Name:

Exam Style Questions

Product of Primes
LCM and HCF

Corbettmaths

Equipment needed: Pen and Calculator

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

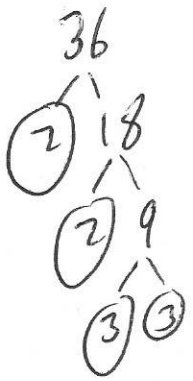
Video Tutorial

www.corbettmaths.com/contents

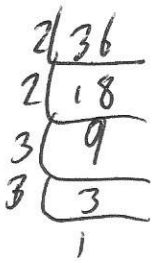
Videos 223, 224

Answers and Video Solutions

1. Express 36 as a product of its prime factors.



or



$2 \times 2 \times 3 \times 3$

or

$2^2 \times 3^2$

.....

(2)

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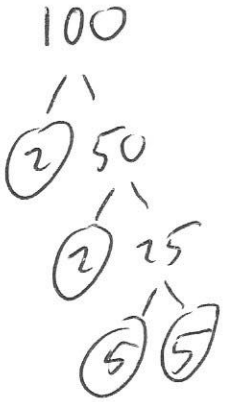
2. Express 100 as a product of its prime factors.



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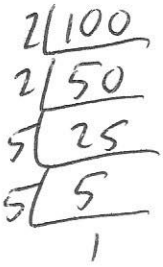

$2 \times 2 \times 5 \times 5$

or

$2^2 \times 5^2$

.....

(2)

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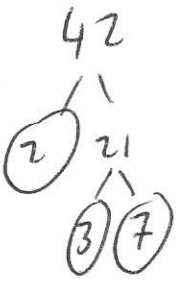
3. Write 42 as a product of its prime factors.



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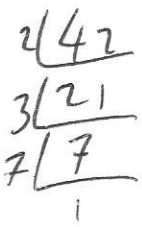
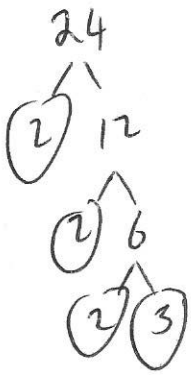


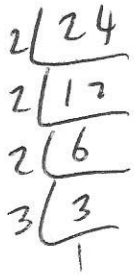
$2 \times 3 \times 7$

.....

(2)

4. Write 24 as the product of its prime factors.
Give your answer in index form.





$2 \times 2 \times 2 \times 3$

$2^3 \times 3$

(3)

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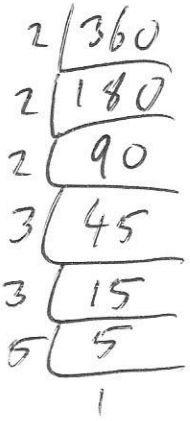
5. Write 360 as a product of its prime factors.



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

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

(2)

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6. Write 5760 as a product of prime factors.

Give your answer in index form.

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

(2)

7. A number is written as a product of its prime factors as $2 \times 3^2 \times 5$

Work out the number.

$2 \times 3^2 \times 5$

$2 \times 9 \times 5 = 90$

90

.....

(2)

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8. Given that $18000 = 2^a \times 3^b \times 5^c$

Find the values of a, b and c.

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

a = 4

b = 2

c = 3

(2)

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9. $3x^2 = 75$

(a) Find the value of x.

$x^2 = 25$

$x = 5$

or 75 → 3, 25 → 5, 5

or 3 | 75; 5 | 25; 5 | 5; 1

5

.....

(2)

(b) Express 75 as a product of its prime factors.

$75 = 3 \times 5 \times 5$

$3 \times 5 \times 5$

or

3×5^2

.....

(2)

10. You are given that $3x^3 = 375$

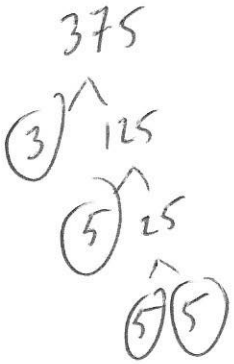
Find the value of x.

$3x^3 = 375$

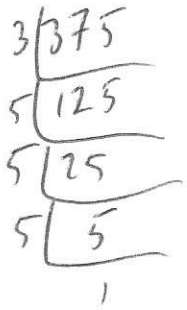
$x^3 = 125$

$x = 5$

or



or



$x = 5$

.....

(2)

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11. You are given that $m = 2^3 \times 5$

(a) Work out 10m

$m = 8 \times 5$

$= 40$

$10m = 400$

400

.....

