3 Find the highest common factor (HCF) of 72 and 108
Show your working clearly.

$72 = 2 \times 2 \times 2 \times 3 \times 3$

$108 = 2 \times 2 \times 3 \times 3 \times 3$

HCF = $2 \times 2 \times 3 \times 3$

$= 36$

(Total for Question 3 is 2 marks)

2 Find the lowest common multiple (LCM) of 28 and 105

$28 = 2 \times 2 \times 7$

$105 = 3 \times 5 \times 7$

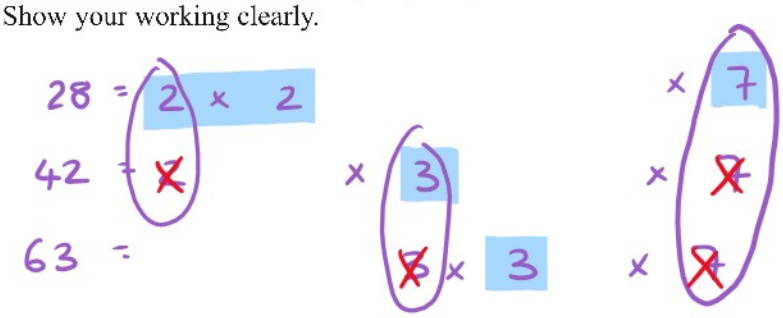
$LCM = 2 \times 2 \times 7 \times 3 \times 5$

$= 420$

.....

(Total for Question 2 is 2 marks)

7 Find the lowest common multiple (LCM) of 28, 42 and 63
Show your working clearly.



LCM = 2 x 2 x 3 x 3 x 7

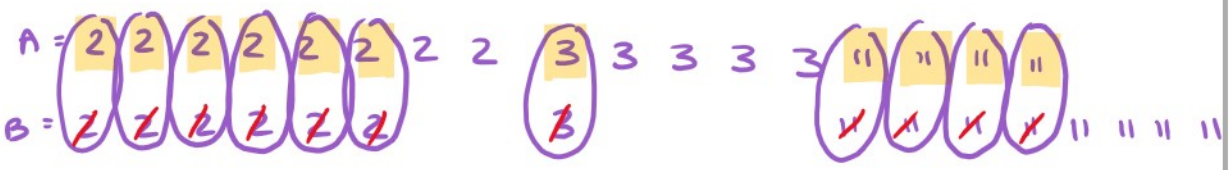
= 252

.....

(Total for Question 7 is 3 marks)

9 $A = 2^8 \times 3^5 \times 11^4$ $B = 2^6 \times 3 \times 11^8$

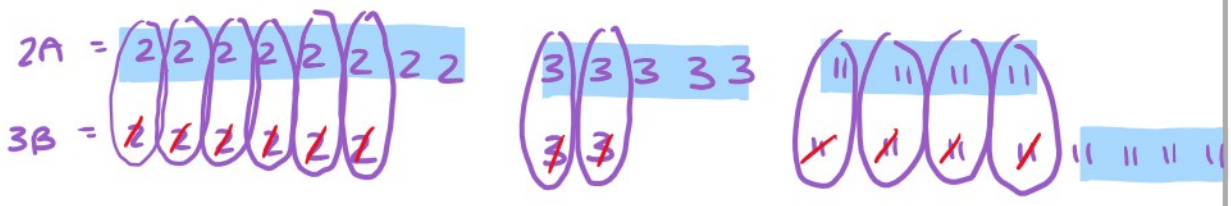
(a) Find the highest common factor (HCF) of A and B.



HCF = $2^6 \times 3 \times 11^4$

(2)

(b) Find the lowest common multiple (LCM) of $2A$ and $3B$.
Give the LCM as a product of powers of its prime factors.



