Top Math IGCSE

Intensive Maths IGCSE -Oct Nov 2023

Day:1

Topic📚

Numbers

Fraction Decimal

Percentage

Ratio and Proportion

Estimating

Standard form

Part - ครูส้ม🍊

Numbers:Numbers.

Prime Numbers

2 3 5 7 11 13 17 19 23 29 31

"1" is not a prime numbers

"2" is the only even prime numbers

Numbers:Numbers.

Product of prime factors (The Factor Tree)

Example:Express 240 as a product of power of prime factor.

Product of prime factor

Product of power of prime factor

8 (a) Write 300 as a product of its prime factors.
Show your working clearly.

.....

(2)

1 Write 2250 as a product of powers of its prime factors.
Show your working clearly.

.....

(Total for Question 1 is 3 marks)

Numbers:Numbers.

LCM and HCF

LCM-Lowest Common Multiple

The smallest number that will divide by all the numbers in question

(Big value)

HCF-Highest Common Factor

The biggest number that will divide into all the numbers in question

(Small value)

Example:Find HCF and LCM of 90,150

Extra : $(X_1)(X_2)$ = (HCF of X_1 and X_2)(LCM of X_1 and X_2)

HCF of 90 and 150 is 30

LCM of 90 and 150 is 450

Extra : $(X_1)(X_2)$ = (HCF of X_1 and X_2)(LCM of X_1 and X_2)

Example: x and 147 have HCF = 21 and LCM = 735. Find value of x.

Example: Find HCF and LCM of A and B .

$A = 2^3 \times 3^5 \times 5$

$B = 2 \times 3^2 \times 5^2 \times 7$

Example: Find HCF and LCM of A , B and C.

$A = 2^4 \times 3 \times 7$

$B = 2^3 \times 3^2 \times 5$

$C = 2^2 \times 5 \times 7$

7 (a) Find the highest common factor (HCF) of 200 and 420

.....

(2)

6 (a) Work out the lowest common multiple (LCM) of 36 and 120

.....

(2)

8) $A = 2 \times 2 \times 2 \times 3 \times 3 \times 5$

$B = 2 \times 2 \times 3 \times 3 \times 3 \times 5$

(b) Find the lowest common multiple (LCM) of $5A$ and $7B$
Show your working clearly.

.....

(2)

(Total for Question 8 is 4 marks)

7) $A = 2^3 \times 3 \times 5 \times 7^2$
$B = 2 \times 3^2 \times 7$
$C = 3 \times 5^2 \times 11$

(b) Find the lowest common multiple (LCM) of A, B and C
Write your answer as a product of powers of prime factors.

.....

(2)

(Total for Question 7 is 4 marks)

6) $A = 5^2 \times 7^4 \times 11^p$
$B = 5^m \times 7^{n-5} \times 11$

m, n and p are integers such that
$m > 2$
$n > 10$
$p > 1$

(b) Find the highest common factor (HCF) of A and B
Give your answer as a product of powers of its prime factors.

.....

(2)

(Total for Question 6 is 4 marks)

Numbers:Fractions.

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Convert between Mixed numbers and Improper fractions.

Example: $4\frac{3}{5}$ → Improper fraction

Example: $\frac{37}{4}$ → Mixed number

Calculator

Numbers:Numbers.

Calculator

Ans ⇝ This uses last answer in your current calculation

S⇔D ⇝ Fraction or Surd to decimal (Estimate)

SHIFT = Yellow

$\sqrt[3]{\square}$ ⇝ the cube root

$a\frac{b}{c} \leftrightarrow \frac{d}{c}$ ⇝ Change between Mixed number and Improper Fraction.

$\square\frac{\square}{\square}$ ⇝ Mixed number

1 Show that $4\frac{2}{3} \div 1\frac{1}{5} = 3\frac{8}{9}$

(Total for Question 1 is 3 marks)

4 Show that $5\frac{1}{3} - 2\frac{6}{7} = 2\frac{10}{21}$

(Total for Question 4 is 3 marks)

Example : Write $3.\dot{4}2\dot{1}$ as a fraction.