(2)

(b) Write 10m as a product of primes

$m = 2^3 \times 5$

$10m = 2^3 \times 5 \times 2 \times 5$

$10m = 2^4 \times 5^2$

$2^4 \times 5^2$

.....

(2)

12. $y = 3^2 \times 5^4$

Write $50y$ as a product of prime factors in index form.

50
2 25
5 5

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

$50y = 3^2 \times 5^4 \times 2 \times 5^2$

$= 2 \times 5^6 \times 3^2$

$= 2 \times 3^2 \times 5^6$

$2 \times 3^2 \times 5^6$

.....

(2)

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13. (a) Write 48 as a product of its prime factors.

2 24
2 12
2 6
2 3

or

2|48
2|24
2|12
2|6
3|3
1

$2 \times 2 \times 2 \times 2 \times 3$

or

$2^4 \times 3$

.....

(2)

(b) Find the Highest Common Factor (HCF) of 48 and 56.

56
2 28
2 14
7 7

or

2|56
2|28
2|14
7|7
1

$2 \times 2 \times 2 \times 7$

48: 2, 3, 2, 2, 2
56: 2, 2, 2, 7

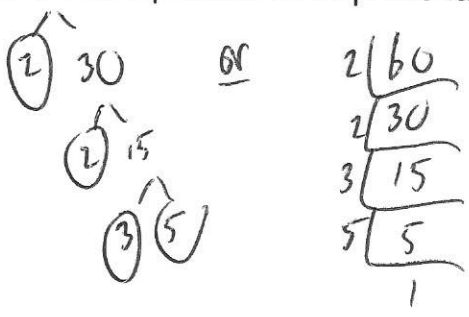
HCF $= 2 \times 2 \times 2 = 8$

8

.....

(2)

14. (a) Write 60 as a product of its prime factors.



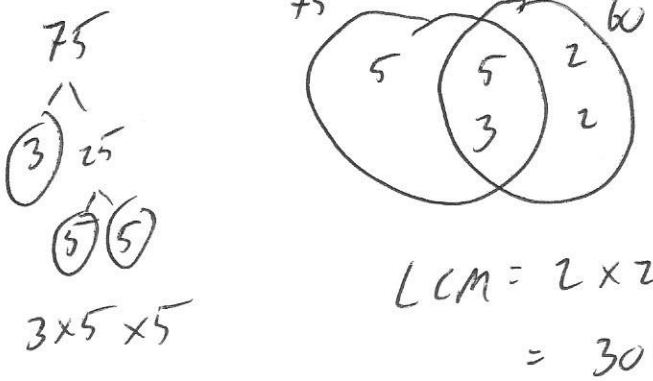
$2 \times 2 \times 3 \times 5$

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

.....

(2)

(b) Find the Lowest Common Multiple (LCM) of 60 and 75.



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

$= 300$

300

.....

(2)

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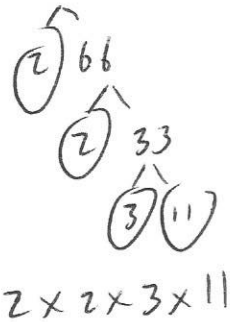
15. (a) Write 132 as a product of its prime factors.



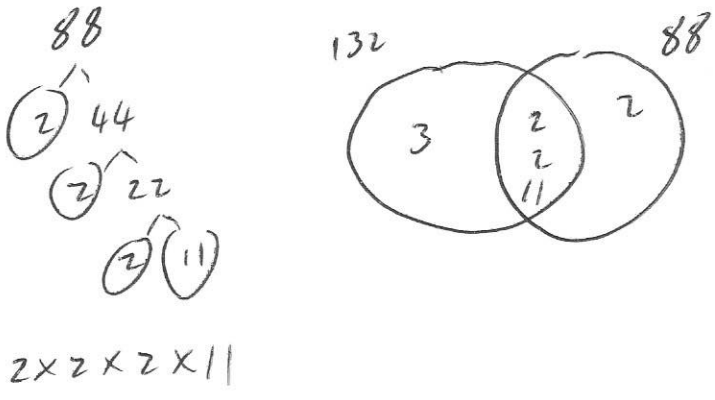
$2 \times 2 \times 3 \times 11$

or $2^2 \times 3 \times 11$

.....

(2)

(b) Find the Highest Common Factor (HCF) of 88 and 132.