LCM = $2^8 \times 3^5 \times 11^8$

(2)

(Total for Question 9 is 4 marks)

January 2022 Paper 1HR

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

$36 = 2 \times 2 \times 3 \times 3$

$120 = 2 \times 2 \times 2 \times 3 \times 5$

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

$= 360$

(2)

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

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.

$11^p \rightarrow p > 1$

$A = 5 \times 5 \times 5 \times 5$

$B = 5 \times 5 \times 5 \times 7 \times 7 \times 7 \times 7 \times 7 \times 11$

$5^m \rightarrow m > 2$

$7^{n-5} \rightarrow n > 10$

$HCF = 5^2 \times 7^4 \times 11$

(2)

(Total for Question 6 is 4 marks)

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January 2019 P2H

6 (a) Find the highest common factor (HCF) of 96 and 120

96 = 2 × 2 × 2 × 2 × 2 × 3

120 = 2 × 2 × 2 × 3 × 5

HCF = $2^3 \times 3$

= 24

(2)

$A = 2^3 \times 5 \times 7^2 \times 11$
$B = 2^4 \times 7 \times 11$
$C = 3 \times 5^2$

(b) Find the lowest common multiple (LCM) of A, B and C.

A = 2 2 2 5 7 7 11

B = 2 2 2 2 7 11

C = 3 5 5

(2)

(Total for Question 6 is 4 marks)

LCM = $2^4 \times 3 \times 5^2 \times 7^2 \times 11$

= 646800

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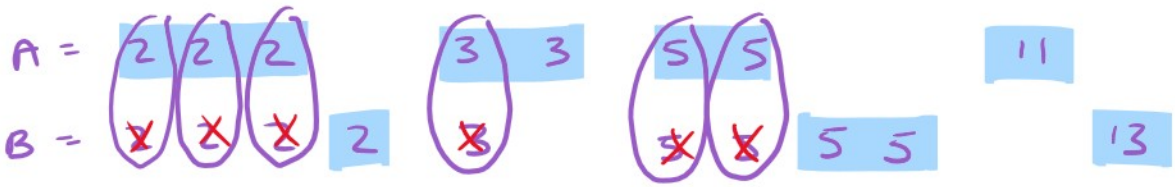
9 $A = 2^3 \times 3^2 \times 5^2 \times 11$
$B = 2^4 \times 3 \times 5^4 \times 13$

Find the lowest common multiple (LCM) of A and B.
Give your answer as a product of powers of prime numbers.



LCM = $2^4 \times 3^2 \times 5^4 \times 11 \times 13$

.....

(Total for Question 9 is 2 marks)

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

$200 = 2^3 \times 5^2$

$420 = 2^2 \times 3 \times 5 \times 7$

$200 = 2 \times 2 \times 2 \times 5$

$420 = 2 \times 2 \times 3 \times 5 \times 7$

HCF $= 2^2 \times 5$

$= 20$

(2)

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

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

A = 2 2 2 3 5 7 7

B = 2 3 3 7

C = 3 5 5 11

LCM $= 2^3 \times 3^2 \times 5^2 \times 7^2 \times 11$

(2)

(Total for Question 7 is 4 marks)

8 $A = 3^5 \times 5 \times 7^3$
$B = 2^3 \times 3 \times 7^4$

(a) (i) Find the Highest Common Factor (HCF) of A and B.

A = 3 3 3 3 3 5 7 7 7

B = 2 2 2 3 7

HCF = 3×7^3

(ii) Find the Lowest Common Multiple (LCM) of A and B.

LCM = $2^3 \times 3^5 \times 5 \times 7^4$

(2)

$A = 3^5 \times 5 \times 7^3$
$B = 2^3 \times 3 \times 7^4$
$C = 2^p \times 5^q \times 7^r$

Given that
the HCF of B and C is $2^3 \times 7$
the LCM of A and C is $2^4 \times 3^5 \times 5^2 \times 7^3$

(b) find the value of p, the value of q and the value of r.

