Exam 1_2 (Units 1-2)

Remember: in each question, write the steps you have taken to reach the solution.

1) Classify the following numbers and express the rational numbers as fractions:

$$1.6, \quad 0.161661666...., \quad -\sqrt{3}, \quad -0.1\hat{6}, \quad 0.1666666......, 1 \qquad (1.5p)$$

2) Calculate and express your result using standard form: (2 p)

a) $(5.12 \cdot 10^5) \cdot (3 \times 10^2) =$

b) $(8.43 \cdot 10^8) \div (3 \cdot 10^{-3}) =$

c) $(4.5 \cdot 10^3 + 2.1 \cdot 10^4) \cdot 6.2 \cdot 10^{-2}$

d) $5.2 \cdot 10^5 - 1.4 \cdot 10^6 =$

3) Round: (1 p)

Number	To the nearest tenth	To the nearest thousandth
-1.302571		
0.0072849		
2.666666.....		
98.070770777...		

4) Reduce the powers, using properties: (1.5 p)

a) $\left(\dfrac{4}{3}\right)^{-1} \cdot \dfrac{9}{2} \cdot \left(\dfrac{3}{2}\right)^{-2} =$

b) $\dfrac{a^{-2} \cdot b^4 \cdot \left(a^2 b\right)^3}{\left(a^2\right)^5 \cdot b^{-2} \cdot (ab)^3} =$

5) Work out and simplify: (1.5 p)

a) $\left(1 - \dfrac{1}{3} + \dfrac{3}{6}\right) \cdot 2^{-2} - \dfrac{1}{2} \cdot \dfrac{5}{3} =$

b) $\dfrac{3}{5} + \dfrac{8}{5} \cdot \left(\dfrac{2}{3} - \dfrac{1}{4}\right) - \dfrac{1}{5} =$

5) Victoria is planning for her holiday. She calculates that if she spends a third of her savings on a plane ticket and a quarter of the rest on a hotel, she will still have €450 left. How much money does she have? (1.25 p)

6) Your friend diets and goes from 125 pounds to 110 pounds. What was her percentage weight loss? (1.25 p)

ANSWERS

1) Classify the following numbers and express the rational numbers as fractions:

$$1.6, \quad 0.161661666...., \quad -\sqrt{3}, \quad -0.1\hat{6}, \quad 0.161616......, 1$$

1.6 Rational $\rightarrow 1.6 = \dfrac{16}{10} = \dfrac{8}{5}$

$0.161661666.....$ Irrational

$-\sqrt{3}$ Irrational

$-0.1\hat{6}$ Rational $\rightarrow N = 0.1\hat{6} \rightarrow \begin{cases} 100N = 16.66666... \\ 10N = 1.66666... \end{cases} \rightarrow 90N = 15 \rightarrow N = \dfrac{15}{90}$

$-0.1\hat{6} = -\dfrac{15}{90} = -\dfrac{1}{6}$

$0.161616......$ Rational $\rightarrow \begin{cases} 100N = 16.66666... \\ N = 0.66666... \end{cases} \rightarrow 99N = 16 \rightarrow N = \dfrac{16}{99}$

1 Whole number, rational

2) Calculate and express your result using standard form:

a) $\left(5.12 \cdot 10^5\right) \cdot \left(3 \cdot 10^2\right) = 15.36 \cdot 10^7 = 1.536 \cdot 10^8$

b) $\left(8.43 \cdot 10^8\right) \div \left(3 \cdot 10^{-3}\right) = 2.81 \cdot 10^{8-(-3)} = 2.81 \cdot 10^{11}$

c) $\left(4.5 \cdot 10^3 + 2.1 \cdot 10^4\right) \cdot 6.2 \cdot 10^{-2} = \left(0.45 \cdot 10^4 + 2.1 \cdot 10^4\right) \cdot 6.2 \cdot 10^{-2} =$

$= \left(2.55 \cdot 10^4\right) \cdot 6.2 \cdot 10^{-2} = 15.81 \cdot 10^2 = 1.581 \cdot 10^3$

d) $5.2 \cdot 10^5 - 1.4 \cdot 10^6 = 5.2 \cdot 10^5 - 14 \cdot 10^5 = -8.8 \cdot 10^5$

3) Complete :

Number	To the nearest tenth	To the nearest thousandth
-1.302571	-1.3	-1.303
0.0072849	0.0	0.007
2.666666.....	2.7	2.667
98.070770777...	98.1	98.071

4) Reduce the powers, using properties:

a) $\left(\dfrac{4}{3}\right)^{-1} \cdot \dfrac{9}{2} \cdot \left(\dfrac{3}{2}\right)^{-2} = \dfrac{3}{4} \cdot \dfrac{9}{2} \cdot \left(\dfrac{2}{3}\right)^2 = \dfrac{3 \cdot 3^2 \cdot 2^2}{2^2 \cdot 2 \cdot 3^2} = \dfrac{3}{2}$

b) $\dfrac{a^{-2} \cdot b^4 \cdot \left(a^2 b\right)^3}{\left(a^2\right)^5 \cdot b^{-2} \cdot (ab)^3} = \dfrac{a^{-2} \cdot b^4 \cdot a^6 b^3}{a^{10} \cdot b^{-2} \cdot a^3 b^3} = \dfrac{a^4 b^7}{a^{13} b} = \dfrac{b^6}{a^9}$

5) Work out and simplify:

a) $\left(1 - \dfrac{1}{3} + \dfrac{3}{6}\right) \cdot 2^{-2} - \dfrac{1}{2} \cdot \dfrac{5}{3} = \left(\dfrac{6}{6} - \dfrac{2}{6} + \dfrac{3}{6}\right) \cdot \dfrac{1}{2^2} - \dfrac{5}{6} = \dfrac{7}{6} \cdot \dfrac{1}{4} - \dfrac{5}{6} =$

$= \dfrac{7}{24} - \dfrac{5}{6} = \dfrac{7}{24} - \dfrac{20}{24} = -\dfrac{13}{24}$

b) $\dfrac{3}{5} + \dfrac{8}{5} \cdot \left(\dfrac{2}{3} - \dfrac{1}{4}\right) - \dfrac{1}{5} = \dfrac{3}{5} + \dfrac{8}{5} \cdot \left(\dfrac{8}{12} - \dfrac{3}{12}\right) - \dfrac{1}{5} = \dfrac{3}{5} + \dfrac{8}{5} \cdot \dfrac{5}{12} - \dfrac{1}{5} =$

$= \dfrac{3}{5} + \dfrac{8}{12} - \dfrac{1}{5} = \dfrac{3}{5} + \dfrac{2}{3} - \dfrac{1}{5} = \dfrac{2}{5} + \dfrac{2}{3} = \dfrac{6}{15} + \dfrac{10}{15} = \dfrac{16}{15}$

5) Victoria is planning for her holiday. She calculates that if she spends a third of her savings on a plane ticket and a quarter of the rest on a hotel, she will still have €450 left. How much money does she have?

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1/3 PLANE TICKETS (ORANGE)
1/4 (of the rest) HOTEL (BLUE)
She will have $450 left (WHITE)
Each square $450 \div 6 = 75 \rightarrow$ TOTAL: $75 \cdot 12 = 900$

A: She has $900

6) Your friend diets and goes from 125 pounds to 110 pounds. What was her percentage weight loss?

$\dfrac{125}{100\,\%} = \dfrac{110}{x\,\%} \rightarrow x = \dfrac{110 \cdot 100}{125} = 88\,\%$

A: She has lost 12% of her weight