HCF : $2 \times 2 \times 11$

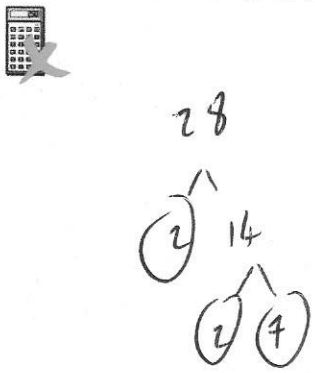
$= 44$

44

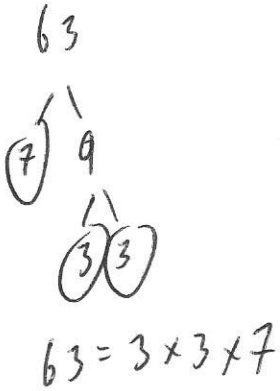
.....

(2)

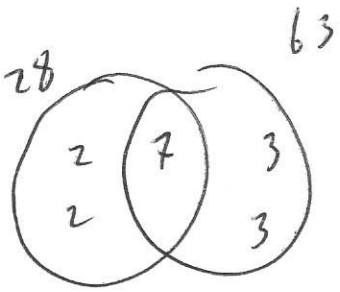
16. Find the lowest common multiple (LCM) of 28 and 63.



28 = 2 × 2 × 7



63 = 3 × 3 × 7



LCM = 2 × 2 × 7 × 3 × 3
= 252

252

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(2)

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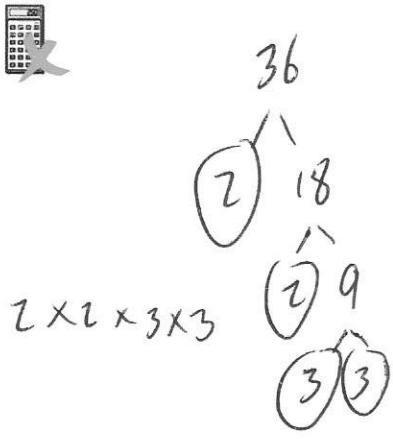
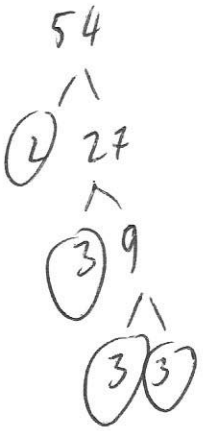
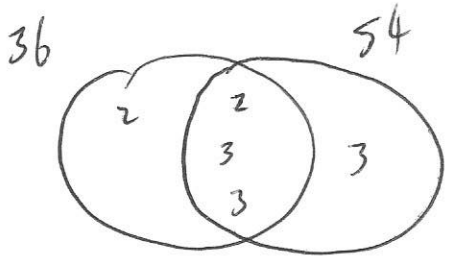
17. Find the lowest common multiple (LCM) of 36 and 54.



36 = 2 × 2 × 3 × 3



54 = 2 × 3 × 3 × 3



LCM = 2 × 2 × 3 × 3 × 3
= 108

108

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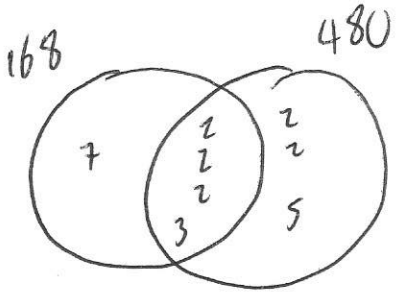
(2)

18. $480 = 2^5 \times 3 \times 5$

Find the highest common factor (HCF) of 480 and 168

$168 = 2^3 \times 3 \times 7$



$2 \times 2 \times 2 \times 3 = 24$

24

.....

(3)

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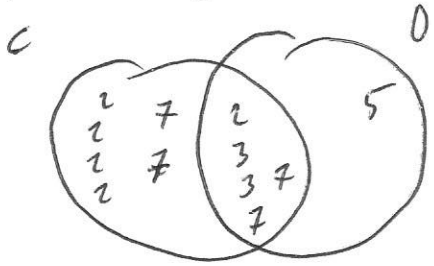
19. $C = 2^5 \times 3^2 \times 7^4$ $D = 2 \times 3^2 \times 5 \times 7^2$

(a) Find the highest common factor (HCF) of C and D.



HCF = 882

882

.....

(2)

(b) Find the lowest common multiple (LCM) of C and D.

LCM = 3457440

3457440

.....

(2)

20. You are given that $45 = 3^2 \times 5$

(a) Write each of the following as the product of prime factors in index form.

(i) 90

45×2

$(3^2 \times 5) \times 2$

$2 \times 3^2 \times 5$

.....

(1)

(ii) 135

45×3

$(3^2 \times 5) \times 3$

$3^3 \times 5$

.....