If HCF of B & C = $2^3 \times 7$

B = 2 2 2 3 7 7 7 7

C = 2 2 2 ? 5^q 7

$r = 1$

LCM of A & C = $2^4 \times 3^5 \times 5^2 \times 7^3$

A = 3 3 3 3 3 5 7 7 7

C = 2 2 2 2 5

$p = 4$

p = 4

q = 2

r = 1

(2)

(Total for Question 8 is 4 marks)

8 $A = 3^2 \times 5^4 \times 7$ $B = 3^4 \times 5^3 \times 7 \times 11$

(a) Find the highest common factor (HCF) of A and B.

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

.....

(2)

(b) Find the lowest common multiple (LCM) of A and B.

LCM = $3^4 \times 5^4 \times 7 \times 11$

.....

(2)

(Total for Question 8 is 4 marks)

3 (a) Find the highest common factor (HCF) of 56 and 84
Show your working clearly.

$56 = 2^3 \times 7$ = 2 2 2 7

$84 = 2^2 \times 3 \times 7$ = 2 2 3 7

HCF = $2^2 \times 7$

(2)

(b) Find the lowest common multiple (LCM) of 60 and 72
Show your working clearly.

$60 = 2^2 \times 3 \times 5$ = 2 2 3 5

$72 = 2^3 \times 3^2$ = 2 2 2 3 3

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

(2)

(Total for Question 3 is 4 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

$P = 3 \times 3 \times 3 \times 5 \times 5 \times 7$

$Q = 3 \times 3 \times 5 \times 7 \times 7$

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

.....

(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.

$P^3 = (3^3 \times 5^2 \times 7)^3$

$= 3^9 \times 5^6 \times 7^3$

$P^3 \times Q = 3^9 \times 5^6 \times 7^3 \times 3^2 \times 5 \times 7^2$

$= 3^{11} \times 5^7 \times 7^5$

.....

(2)

(Total for Question 12 is 3 marks)

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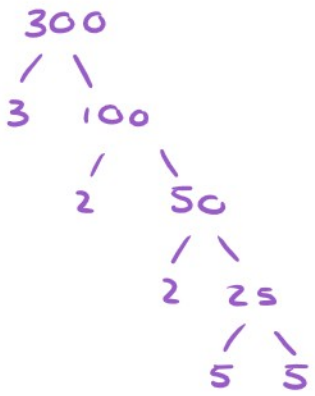
8 (a) Write 300 as a product of its prime factors.
Show your working clearly.



$2^2 \times 3 \times 5^2$

(2)

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

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

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

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

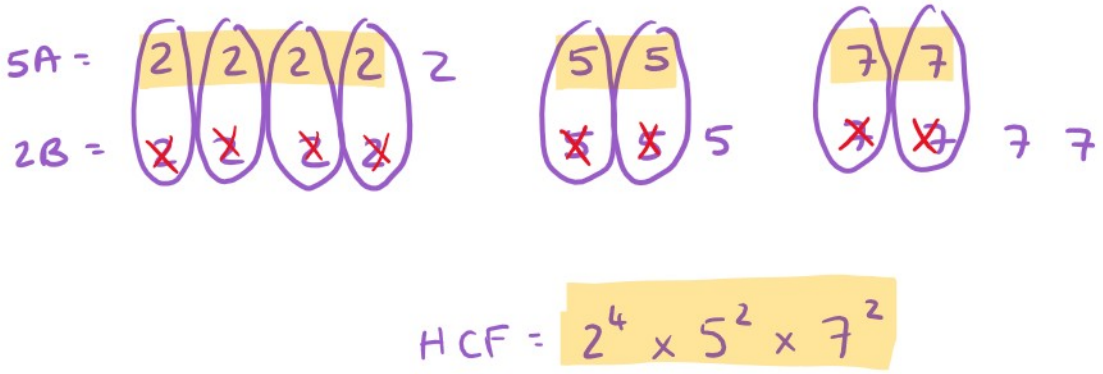
(2)

(Total for Question 8 is 4 marks)

11 $A = 2^5 \times 5 \times 7^2$

$B = 2^3 \times 5^3 \times 7^4$

(a) Write down the highest common factor (HCF) of $5A$ and $2B$
Give your answer as a product of prime factors.



