The National Orthodox School Shmaisani

Subject: Mathematics **Revision Worksheet**

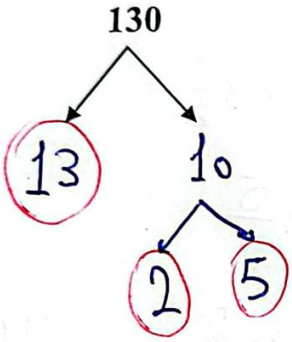
Name: Basel Nassar **Grade-Section:** 8 CS

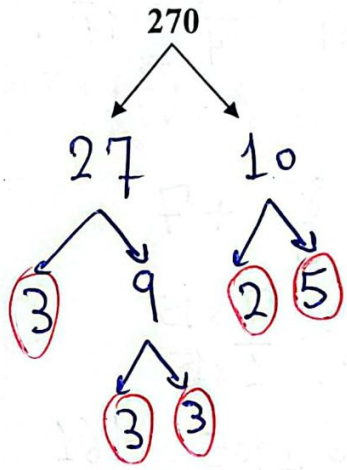
Date: **Teacher:** Zain Hattar

Objective: Revise factors, fractions, order of operations, recurring decimals, irrational numbers, estimating square roots and cube roots, index laws, multiplying and dividing a number by a power of 10, standard form, lower and upper bounds, ratio and proportion.

Question 1

Find the HCF of 130 and 270





130 = 2 x 5 x 13

270 = 2 x 3 x 3 x 3 x 5

HCF = 2 x 5 = 10

Question 2

Work out the following without using a calculator. Show all the steps of your working and give your answer as a fraction in its simplest form.

a) $9\frac{5}{7} + 4\frac{1}{2} \times 3 =$

$= \frac{68}{7} + \frac{9}{2} \times 3$

$= \frac{2 \times 68}{2 \times 7} + \frac{27 \times 7}{2 \times 7}$

$= \frac{136}{14} + \frac{189}{14} = \frac{325}{14} = 23\frac{3}{14}$

b) $5\frac{1}{8} - 3\frac{3}{4} =$

$\frac{41}{8} - \frac{15 \times 2}{4 \times 2} = \frac{41}{8} - \frac{30}{8}$

$= \frac{11}{8} = 1\frac{3}{8}$

c) $(2\frac{1}{3}) \times (1\frac{3}{5}) + 7 =$

$\frac{7}{3} \times \frac{8}{5} + 7$

$= \frac{56}{15} + \frac{7 \times 15}{1 \times 15}$

$= \frac{56}{15} + \frac{105}{15} = \frac{161}{15}$

$= 10\frac{11}{15}$

d) $-10\frac{1}{4} \div 2\frac{1}{2} =$

$-\frac{41}{4} \div \frac{5}{2}$

$= -\frac{41}{4} \times \frac{2}{5} = -\frac{41}{10}$

$= -4\frac{1}{10}$

Question 3

Decide whether the fraction $\frac{28}{160}$ will be equivalent to a recurring decimal or a terminating decimal. Explain why using prime factors!

$\frac{28}{160}$ is equivalent to a terminating decimal because $160 = 2^5 \times 5$.

Question 4

Sort the following numbers into one of these three groups.

Put a tick (√) in the correct box.

Number	Rational	Irrational	Not rational or irrational
-697	✓		
$-\sqrt{49}$	✓		
1.67	✓		
$\sqrt[3]{-125}$	✓		
80π		✓	
$\sqrt[3]{310}$		✓	
$\sqrt{-77}$			✓
$\frac{44}{6}$	✓		

Question 5

Estimate the following square root to 1 d.p. Show all the steps of your working

$\sqrt{85}$

closer

$81 < 85 < 100$

$9 < \sqrt{85} < 10$

$\sqrt{85} \approx 9.1$

Estimate the following cube root to 1 d.p. Show all the steps of your working.

$\sqrt[3]{120}$

closer

$64 < 120 < 125$

$4 < \sqrt[3]{120} < 5$

$\sqrt[3]{120} \approx 4.9$

Question 6

Complete using index laws:

$3^{\boxed{-1}} = \frac{1}{9}$

$(-\frac{2}{5})^0 = \boxed{1}$

$(14)^0 = \boxed{1}$

Question 7

Simplify using index laws. Show all the steps of your working and leave your answer in positive index form.

