High School Mathematics Test 2014

Year 7

Whole Numbers

Non Calculator Test

- Identify and describe properties of prime, composite, square and triangular numbers (ACMNA122)
- Investigate index notation and represent whole numbers as products of powers of prime numbers (ACMNA149)
- Investigate and use square roots of perfect square numbers (ACMNA150)
- Apply the associative, commutative and distributive laws to aid mental and written computation (ACMNA151)

Name_____

Answer all questions in the spaces provided on this test paper by:
Writing the answer in the box provided.
or
Shading in the bubble for the correct answer from the four choices provided.
*Show any working out on the test paper. Calculators are **not** allowed.*

1. Write the number 45 307 in words.

……..

2. Write the numeral for the number which is ten less than three thousand.

3. What is the single numeral for the number written in expanded notation below?

$6 \times 1\,000 + 8 \times 100 + 4 \times 10 + 7 \times 1$

4. What is the expanded notation for the number 38 075?

- ☐ $3 \times 1\,000 + 8 \times 100 + 7 \times 10 + 5 \times 1$
- ☐ $3 \times 10\,000 + 8 \times 1000 + 7 \times 100 + 5 \times 10$
- ☐ $3 \times 10\,000 + 8 \times 1\,000 + 7 \times 10 + 5 \times 1$
- ☐ $3 \times 100\,000 + 8 \times 1000 + 7 \times 100 + 5 \times 10$

5. Circle the prime numbers in the list below.

15, 17, 23, 27, 35, 37, 41

6. Keith has a hundred and six horses and three hundred and fifty alpacas.
How many more alpacas than horses does he have?

☐ 190 ☐ 199 ☐ 244 ☐ 290

7. Jade receives 24 567 online votes in a dancing contest.
What is this number rounded to the nearest hundred?

8. What is the value of 8^2 ?

9. What number has a prime factorisation of $2 \times 3 \times 5$?

10. Mahta gives away half of her collection of 76 beads. How many does she have left?

11. Write down all the factors of 60. (you may not need all the boxes)

12. Which is the prime factorisation of 120?

- ☐ $2 \times 2 \times 3 \times 10$
- ☐ $2 \times 2 \times 2 \times 2 \times 5$
- ☐ $4 \times 2 \times 3 \times 5$
- ☐ $2 \times 2 \times 2 \times 3 \times 5$

13. Write the prime factorisation of 40.

$40 = \square \times \square \times \square \times \square$

14. Which number is an even square number?

☐ 9 ☐ 12 ☐ 25 ☐ 36

15. List all of the prime numbers between 5 and 20.

……..

16. What is the value of 2^3?

17. Write the following calculation in index notation:

$5 \times 5 \times 5 \times 5 = \square^{\square}$

18. The first three square numbers are 1, 4, and 9.
What is the seventh square number?

☐

19. Between which two whole numbers does the square root of 50 ($\sqrt{50}$) lie?

☐ and ☐

20. Given that $\sqrt{169} = 13$ and $\sqrt{196} = 14$.
Which is not true?

- ☐ $14^2 = 196$.
- ☐ $13 \times 14 = \frac{169 \times 196}{2}$
- ☐ $13^2 = 169$.
- ☐ $14^2 \times 13^2 = 196 \times 169$.

21. Given that $5^2 \times 9^2 = 2025$. What is the value of $\sqrt{2025}$?

☐ 14 ☐ 45 ☐ 90 ☐ 1012

22. Which of the numbers below is divisible by 5?

☐ 845 ☐ 866 ☐ 888 ☐ 891

23. Which of the following can be used to determine if a number is divisible by 3?

- ☐ The last digit of the number is a 3, 6 or 9.
- ☐ The sum of the digits of the number is divisible by 3.
- ☐ The last digit of the number is an odd number.
- ☐ The last digit of the number is a 5 or a 0.

24. Write one of the symbols $>$, $<$ or $=$ in the box to correctly complete the sentence below.

$28 + 32 \square 5 \times 10$

25. Which of the following statements is true?

Statement I
$8^2 > 7 \times 7$

Statement II
$50 \div 2 \neq 29 - 4$

- ☐ Statement I only is true.
- ☐ Statement II only is true.
- ☐ Both statements are true.
- ☐ Neither statement is true.

26. Which is true?

☐ $8 - 3 = 3 - 8$. ☐ $3 \div 8 = 8 \div 3$.

☐ $3 \times 8 = 8 \times 3$. ☐ $3 \times 8 = 8 \div 3$.

27. For any three numbers a, b and c, which statement is always true?

☐ $a + b \times c = a + b \times a + c$.