Example : Write $0.4\dot{2}\dot{1}$ as a fraction.

Example : Write $0.42\dot{1}$ as a fraction.

15 (a) Use algebra to show that $4.\dot{5}\dot{7} = 4\frac{19}{33}$

(2)

13 Use algebra to show that $0.3\dot{8}\dot{1} = \frac{21}{55}$

(Total for Question 13 is 2 marks)

16 Use algebra to show that the recurring decimal $0.28\dot{1}\dot{3} = \frac{557}{1980}$

(Total for Question 16 is 2 marks)

18 $0.4\dot{x}$ is a recurring decimal.
x is a whole number such that $1 \leqslant x \leqslant 9$

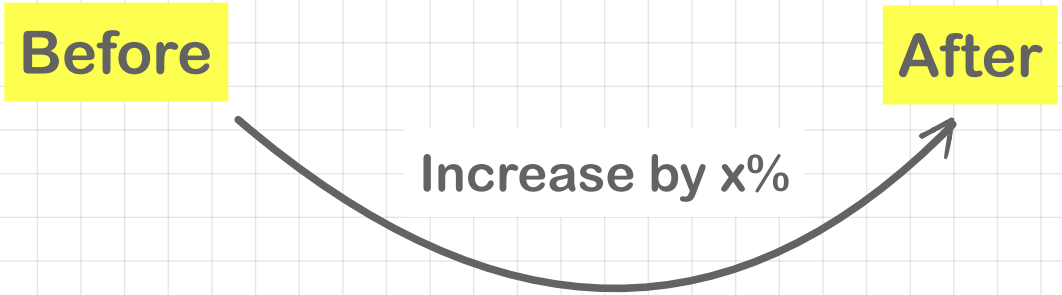
Find, in terms of x, the recurring decimal $0.4\dot{x}$ as a fraction.
Give your fraction in its simplest form.
Show clear algebraic working.

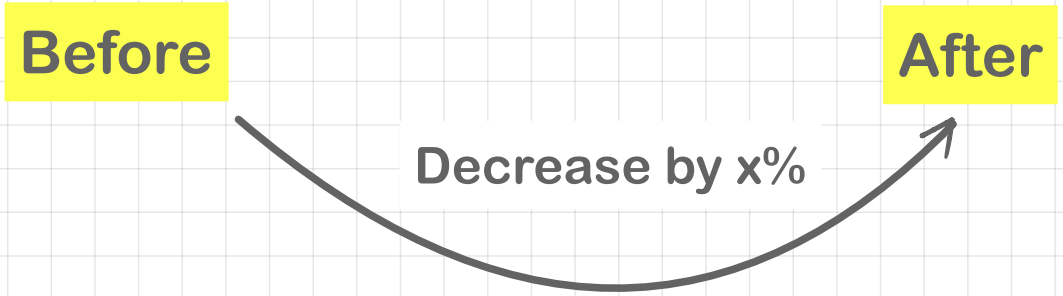
.....

(Total for Question 18 is 3 marks)

