Subject: Mathematics

Name: Answers

Date:

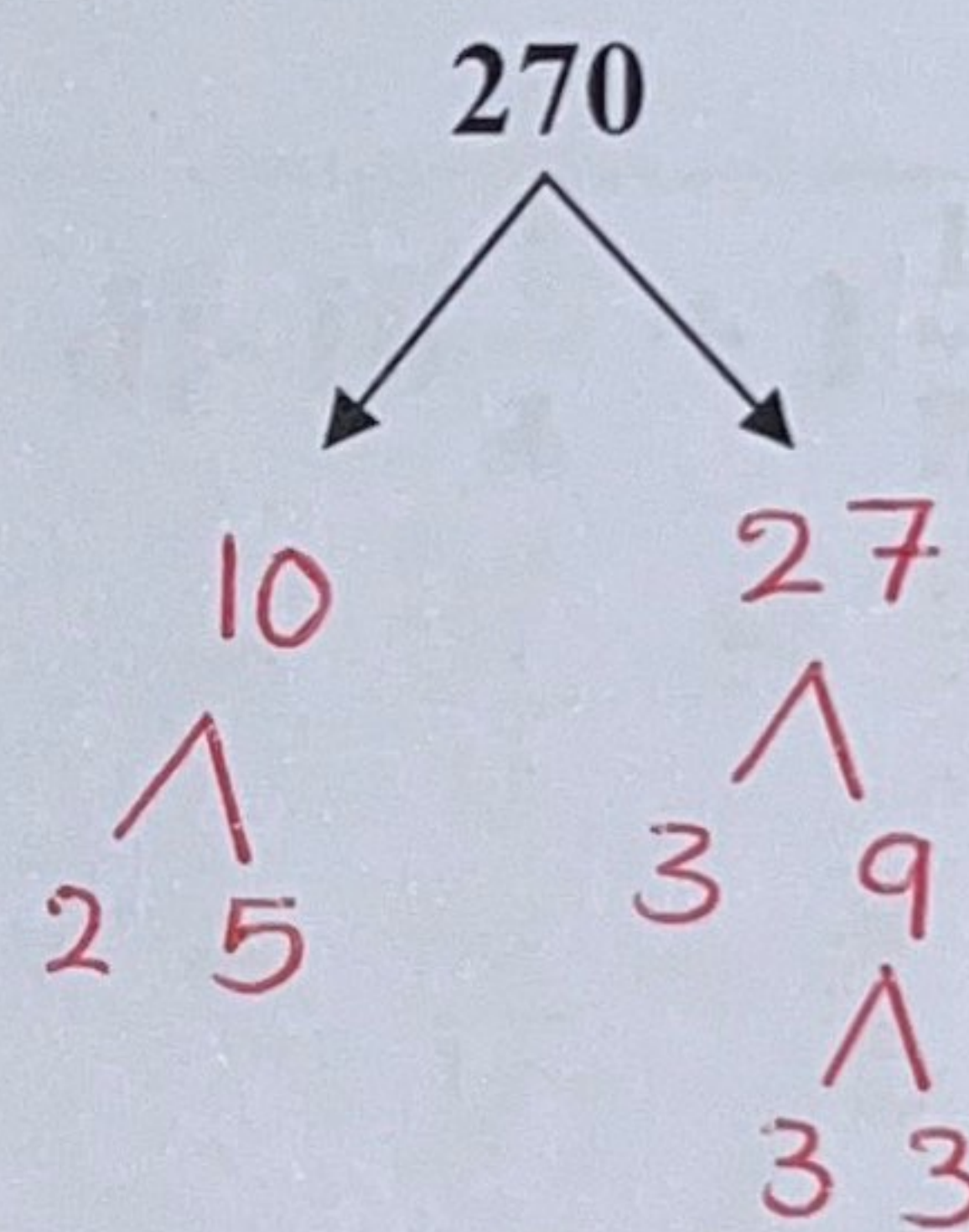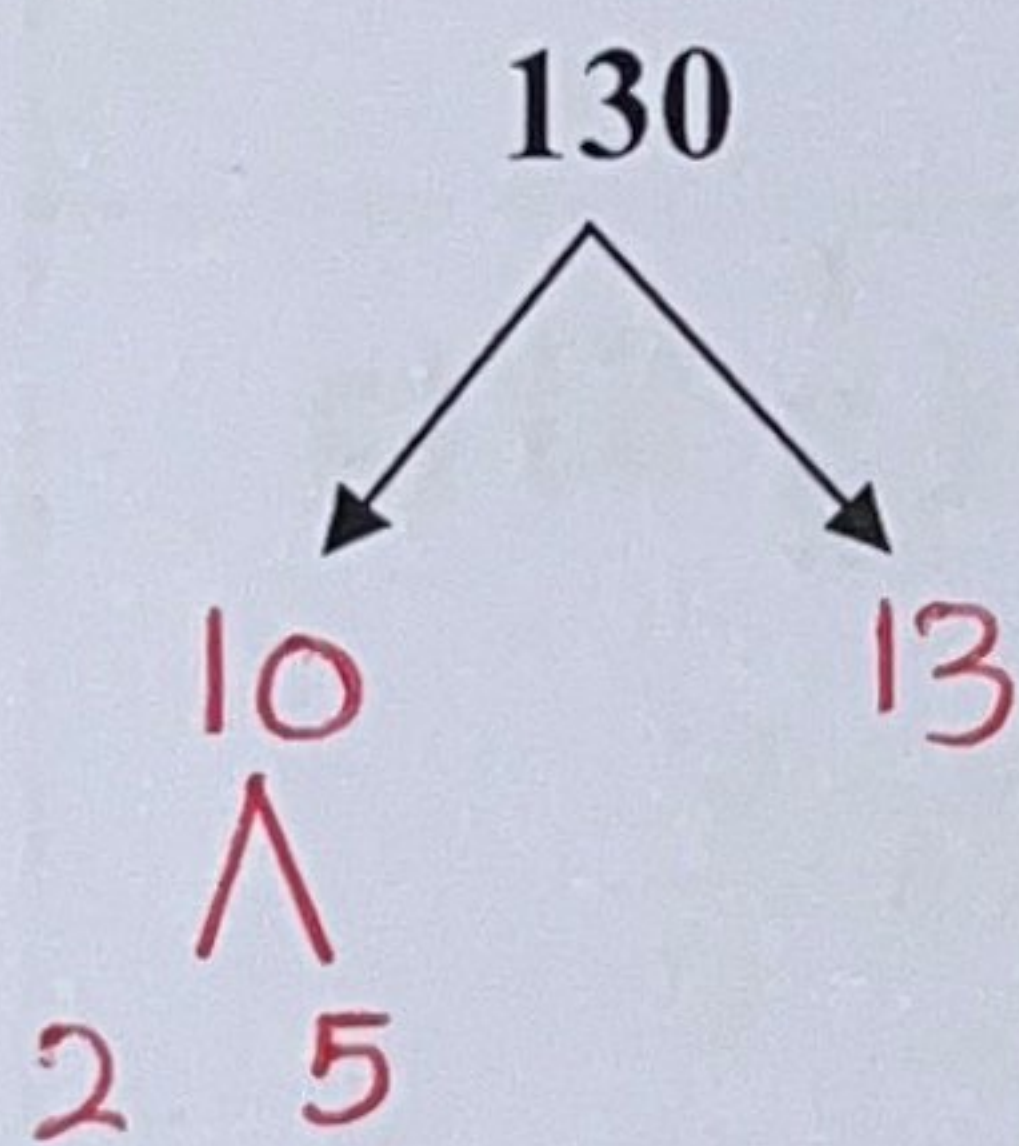**Revision Worksheet**