a) $\frac{(7^4 \times 7^5)^2}{7^7} = \frac{(7^9)^2}{7^7}$

$= \frac{7^{18}}{7^7} = 7^{18-7}$

$= 7^{11}$

b) $\frac{(3^5 \times 3^2)^2}{(3^7 \div 3^3)}$

$\frac{(3^7)^2}{3^4} = \frac{3^{14}}{3^4}$

$= 3^{14-4} = 3^{10}$

Question 8

What are the numbers x and y if

$2^x = 4^y = 16^2 = 256$

$4^y = 16^2$

$4^y = (4^2)^2 = 4^4$

$\rightarrow \boxed{y = 4}$

$2^x = 4^4 = (2^2)^4 = 2^8$

$\boxed{x = 8}$

x = 8

y = 4

Question 9

Work out:

a) $0.94 \times 10^3 =$ 940

b) $1986 \div 10^5 =$ 0.01986

c) $7000 \times 10^{-3} =$ 7

d) $0.0987 \div 10^{-4} =$ $0.0987 \div \frac{1}{10^4} = 0.0987 \times 10^{+4} = 987$

e) $4700 \times 10^{-2} + 0.23 \div 10^{-3} =$ $47 + 0.23 \div \frac{1}{10^3} = 47 + 0.23 \times 10^3 = 47 + 230 = \boxed{277}$

Question 10

Write in standard form:

a) $84510 =$ 8.451×10^4

b) $0.00643 =$ 6.43×10^{-3}

c) $78412 =$ 7.8412×10^4

d) $0.0458 =$ 4.58×10^{-2}

Question 11

Write an inequality to show the upper and lower bounds for a number, n, where n is:

a) 47.6 rounded correct to the nearest 1 d.p.

$\frac{0.1}{2} = 0.05$

U.B $\rightarrow$ $47.6 + 0.05 = 47.65$

L.B $\rightarrow$ $47.6 - 0.05 = 47.55$

$47.55 \leq n < 47.65$

b) 0.03 rounded correct to the nearest 1 s.f.

$\frac{0.01}{2} = 0.005$

U.B $\rightarrow$ $0.03 + 0.005 = 0.035$

L.B $\rightarrow$ $0.03 - 0.005 = 0.025$

$0.025 \leq n < 0.035$

Question 12

$0.456 \times 1000 = 456\ g$

Divide 0.456 kg in the ratio 6 : 1 : 5

Show your work clearly.

$6+1+5 = 12$ Parts

$\frac{456}{12} = 38\ g$ for each part

$6 \times 38 = 228\ g$, $1 \times 38 = 38\ g$, $5 \times 38 = 190\ g$

228 grams 38 grams 190 grams

Question 13

Write each of these as a ratio in its simplest whole-number form.
Show your work.

a) $(248 : 124 : 48) \div 4$

$62 : 31 : 12$

b) $(25 : 3.5 : 11.5) \times 10$

$(250 : 35 : 115) \div 5$

$50 : 7 : 23$

c) $0.2 : 40\% : \frac{2}{5}$

$(0.2 : 0.4 : 0.4) \times 10$

$(2 : 4 : 4) \div 2$

$1 : 2 : 2$

Question 14

Compare these quantities using ratio.

a) 490 mm and 70 cm

490 mm and 700 mm

490 : 700

(49 : 70) ÷ 7

7 : 10

b) 12.6 kg and 360 g

12600 g and 360 g

(12600 : 360) ÷ 6

(210 : 6) ÷ 6 = **35 : 1**

Question 15

I exchange **200 US dollars** ($) for **1900 South African rand** (R).

At the same rate of exchange, how many dollars would I get for **R 3610**? $380

$	200	380
R	1900	3610

÷9.5

$$\text{multiplier} = \frac{1900}{200} = 9.5$$

Question 16

x and y are directly proportional.

x	5	10	15
y	22.5	45	67.5

a) Find the multiplier from x to y.

$$\text{multiplier} = \frac{22.5}{5} = 4.5$$

b) Find the equation connecting x and y.

$y = mx$, m = gradient = multiplier

$$\boxed{y = 4.5x}$$

c) Using the equation, find the value of y when x = 20

$$y = 4.5 \times 20 = 90$$

d) Using the equation, find the value of x when y = 135

$$\frac{135}{4.5} = \frac{4.5}{4.5}x$$

$$\boxed{x = 30}$$

Question 17

a) The time, t seconds, it takes a water heater to boil some water is directly proportional to the mass of water, m kg, in the water heater.

When $m = 250$ kg, $t = 600$ seconds

Find t when $m = 400$ kg

t (s)	600	960
m (kg)	250	400

$\div \frac{5}{12}$

Multiplier $= \frac{250}{600} = \frac{5}{12}$

$t =$ 960 seconds

b) The time, t seconds, it takes a water heater to boil a constant mass of water is inversely proportional to the power, p watts, of the water heater.

When $p = 1400$ watts, $t = 360$ seconds

Find the value of t when $p = 900$ watts

t (s)	360	560
P (watts)	1400	900

$360 \times 1400 = 504000$

$\frac{504000}{900} = 560$

$t =$ 560 seconds