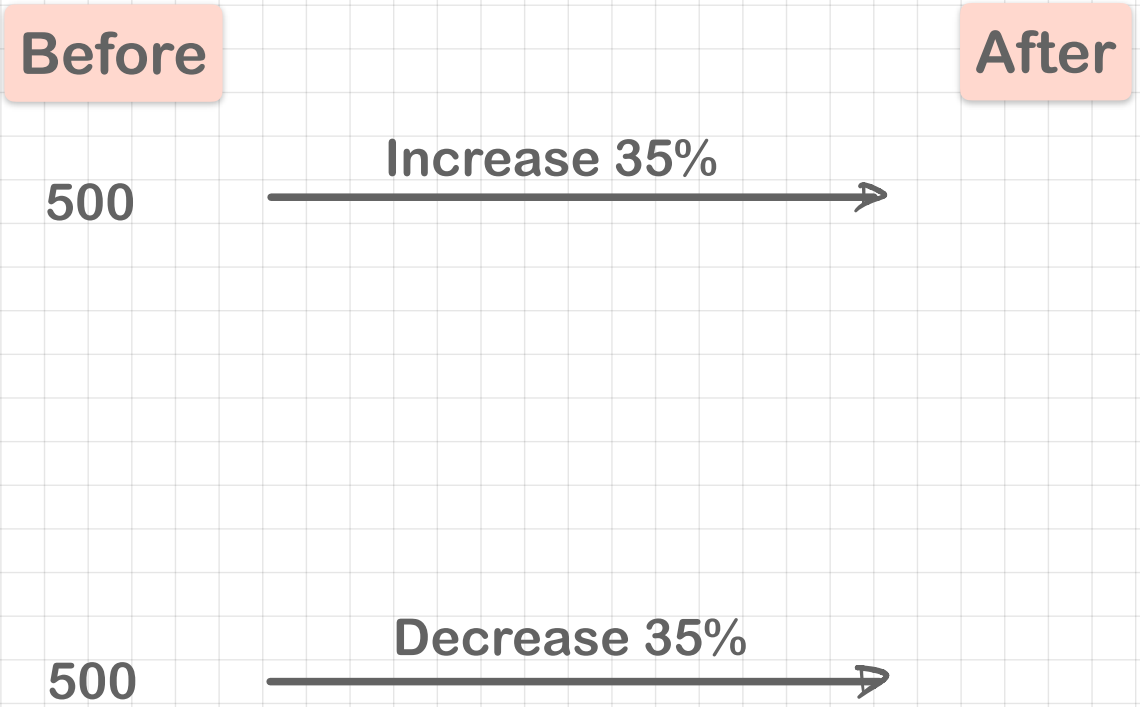
Numbers:Percentages.

Find the new amount after x% (increase/decrease)

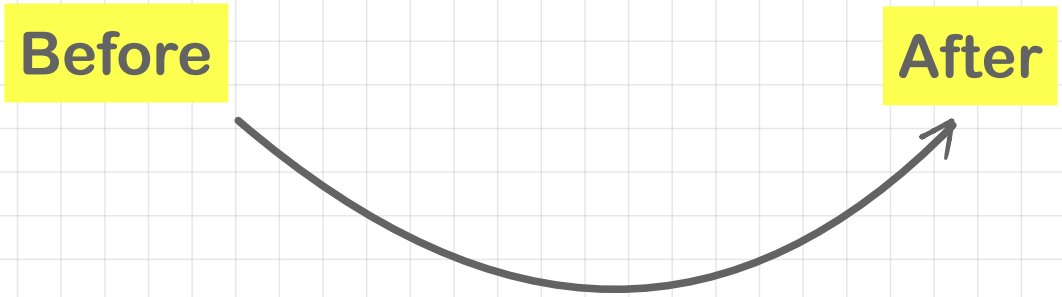




Numbers:Percentages.



Numbers:Percentages.



m = 1.15 →

m = 0.74 →

m = 1.02 →

m = 0.97 →

m = 2.15 →

Numbers:Percentages.

Extra

Example:The house is valued at €250000. Its value increases by 10% then decreases by 10% the year after. What is the value of house after these two changes.

Numbers:Percentages.

Example:The house value increases by 10% then decreases by 15%

the year after. Find the percentage changes.

Numbers:Percentages.

Simple Interest

$$\text{Total interest} = p \times \frac{r}{100} \times t$$

p = Initial amount

r = Rate of interest

t = Time

Numbers:Percentages.

Compound Interest

$$\text{total value} = p\left(1 + \frac{r}{100}\right)^{t}$$

p = Initial amount

r = Rate of change

t = Time

(+) Increase compound interest

(−) Decrease depreciation

8 Charlotte buys a painting for $680
The value of the painting increases by 4% each year.

Work out the value of the painting at the end of 3 years.
Give your answer correct to the nearest $

$.....

(Total for Question 8 is 3 marks)

9 Kazi buys a car for 700 000 taka.
The value of the car depreciates by 12% each year.

Work out the value of the car at the end of 3 years.
Give your answer correct to the nearest taka.