Grade-Section: 8 CS

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

$$130 = \underline{2 \times 5 \times 13}$$

$$270 = \underline{2 \times 3^3 \times 5}$$

$$HCF = \underline{2 \times 5 = 10}$$

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.

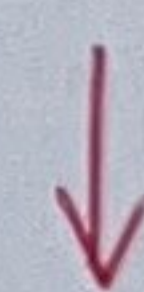|	
a) $9\frac{5}{7} + 4\frac{1}{2} \times 3 =$ $\frac{68}{7} + \frac{9}{2} \times 3 =$ $\frac{68^{\times 2}}{7^{\times 2}} + \frac{27^{\times 7}}{2^{\times 7}} =$ $\frac{136}{14} + \frac{189}{14} = \frac{325}{14}$ $= 23\frac{3}{14}$	b) $5\frac{1}{8} - 3\frac{3}{4} =$ $\frac{41}{8} - \frac{15\times 2}{4\times 2} =$ $\frac{41}{8} - \frac{30}{8} = \frac{11}{8}$ $= 1\frac{3}{8}$
c) $(2\frac{1}{3}) \times (1\frac{3}{5}) + 7 =$ $\frac{7}{3} \times \frac{8}{5} + \frac{7^{\times 15}}{1^{\times 15}} =$ $\frac{56}{15} + \frac{105}{15} =$ $= \frac{161}{15} = 10\frac{11}{15}$	d) $-10\frac{1}{4} \div 2\frac{1}{2} =$ $-\frac{41}{4} \div \frac{5}{2} =$ $-\frac{41}{\cancel{4}_2} \times \frac{\cancel{2}}{5} =$ $= -\frac{41}{10} = -4\frac{1}{10}$

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!

