

Grade 7

NUMBER SENSE AND NUMERATION: MULTIPLES, FACTORS AND SQUARE ROOTS

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Answers:

1. a.

	1	2	3	4	5	6	7	8	9	10	11	12
Multiples of 3	3	6	9	12	15	18	21	24	27	30	33	36
Multiples of 7	7	14	21	28	35	42	49	56	63	70	77	84

 - b. 21, 42, 63, 84

2. a.

	1	2	3	4	5	6	7	8	9	10	11	12
Multiples of 4	4	8	12	16	20	24	28	32	36	40	44	48
Multiples of 6	6	12	18	24	30	36	42	48	54	60	66	72

 - b. 12, 24, 36 and 48
 - c. 12

3. a. 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72
b. 6

4. a. 12 b. 30 c. 24 d. 14 e. 20 f. 36

5. a. 23 b. 62 c. 154 d. 88 e. 134 f. 178

6. Yes. 84 is divisible by 3 since the sum of the digits is $8 + 4 = 12$ and 12 is divisible by 3.

7. Mao weight trains on Jan. 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31 and so on.
Mao runs on Jan. 1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31 and so on.
 - a. On Friday, January 7 Mao will next both lift weights and run on the same day.
 - b. 6 times (Jan. 1, 7, 13, 19, 25 and 31)
 - c. Mao runs 3 km every third day. He runs 11 times in January.
The distance he runs in January is 33 km (11×3).
 - d. 121 (365 days in 2005 and he run every third day beginning on Jan. 1)

8. 24 because 24 is the LCM of 12 and 8.

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9. a. i. 1, 3, 9 ii. 1, 17
 iii. 1, 2, 4, 8, 16 iv. 1, 2, 3, 4, 6, 9, 12, 18, 36
 v. 1, 43 vi. 1, 2, 4, 5, 10, 20, 25, 50, 100
 b. Prime numbers are 17 and 43 Composite numbers are 9, 16, 36 and 100.

10. a. 2×7 b. $2 \times 5 \times 11$ c. 3×41 d. $2 \times 2 \times 3 \times 3$ or $2^2 \times 3^2$
 e. $2 \times 5 \times 5 \times 7$ or $2 \times 5^2 \times 7$ f. $2 \times 2 \times 2 \times 5 \times 5 \times 5$ or $2^3 \times 5^3$

11. a. i. $10 = 2 \times 5$ and $15 = 3 \times 5$ ii. $12 = 2 \times 2 \times 3$ and $20 = 2 \times 2 \times 5$
 iii. $18 = 2 \times 3 \times 3$ and $24 = 2 \times 2 \times 2 \times 3$ iv. $21 = 3 \times 7$ and $35 = 5 \times 7$
 v. $54 = 2 \times 3 \times 3 \times 3$ and $72 = 2 \times 2 \times 2 \times 3 \times 3$
 b. i. 5 ii. 4 iii. 6 iv. 7 v. 18

12. a. 2 b. 3 c. 1 d. 4 e. 0

13.

Whole number	0	1	4	9	16	25	36	49	64	81	100	121	144
Square root	0	1	2	3	4	5	6	7	8	9	10	11	12

14. a. 20 b. 15 c. 18 d. 16 e. 13
 f. 19 g. 14 h. 24 i. 30 j. 25

15. 5 cm

16. 6 cm

17. a. 36 cm^2 b. 6 cm

18. a. i. 64 cm^2 ii. 225 cm^2 iii. 196 cm^2
 b. i. 8 cm ii. 15 cm iii. 14 cm

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19. a. $\sqrt{13 + \sqrt{8 + \sqrt{1}}}$
 $= \sqrt{13 + \sqrt{8 + 1}}$
 $= \sqrt{13 + \sqrt{9}}$
 $= \sqrt{13 + 3}$
 $= \sqrt{16}$
 $= 4$

b. $(\sqrt{225} - \sqrt{144})^2$
 $= (15 - 12)^2$
 $= (3)^2$
 $= 3 \times 3$
 $= 9$

20. The prime factorization of 770 is $770 = 2 \times 5 \times 7 \times 11$. The numbers 2, 5, 7, and 11 need to be multiplied together in pairs to give the ages of two persons. The ages of two persons must be over 19 so the two ages are $2 \times 11 = 22$ and $5 \times 7 = 35$. The sum of their ages is 57.

21. A perfect square is a number that is the product of two repeated factors. For example, 4 is a perfect square because $4 = 2 \times 2$.

a. $28 = 2 \times 2 \times 7$ This will be a perfect square when it is multiplied by 7.

b. $126 = 2 \times 3 \times 3 \times 7$ This will be a perfect square when it is multiplied by 2×7 or 14.

22. 973, 60 494 and 12 345 676 are divisible by 7.

Solution for 973

$97 - 6 = 91$; $9 - 2 = 7$. Since 7 is divisible by 7, then 973 is divisible by 7 or

$97 - 6 = 91$; Since $91 = 7 \times 13$ which is clearly divisible by 7, then 973 is divisible by 7.

Solution for 60 494

$6049 - 8 = 6041$; $604 - 2 = 602$; $60 - 4 = 56$. Since 56 is divisible by 7, then 60494 is divisible by 7.

Solution for 5885

$588 - 10 = 578$; $57 - 16 = 41$ which is not a multiple of 7 so is not divisible by 7.

Thus 5885 is not divisible by 7.

Solution for 12 345 676

$1234567 - 12 = 1234555$; $123455 - 10 = 123445$; $12344 - 10 = 12334$;

$1233 - 8 = 1225$; $122 - 10 = 112$; $11 - 4 = 7$ which is divisible by 7,

so 12 345 676 is divisible by 7.

23. The list includes 32 two-digit integers:

12, 21, 15, 51, 18, 81, 24, 42, 26, 62, 27, 72, 28, 82, 36, 63, 39, 93, 45, 54, 46, 64, 48, 84, 57, 75, 68, 86, 69, 96, 78, 87