..... taka

(Total for Question 9 is 3 marks)

6 In his previous job, Pierre was paid 400 euros in total for working a 5-day week.

In his new job, Pierre is paid 14 euros per hour.
In his new job, Pierre works for 7 hours each day for a 5-day week.

(a) Work out the percentage increase in the amount that Pierre is paid for a 5-day week.

.....%

(4)

Marie changes her job.

Her salary decreases by 6%
Her new salary is 23 030 euros.

(b) Work out Marie's salary before she changes her job.

..... euros

(3)

(Total for Question 6 is 7 marks)

13 Feruzi invests 80 000 Kenyan shillings (KES)
He invests the money for 3 years at x% compound interest each year.

At the end of 3 years, the total interest he receives is 6151.25 KES

Work out the value of x

$x =$ .....

(Total for Question 13 is 3 marks)

8 Matteo is going to invest 5000 Swiss francs for two years.

He can invest his money in Bank **G** or in Bank **H**.

Bank **G**	Bank **H**
1.6% per year compound interest	2.9% interest added after two years

The total amount of interest Matteo would receive at the end of two years from Bank **G** is more than the amount of interest Matteo would receive at the end of two years from Bank **H**.

How much more?

..... Swiss francs

(Total for Question 8 is 4 marks)

4 Divya and Yuan each pay for a holiday at a special offer price.

Divya's holiday	**Yuan's holiday**
Normal price: \$1600	Normal price: \$1400
Special offer: 16% off the normal price	Special offer: k% off the normal price

The amount that Divya pays is the same as the amount that Yuan pays.

Work out the value of k

$k =$ .....

(Total for Question 4 is 4 marks)

13 A rectangle has length L and width W

L is increased by 20%
W is decreased by 35%

Calculate the percentage reduction in the area of the rectangle.

.....%

(Total for Question 13 is 3 marks)

9 Teresa invests $2000 for 3 years in a savings account.
She gets 4% each year compound interest.

(a) How much money will Teresa have in her savings account at the end of 3 years?
Give your answer correct to the nearest dollar.

$.....

(3)

Sam invested $\$T$
The value of his investment decreased by 9% each year.

At the end of the first year, the value of Sam's investment was \$1365

(b) Work out the value of T

.....

(3)

(Total for Question 9 is 6 marks)

Numbers:Ratio and Proportion

Example: J and P share some money in ratio 5 : 7

(i) J receives $240. Find P receives.

(ii) Total money is $480. Find J and P receives.

(iii) The difference between money of J and P is $120. Find total money.

5 C grams of chocolate is shared in the ratios $2 : 5 : 8$
The difference between the largest share and the smallest share is 390 grams.

Work out the value of C

$C =$ .....

(Total for Question 5 is 3 marks)

5 In a box, there are only green sweets, orange sweets and yellow sweets.

There are 280 sweets in the box so that

the number of green sweets : the number of orange sweets = 2 : 3

and

the number of orange sweets : the number of yellow sweets = 1 : 5

Work out how many green sweets there are in the box.

.....

(Total for Question 5 is 3 marks)

8 Behnaz makes 300 celebration cards so that

$$\text{number of birthday cards} : \text{number of anniversary cards} : \text{number of congratulations cards} = 7:5:3$$

$\frac{2}{5}$ of the birthday cards have numbers on them.

36% of the anniversary cards have numbers on them.

None of the congratulations cards have numbers on them.

Work out what fraction of the 300 cards have numbers on them.