$\frac{28 \div 4}{160 \div 4} = \frac{7}{40}$

40
$\wedge$
$4 \quad 10$
$\wedge \quad \wedge$
$2 \ 2 \quad 2 \ 5$

$40 = 2^3 \times 5$

Only 2s and 5s

$\downarrow$

Terminating decimal

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		✓	
$\sqrt[3]{310}$		✓	
$\sqrt{-77}$			✓
$\dfrac{44}{6}$	✓		

Question 5

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

$$\sqrt{81} \qquad \sqrt{85} \qquad \sqrt{100}$$

$$9 \qquad\qquad 10$$

$$85 - 81 = 4$$

$$100 - 81 = 19$$

$$\frac{4}{19} \approx 0.2$$

$$9 + 0.2 = 9.2 \rightarrow \sqrt{85} \approx 9.2$$

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

$$\sqrt[3]{64} \qquad \sqrt[3]{120} \qquad \sqrt[3]{125}$$

$$4 \qquad\qquad\qquad 5$$

$$120 - 64 = 56$$

$$125 - 64 = 61$$

$$\frac{56}{61} \approx 0.9$$

$$4 + 0.9 = 4.9 \rightarrow \sqrt[3]{120} \approx 4.9$$

Question 6

Complete using index laws:

$$3^{-2} = \frac{1}{9}$$

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

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

Question 7

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

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

$\dfrac{(7^9)^2}{7^7} = \dfrac{7^{18}}{7^7}$

$= 7^{11}$

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

$\dfrac{(3^7)^2}{3^4} = \dfrac{3^{14}}{3^4} = 3^{10}$

Question 8

What are the numbers x and y if

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

$4^y = 16^2$ ⟩ Replace 16 by 4^2

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

$4^y = 4^4$

→ $y = 4$

$2^x = 4^y = 4^4$ ⟩ Replace 4 by 2^2

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

$2^x = 2^8$

→ $x = 8$

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} = $ _987_

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

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.

$$0.1 \div 2 = 0.05$$

$$47.6 - 0.05 = 47.55$$

$$47.6 + 0.05 = 47.65$$

$$\boxed{47.55} \leq n < \boxed{47.65}$$

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

↑
1 s.f.

$$0.01 \div 2 = 0.005$$

$$0.03 - 0.005 = 0.025$$

$$0.03 + 0.005 = 0.035$$

$$\boxed{0.025} \leq n < \boxed{0.035}$$

Question 12

Divide 0.456 kg in the ratio 6 : 1 : 5

Show your work clearly.

$0.456 \text{ kg} \xrightarrow{\times 1000} 456 \text{ g}$

$6 : 1 : 5$

$228g \quad 38g \quad 190g$

$12 \text{) } \times 38$
$456 g$

__228__ grams __38__ grams __190__ grams

Question 13

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

a) 248 : 124 : 48

÷4 62 : 31 : 12

b) 25 : 3.5 : 11.5 | or   25 : 3.5 : 11.5

×2   50 : 7 : 23 | ×10 250 : 35 : 115

                                      ÷5   50 : 7 : 23

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

     0.2 : 0.4 : 0.4

×10 2 : 4 : 4

÷2   1 : 2 : 2

Question 14

They
must
be
the
Same
unit.

Compare these quantities using ratio.

a) 490 mm and 70 cm

$÷10$ ↓ mm/cm

$49 : 70$

$÷7$

$7 : 10$

b) 12.6 kg and 360 g

$× 1000$ ↓ kg/g

$12600 : 360$

$÷10$ $1260 : 36$

$÷36$ $35 : 1$

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?

$$\$ \qquad R$$

Direct
Proportion

$$200 \qquad 1900$$

$$? \qquad 3610$$

$$= \frac{3610 \times 200}{1900} = \$380$$

Question 16

x and y are <u>directly proportional.</u>

x	5	10	15
y	22.5	45	67.5

(annotation: 2×4.5)

a) Find the multiplier from x to y.

$$m = \frac{22.5}{5} = 4.5$$

b) Find the equation connecting x and y.

$$y = mx$$
$$y = 4.5\,x$$

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

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

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

$$y = 4.5\,x$$
$$\frac{135}{4.5} = \frac{4.5\,x}{4.5}$$
$$x = 30$$

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

Direct
Proportion

$$\begin{array}{cc} t & m \\ 600 \text{ seconds} & 250 \text{ kg} \\ ? & 400 \text{ kg} \end{array}$$

$$\frac{400 \times 600}{250} = 960 \text{ seconds}$$

$t = \underline{960}$ 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

Inverse
Proportion

$$\begin{array}{cc} t & P \\ 360 \text{ seconds} & \xleftrightarrow{x} 1400 \text{ watts} \\ ? & 900 \text{ watts} \end{array}$$

$360 \times 1400 = 504\,000$
$504\,000 \div 900 = 560$ seconds

$t = \underline{560}$ seconds