(1)

(iii) 450

45×10

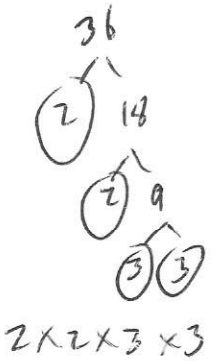
$(3^2 \times 5) \times (2 \times 5)$

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

.....

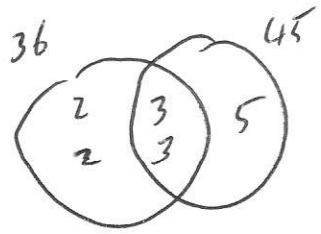
(1)

(b) What is the lowest common multiple (LCM) of 36 and 45.



$2 \times 2 \times 3 \times 3$

$45 = 3 \times 3 \times 5$



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

180

.....

(2)

(c) What is the highest common factor (HCF) of 36 and 45.

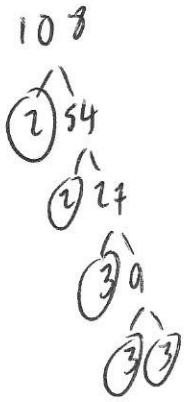
3×3

9

.....

(2)

21. (a) Express 108 as a product of its prime factors.
Give your answer in index form.

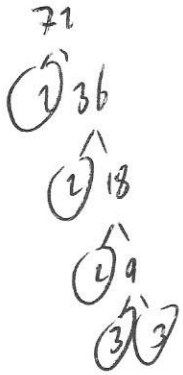


$2^2 \times 3^3$

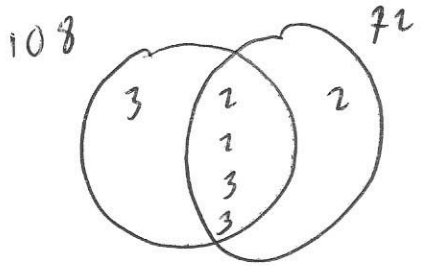
.....

(3)

(b) Find the Highest Common Factor (HCF) of 108 and 72.



$2 \times 2 \times 2 \times 3 \times 3$



HCF : $2 \times 2 \times 3 \times 3$

$= 36$

36

.....

(2)

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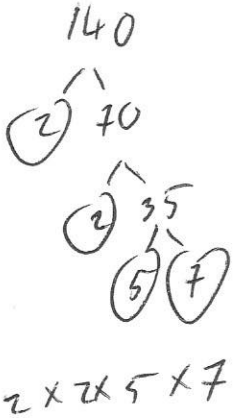
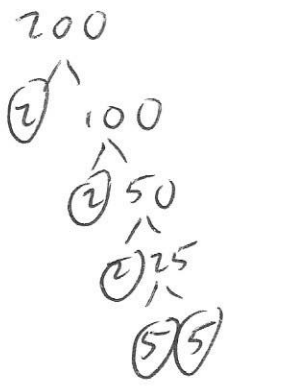
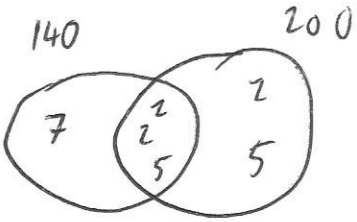
22. Find the Lowest Common Multiple (LCM) of 140 and 200



$2 \times 2 \times 5 \times 7$



$2 \times 2 \times 2 \times 5 \times 5$



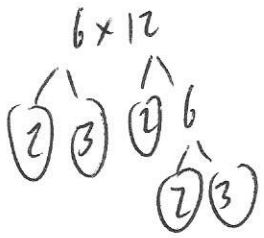
LCM: 1400

1400

.....

(3)

23. (a) Work out 6 x 12 as the product of prime factors.
Give your answer in index form.



$2^3 \times 3^2$

.....

(3)

(b) Find the Highest Common Factor (HCF) of y and 5y.

y

.....

(1)

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24. (a) Write 1008 as a product of prime factors.
Express your answer in index form.

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

.....

(2)

(b) Hence find the **lowest** whole number by which 1008 would need to be multiplied by to give a square number.

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

$\downarrow \times 7$

$2^4 \times 3^2 \times 7^2 = 7056$

$\sqrt{7056} = 84$

7

.....

(1)

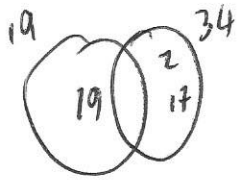
25. Find the lowest common multiple of 19 and 34.

19 (prime)

34

2 × 17

19



2 × 19 × 17

38 × 17

38
× 17
266
+380
646

646

.....

(2)

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26. $16200 = 2^3 \times 3^4 \times 5^2$

Write down the lowest whole number by which 16200 needs to be multiplied by to make a **cube** number.