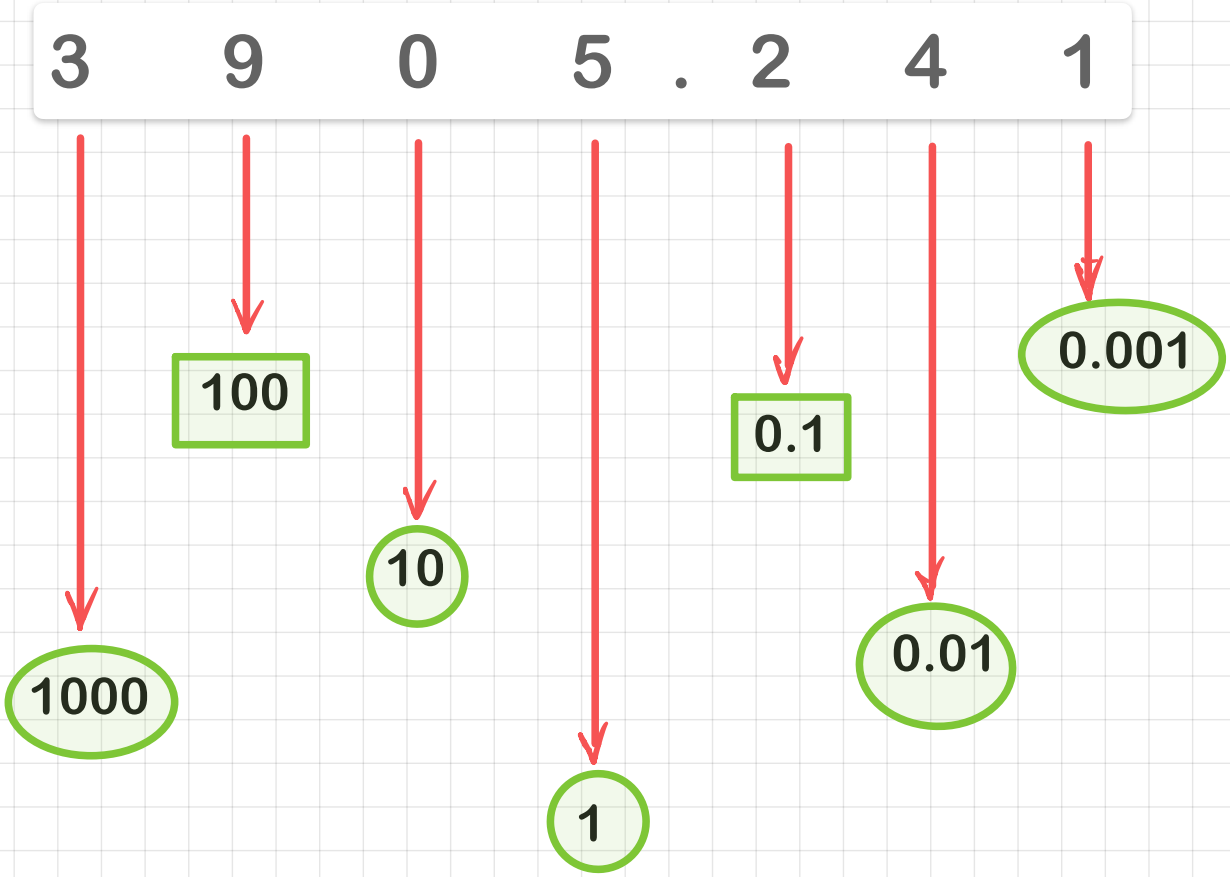
Give your answer in its simplest form.

.....

(Total for Question 8 is 5 marks)

Numbers:Estimating

Review: Place value



Numbers:Estimating

270 (nearest 10)

U.B.

L.B.

270 (nearest whole number)

U.B.

L.B.

Numbers:Estimating

27000 (for 2 s.f.)

U.B.

L.B.

27000 (for 3 s.f.)

U.B.

L.B.

Numbers:Estimating

0.123 (for 3 s.f.)

U.B.

L.B.

2.7 (nearest 1 d.p.)

U.B.

L.B.

Numbers:Estimating

H = 270 cm. (nearest 5 cm)

U.B.

L.B.

H = 2.70 m. (nearest 1 cm)

U.B.

L.B.

Numbers:Estimating

Maximum Value and Minimum Value

Maximum (Upper Bound)	Minimum (Lower Bound)
$A + B$	$A + B$
$A - B$	$A - B$
$(A)(B)$	$(A)(B)$
$\frac{A}{B}$	$\frac{A}{B}$

5 The weight of a cake is 2.75 kg, correct to 2 decimal places.

(a) Write down the lower bound of the weight of the cake.