☐ $(a + b) \times c = a + b \times a + c$.

☐ $(a + b) \times c = a \times c + b \times c$.

☐ $a + b \times c = a + b \times a + c$.

28. $4 \times (15 - 7) \div (5 - 3) =$

☐ 8 ☐ 12 ☐ 16 ☐ 24

29. Find the value of :

$$\frac{24 - 6}{3^2}$$

☐

30. a, b and c are three unequal numbers.
What can be said about the statement below?

$$a \times b \times c = c \times b \times a$$

☐ It is true for all values of a, b and c.

☐ It is true only if a, b and c are even numbers.

☐ It is true only if a, b and c are composite numbers.

☐ It is never true, no matter what values are used for a, b and c.

31. Find the highest common factor of 36 and 54.

☐

32. Find the lowest common multiple of 12 and 16.

☐

High School Mathematics Test 2014

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Whole Numbers

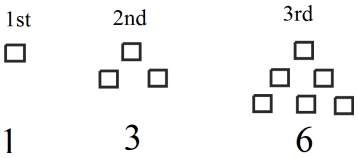
Non Calculator Longer Answer Section

Name_____

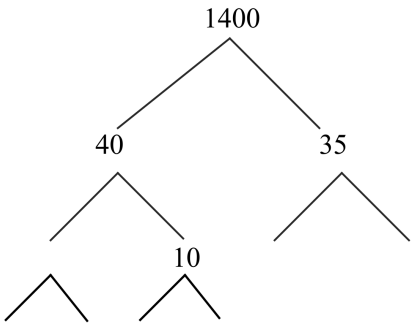
Write all working and answers in the spaces provided on this test paper.

Marks

1. The first three triangular numbers are shown. **2**
Draw diagrams and write the values of the next two triangular numbers.



2. (a) Complete the factor tree below. **2**



(b) Hence write the prime factorisation of 1 400. **1**

……..

……..

(c) Another number has a prime factorisation of $2 \times 3 \times 5 \times 5 \times 7$. **2**
What is the number, and what is the highest common factor of this number and 1400?

……..

……..

3. The table below gives some squares and cubes.

Number	Square	Cube		Number	Square	Cube
11	121	1331		21	441	9261
12	144	1728		22	484	10648
13	169	2197		23	529	12167
14	196	2744		24	576	13824
15	225	3375		25	625	15625
16	256	4096		26	676	17576
17	289	4913		27	729	19683
18	324	5832		28	784	21952
19	361	6859		29	841	24389
20	400	8000		30	900	2700

(a) What is the value of : **2**

i) 16^2 ? ……..

ii) 21^3 ? ……..

(b) What is the value of : **2**

i) $\sqrt{784}$? ……..

ii) $\sqrt[3]{15625}$? ……..

(c) $729 \times 441 = 321\,489$. **2**
What is the value of $\sqrt{321\,489}$?

……..

……..

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Whole Numbers
ANSWERS

Non Calculator Section (1 mark each)

Q no	Answer
1.	Forty five thousand, three hundred and seven.
2.	3000-10 = 2990
3.	$6 \times 1\,000 + 8 \times 100 + 4 \times 10 + 7 \times 1 = 6\,847$
4.	$38\,075 = 3 \times 10\,000 + 8 \times 1\,000 + 7 \times 10 + 5 \times 1$ (3rd answer)
5.	15, (17), (23), 27, 35, (37), (41)
6.	$\begin{array}{r} 350 - \\ 106 \\ \hline 244 \end{array}$
7.	24 567 = 24 600 (nearest hundred)
8.	$8^2 = 8 \times 8 = 64$
9.	$2 \times 3 \times 5 = 6 \times 5 = 30$
10.	$76 \div 2 = 38$ beads.
11.	Factors of 60 are 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60.
12.	$120 = 12 \times 10 = 4 \times 3 \times 5 \times 2 = \mathbf{2 \times 2 \times 2 \times 3 \times 5}$ (4th Answer)
13.	$40 = 4 \times 10 = \mathbf{2 \times 2 \times 2 \times 5}$
14.	36 is the only even square number (4th Answer)
15.	7, 11, 13, 17, 19
16.	$2^3 = 2 \times 2 \times 2 = 8$
17.	$5 \times 5 \times 5 \times 5 = 5^4$
18.	$7^2 = 49$
19.	$7^2 = 49$ and $8^2 = 64$ so $\sqrt{50}$ is between **7 and 8**
20.	$13 \times 14 \neq \frac{169 \times 196}{2}$ 2nd Answer