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

$\times 3^2$ ↓ ↓ $\times 5$

$2^3 \times 3^6 \times 5^3$

$3^2 \times 5 = 45$

45

.....

(2)

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27. $4116 = 2^2 \times 3 \times 7^3$

Write down the lowest integer by which 4116 needs to be multiplied by to make a **square** number.

$2^2 \times 3 \times 7^3$

$\times 3$ ↓ ↓ $\times 7$

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

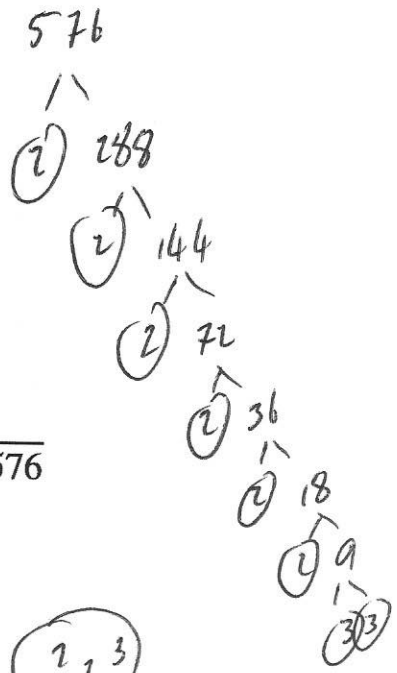
$3 \times 7 = 21$

21

.....

(2)

28. (a) Write 576 as a product of primes.

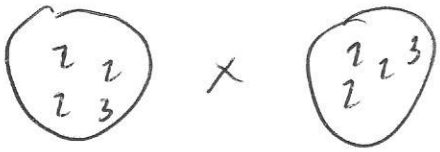


$2^6 \times 3^2$

.....

(2)

(b) Hence find $\sqrt{576}$



$2 \times 2 \times 2 \times 3 = 24$

24

.....

(2)

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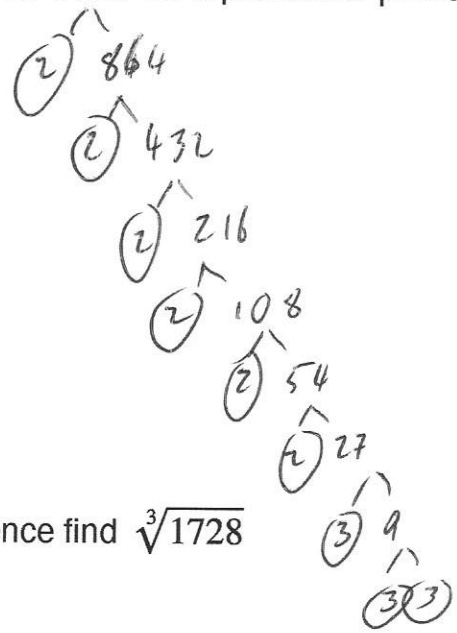
29. (a) Write 1728 as a product of primes.

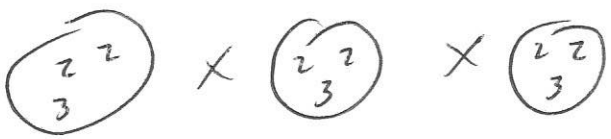


$2^6 \times 3^3$

.....

(2)

(b) Hence find $\sqrt[3]{1728}$



$2 \times 2 \times 3 = 12$

12

.....

(2)

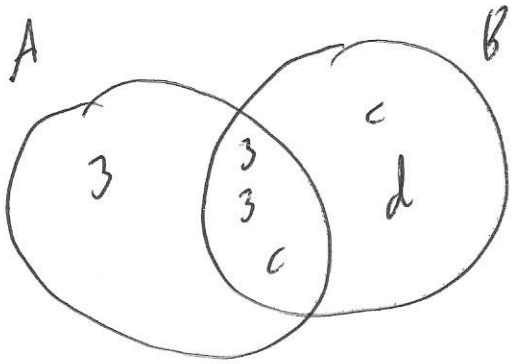
30. $A = 3^3 \times c$

$B = 3^2 \times c^2 \times d$

The highest common factor (HCF) of A and B is 99

The lowest common multiple (LCM) of A and B is 16335

Find B.



$3 \times 3 \times c = 99$

$9c = 99$

$c = 11$

$3 \times 3 \times 3 \times 11 \times 11 \times d = 16335$

$d = 5$

$B = 3 \times 3 \times 11 \times 11 \times 5$

$= 5445$

5445

.....

(4)