..... kg

(1)

(b) Write down the upper bound of the weight of the cake.

..... kg

(1)

Penny has worked out $\dfrac{81.3 \times 59.2}{1.9^2}$ on her calculator.

Her answer is 13 332.299 17

Penny's answer is not sensible.

(c) By rounding each number to one significant figure, work out a suitable estimate to show that her answer is not sensible.
Show your working clearly.

(2)

(Total for Question 5 is 4 marks)

14 $T = \dfrac{p}{r}$

$p = 0.51$ correct to 2 significant figures.
$r = 6.3$ correct to 2 significant figures.

Work out the upper bound for the value of T
Show your working clearly.

.....

(Total for Question 14 is 2 marks)

19 The acceleration, a, of an object is given by

$$a = \frac{v - u}{t}$$

where

$v = 45.23$ correct to 2 decimal places
$u = 5.12$ correct to 2 decimal places
$t = 8.5$ correct to 2 significant figures

By considering bounds, work out the value of a to a suitable degree of accuracy.
Show your working clearly and give a reason for your answer.

$a =$ .....

(Total for Question 19 is 5 marks)

25 A solid sphere has a radius of 2.8 centimetres, correct to 1 decimal place.
The sphere has a mass of $M\pi$ grams, where $M = 260$ correct to 2 significant figures.

Work out the upper bound for the density of the sphere.
Give your answer in g/cm^3 correct to 2 decimal places.
Show your working clearly.

..... g/cm^3

(Total for Question 25 is 4 marks)

Numbers:Standard Form.

$A \times 10^n$

- $1 \leqslant A < 10$
- n is integer.

6 (a) Write $76\,000\,000$ in standard form.

.....

(1)

(b) Write 5.4×10^{-4} as an ordinary number.

.....

(1)

8 (a) Write 5.6×10^{-3} as an ordinary number.

.....

(1)

(b) Work out $\dfrac{6 \times 10^{3}}{2.1 \times 10^{-4} + 9 \times 10^{-5}}$

Give your answer in standard form.

.....

(2)

(Total for Question 8 is 3 marks)

15) (b) Find 4% of 4.5×10^{157}
Give your answer in standard form.

.....

(3)

(Total for Question 15 is 6 marks)

(c) Work out $(3 \times 10^{55}) \times (6 \times 10^{65})$

Give your answer in standard form.

.....

(2)

(Total for Question 7 is 5 marks)

8 $a = 4.2 \times 10^{-24}$ $b = 3 \times 10^{145}$

Work out the value of $a \times b$
Give your answer in standard form.

.....

(Total for Question 8 is 2 marks)

(c) Work out $(4 \times 10^{512}) \div (1.6 \times 10^{700})$
Give your answer in standard form.

.....

(2)

(Total for Question 8 is 4 marks)

10 The table gives information about the population and the total amount of money, in dollars, spent on healthcare for two countries in 2016

Country	Total population	Total spent on healthcare ($)
Austria	8.7×10^6	4.2×10^{10}
Luxembourg	6.3×10^5	3.7×10^9

Work out how much more was spent **per person** on healthcare in Luxembourg than in Austria.
Give your answer correct to the nearest whole number.

..... dollars

(Total for Question 10 is 3 marks)

17 A metal block has a mass of 5 kg, correct to the nearest 50 grams.
The block has a volume of $(1.84 \times 10^{-3})\,m^3$, correct to 3 significant figures.

Work out the upper bound for the density of the block.
Give your answer in kg/m^3 correct to 1 decimal place.
Show your working clearly.

..... kg/m^3

(Total for Question 17 is 4 marks)

Extra

6 Shane bought a car.

The amount Shane paid for the car was $32 000

Theresa also bought a car.
To pay for this car, Theresa paid a deposit of $18 000 together with 14 monthly payments of $1160

Theresa paid more for her car than Shane paid for his car.