21.	Given that $5^2 \times 9^2 = 2025$. 2nd Answer $\sqrt{2025} = \sqrt{5^2 \times 9^2}$ $= \sqrt{5^2} \times \sqrt{9^2}$ $= 5 \times 9$ $= 45$
22.	Only 845 ends in a 5 (or 0) so is the only one divisible by 5. 1st Answer
23.	A number is divisible by 3 if the sum of the digits of the number is divisible by 3. 2nd Answer
24.	LHS =60 RHS = 50 so correct symbol is $>$
25.	Statement I: $8^2 > 7 \times 7$, $LHS = 64$, $RHS = 49$, $\therefore LHS > RHS$, Statement 1 is true. Statement II: $50 \div 2 \neq 29 - 4$, $LHS = 25$, $RHS = 25$, $\therefore LHS = RHS$, Statement 2 is false. 1st Answer
26.	Only $3 \times 8 = 8 \times 3$ is true. 3rd Answer
27.	$(a + b) \times c = a \times c + b \times c$ 3rd Answer
28.	$4 \times (15 - 7) \div (5 - 3) = 4 \times 8 \div 2$ $= 32 \div 2$ $= 16$
29.	$\frac{24 - 6}{3^2} = \frac{18}{9} = 2$
30.	$a \times b \times c = c \times b \times a$ is true for all values of a, b and c.
31.	HCF of 36 and 54. Factors of 36 1, 2, 3, 4, 6, 9, 12, 18, 36 Factors of 54 1, 2, 3, 6, 9, 18, 27, 54 HCF is **18**
32.	LCM 12 and 16. Multiples of 12 12, 24, 36, 48, 60, 72 Multiples of 16 16, 32, 48, 64, 80, 96 LCM is **48**

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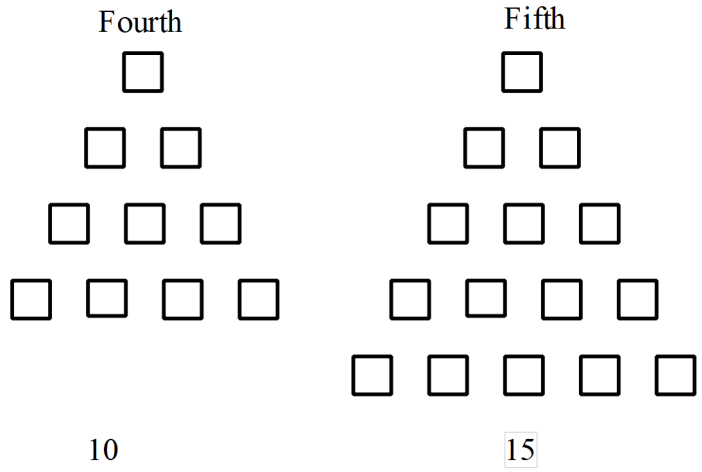
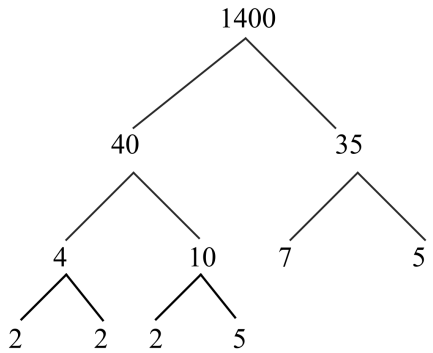
Mathematics Test 2014

Longer Answer Section (1 mark each)

Q no		Answer
1.		1 mark for each
2.	(a) 	2 marks if complete 1 mark for partially correct answer
	(b) $1\,400 = 2 \times 2 \times 2 \times 5 \times 5 \times 7$ $= 2^3 \times 5^2 \times 7$ (Index notation not required for answer)	1
	(c) $2 \times 3 \times 5 \times 5 \times 7 = 30 \times 35$ The number is = 1050 Compare the prime factors of 1400 and 1050 **2** × 3 × **5** × **5** × **7** and **2** × 2 × 2 × **5** × **5** × **7** $HCF = 2 \times 5 \times 5 \times 7 = 10 \times 35 =$ **350**	2 marks for correct answer 1 mark for attempt which has an error

3.	(a) (i) $16^2 = 256$ (ii) $21^3 = 9261$	1 mark each
	(b) (i) $\sqrt{784} = 28$ (ii) $\sqrt[3]{15625} = 25$	1 mark each
	(c) $729 \times 441 = 321\,489.$ $\sqrt{321\,489} = \sqrt{729 \times 441}$ $= \sqrt{27^2 \times 21^2}$ $= 27 \times 21$ $= 567$	2 for correct answer 1 for reasonable attemp