HCF = $2^4 \times 5^2 \times 7^2$

(2)

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

$B = 2^3 \times 5^3 \times 7^4$

(b) Work out the value of $(AB)^2$
Give your answer as a product of prime factors.

$AB = A \times B$

$= 2^5 \times 5 \times 7^2 \times 2^3 \times 5^3 \times 7^4$

$AB = 2^8 \times 5^4 \times 7^6$

$(AB)^2 = (2^8 \times 5^4 \times 7^6)^2$

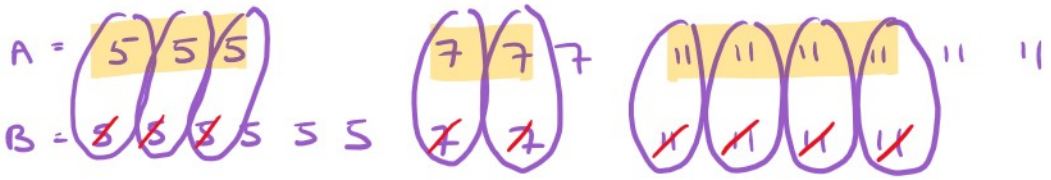
$= 2^{16} \times 5^8 \times 7^{12}$

(2)

(Total for Question 11 is 4 marks)

7 $A = 5^3 \times 7^3 \times 11^6$ and $B = 5^6 \times 7^2 \times 11^4$

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



HCF = $5^3 \times 7^2 \times 11^4$

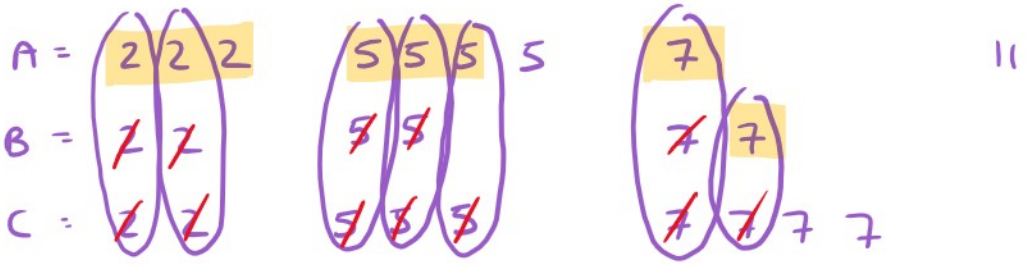
(Total for Question 7 is 2 marks)

6 $A = 2^3 \times 5^4 \times 7 \times 11$

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

$C = 2^2 \times 5^3 \times 7^4$

Find the highest common factor (HCF) of A, B and C
Write your answer as a product of prime factors.



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

.....

(Total for Question 6 is 2 marks)

10 $A = 2 \times 3^{43}$
$B = 16 \times 3^{37}$

(a) Find the highest common factor (HCF) of A and B.

$16 = 2^4$

$A = 2 \times 3^{43} = 2 \times 3 \ldots 3$ (37) (6)

$B = 2^4 \times 3^{37} = 2 \times 2 \times 2 \times 2 \times 3 \ldots 3$ (37)

$HCF = 2 \times 3^{37}$

....
(1)

(b) Express the number $A \times B$ as a product of powers of its prime factors.
Give your answer in its simplest form.

$A \times B = 2 \times 3^{43} \times 2^4 \times 3^{37}$

$= 2^1 \times 2^4 \times 3^{43} \times 3^{37}$

$= 2^5 \times 3^{80}$

....
(2)

(Total for Question 10 is 3 marks)

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P 6 2 6 5 2 A 0 1 1 2 8

Turn over