(a) Work out how much more Theresa paid as a percentage of the amount Shane paid.

.....%

(4)

Kylie bought a van.

After 1 year, the value of the van was $39 865
During this year, the value of the van decreased by 15%

(b) Work out the value of the van when Kylie bought it.

$.....

(3)

(Total for Question 6 is 7 marks)

18 $X = \dfrac{2a - b}{f}$

$a = 7.5$ correct to 1 decimal place.
$b = 3.42$ correct to 2 decimal places.
$f = 2$ correct to the nearest whole number.

Work out the upper bound of the value of X
Show your working clearly.

.....

(Total for Question 18 is 3 marks)

9 The table gives information about the population, correct to 2 significant figures, of each of five cities in 2018

City	Population (2018)
Ahmedabad	7.7×10^6
Barcelona	5.5×10^6
Chicago	8.8×10^6
Lagos	1.3×10^7
Tokyo	3.7×10^7

(a) Write 8.8×10^6 as an ordinary number.

.....

(1)

(b) Which of these cities had the least population in 2018?

.....

(1)

1 Last season, the number of goals scored by Arjun, by Simon and by Kath for their football team were in the ratios $2 : 5 : 8$

Simon scored 12 more goals than Arjun.

Work out the number of goals scored by Kath.

.....

(Total for Question 1 is 3 marks)

11 Himari invests 200 000 yen for 3 years in a savings account paying compound interest.

The rate of interest is 1.8% for the first year and x% for each of the second year and the third year.

The value of the investment at the end of the third year is 209 754 yen.

Work out the value of x
Give your answer correct to one decimal place.

$x =$ .....

(Total for Question 11 is 3 marks)

16 Use algebra to show that $0.1\dot{7}\dot{6} = \frac{35}{198}$

(Total for Question 16 is 2 marks)

12 $P = 3^3 \times 5^2 \times 7$
$Q = 3^2 \times 5 \times 7^2$

(a) Write down the highest common factor (HCF) of P and Q

.....

(1)

$P = 3^3 \times 5^2 \times 7$
$Q = 3^2 \times 5 \times 7^2$

(b) Work out the value of $P^3 \times Q$
Give your answer in the form $3^x \times 5^y \times 7^z$ where x, y and z are positive integers.

.....

(2)

(Total for Question 12 is 3 marks)

3 Nanette buys 60 notebooks for a total cost of 780 dirhams.

Nanette sells 70% of the notebooks for 22 dirhams each.
She sells the remaining notebooks for 19 dirhams each.

Work out Nanette's percentage profit.
Give your answer correct to 3 significant figures.

.....%

(Total for Question 3 is 4 marks)

16 Use algebra to show that $0.4\dot{3}\dot{8} = \frac{217}{495}$

(Total for Question 16 is 2 marks)

7 (a) Write 9.32×10^{-5} as an ordinary number.

.....

(1)

(b) Work out $3 \times 10^5 - 6 \times 10^4$

Give your answer in standard form.

.....

(2)

9 (a) Write 6.25×10^{-4} as an ordinary number.

.....

(1)

(b) Work out $(2.4 \times 10^{12}) \div (9.6 \times 10^{4})$
Give your answer in standard form.

.....

(2)

(Total for Question 9 is 3 marks)

9 The table gives information about the population, correct to 2 significant figures, of each of five cities in 2018

City	Population (2018)
Ahmedabad	7.7×10^6
Barcelona	5.5×10^6
Chicago	8.8×10^6
Lagos	1.3×10^7
Tokyo	3.7×10^7

(c) Work out the difference between the population of Tokyo and the population of Ahmedabad in 2018
Give your answer in standard form correct to 2 significant figures.

.....

(2)

(Total for Question 9 is 4 marks)

1 Show that $4\frac{2}{3} \div 1\frac{5}{6} = 2\frac{6}{11}$

(Total for Question 1 is 3 marks)

1 Show that $3\frac{5}{7} \div 1\frac{5}{8} = 2\frac{2}{7}$

(Total for Question 1 is 3 marks)