b)(a - b)$]

$= x(x^2 + 1 - x)$

Hence, the other expression is $x(x^2 - x + 1)$

22. Let the radius and height of the cylinder be r and h, respectively.

Curved surface area of cylinder = 2πrh

Area of base = $πr^2$

Sum of areas of bases = $2πr^2$

According to the question, 4 × Curved surface area = 6 × Sum of areas of bases

4 × 2πrh = 6 × $2πr^2$

= $8\pi rh = 12\pi r^2$

= 2h = 3r

$\Rightarrow$ $r = \frac{2}{3}h$

$\therefore$ $r = \frac{2}{3} \times 12$ = 8cm [$\because$ h = 12 cm, given]

$\therefore$ Curved surface area of the cylinder = $2\pi rh$

= $2 \times \frac{22}{7} \times 8 \times 12 = \frac{44 \times 8 \times 12}{7}$

= 603.428 cm^2

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

= $\frac{1^{-2}}{2^{-2}} + \frac{1^{-2}}{3^2} + \frac{1^2}{4}$

= $\frac{2^2}{1^2} + \frac{3^2}{1^2} + \frac{4^2}{1^2}$

$\frac{4}{1} + \frac{9}{1} + \frac{16}{1}$

= 4 + 9 + 16

= 29

24. $x_1 y_1$ = 100 × 60 = 6000

$x_2 y_2$ = 200 × 30 = 6000

$x_3 y_3$ = 300 × 20 = 6000

$x_4 y_4$ = 400 × 15 = 6000

As $x_1 y_1 = x_2 y_2 = x_3 y_3 = x_4 y_4$

So,

Hence, x and y are in inverse proportion.

Section D

25. **(b)** 0

Explanation: 0 (zero)

26. **(a)** 20 m/s

Explanation: 20 m/s

27. **(b)** 5 m/sec

Explanation: 5 m/s

28. **(d)** 7.5 m/s

Explanation: 7.5 m/s

29. Let ABCD be a trapezium, where AB || CD.
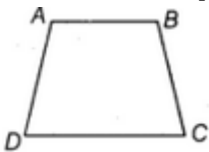
Let the angles A and D be of measures 2x and x, respectively

then 2x + x = 180°

[$\because$ in trapezium, the angles on either side of the base are supplementary]

$\Rightarrow$ 3x = 180°

$\Rightarrow$ x = 60°

$\therefore \angle$A = 2x = 60° = 120°, $\angle$D = 60°

Again, let the angles B and C be 7x and 5x respectively. Then 7x + 5x = 180°

$\Rightarrow$ 12x = 180°

$\Rightarrow$ x = 15°

Thus, $\angle$B = 7 × 15 = 105° and $\angle$C = 5 × 15 = 75°

30. Number of people who like cricket = 60%

Number of people who like football = 30%

Number of people who like other games

= 100% – (60% + 30%)

= 100% – 90%

= 10%

Total number of people = 50 lakhs = 50,00,000

Now number of people who like cricket

= 60% of 50,00,000

$= \frac{60}{100} \times 5000000$

= 30,00,000 or, 30 lakh

Number of people who like football

= 30% of 50,00,000

$= \frac{30}{100} \times 5000000$

= 15,00,000 or, 15 lakh

Number of people who like the other games

= 10% of 50,00,000

$= \frac{10}{100} \times 5000000$

= 5,00,000 or, 5 lakh

31. Let Principal (P) = ₹ x

Rate of interest (R) = 10%

Time period (T) = 2 years

C.I. – S.I =₹ 500

C.I. = A - P

$= P\left(1 + \frac{R}{100}\right)^T - P$

$= x\left(1 + \frac{10}{100}\right)^2 - x$

$= x\left(\frac{11}{10}\right)^2 - x$

$= \frac{121x}{100} - x = \frac{121x - 100x}{100} = \frac{21x}{100}$

$S.I. = \frac{P \times T \times R}{100}$

$= \frac{x \times 2 \times 10}{100} = \frac{x}{5}$

Now, C.I. - S.I. $= \frac{21x}{100} - \frac{x}{5} = 500$

$= \frac{21x}{100} - \frac{x}{5} = 500$

$= \frac{x}{100} = 500$

$x = 500 \times 100 = 50000$

Therefore, x = 50,000.

i.e., Principal (P) =₹ 50,000.

32. (a + b)(2a – 3b + c) – (2a – 3b)c

= a(2a – 3b + c) + b(2a – 3b + c) – (2ac – 3bc)

= $2a^2$– 3ab + ac + 2ab – $3b^2$ + bc – 2ac + 3bc

= $2a^2$ – ab – $3b^2$ + (bc + 3bc) + (ac – 2ac)

= $2a^2$ – $3b^2$ – ab + 4bc – ac

33. $39y^3$ ($50y^2$ – 98) ÷ $26y^2$(5y + 7)

$= \frac{39y^3(50y^2 - 98)}{26y^2(5y + 7)}$

$= \frac{39y^3 \times 2 \times (25y^2 - 49)}{26y^2(5y + 7)}$

$= \frac{39y^3 \times 2 \times \{(5y)^2 - (7)^2\}}{26y^2(5y + 7)}$

$= \frac{39y^3 \times 2 \times (5y + 7)(5y - 7)}{26y^2(5y - 7)}$. . . . [Using Identity III

= 3y (5y – 7)

Section E

34.   **(b)** 432

Explanation: 432

35. **(c)** 3 : 4

    Explanation: 3 : 4

36. **(d)** 289 : 225

    Explanation: 289 : 225

37. **(b)** 97 : 29

    Explanation: 97 : 29

38. **(a)** 79 : 100

    Explanation: 79 : 100

39. 1. 216 cm3

40. **(b)** 512 cm^3

    Explanation: 512 cm^3

41. **(c)** 1000 cm^3

    Explanation: 1000 cm^3

42. **(d)** 1728 cm^3

    Explanation: 1728 cm^3

43. **(b)** False

    Explanation: False