

School Name

Mathematics Test 2017

Year 7

Whole Numbers

Non Calculator
Section

Skills and Knowledge Assessed:

- 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 260 590 in words.

.....

2. Write the numeral for the number which is five less than two thousand four hundred and two.

--

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

$$2 \times 100\,000 + 5 \times 10\,000 + 3 \times 100 + 8 \times 10$$

☐ 205 308

☐ 205 380

☐ 250 308

☐ 250 380

4. What is the expanded notation for the number 170 060?

5. Which statement is true about the numbers 58 and 59?

- ☐ Both numbers are composite.
☐ Both numbers are prime.
☐ 58 is composite and 59 is prime.
☐ 58 is prime and 59 is composite

6. Circle the prime numbers in the list below.

9, 11, 17, 18, 23, 27, 31, 39

7. Mitchell rounded up 537 sheep on Thursday and 286 sheep on Friday.
How many sheep did he round up altogether on the two days?

8. Bella earned \$245 last week and gave her mother \$78 for board.
How much of her pay did she have left?

- ☐ \$167 ☐ \$168 ☐ \$177 ☐ \$178

9. Maddie unpacks 9 cartons which each contain 175 packets of muesli bars.
How many packets of muesli bars does she unpack?

10. Jack has a maxi-taxi which will hold 7 passengers. He is employed to transport people to a party. There are 623 guests to be transported.
How many trips would he have to make, if he took a full load each time?

- ☐ 78 ☐ 89 ☐ 98 ☐ 117

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

12. The population of a town was counted to be 42 368 in the census.
What is this amount to the nearest thousand people?

13. $120 - 8 \times 7 = ?$

☐ 45☐ 64☐ 76☐ 784

14. Write down all the factors of 90.

.....

15. Which is the prime factorisation of 420?

☐ $2 \times 2 \times 3 \times 5 \times 7$ ☐ $2 \times 3 \times 3 \times 5 \times 7$ ☐ $1 \times 2 \times 6 \times 5 \times 7$ ☐ $2 \times 3 \times 3 \times 5 \times 7$

16. Write the prime factorisation of 770.

17. Which number is a perfect square and a perfect cube?

☐ 16☐ 25☐ 49☐ 64

18. How many composite numbers are greater than 20 and less than 40?

☐ 12☐ 13☐ 14☐ 15

19. What is the value of 5^3 ?

20. Write the following calculation in index notation:

$$3 \times 3 \times 3 \times 3 \times 3 = \boxed{}^{\boxed{}}$$

21. What is the next perfect square after 64?

22. $\sqrt{41}$ lies between which two whole numbers?

and

23. Which of the numbers below is divisible by 5 and by 2?

☐ 125☐ 126☐ 128☐ 130

24. Which of the following can be used to determine if a number is divisible by 6?

☐ The last digit is a multiple of 2.☐ The sum of the digits is a multiple of 3.☐ The last digit is a multiple of 2 and the sum of the digits is a multiple of 3.☐ The last digit is a multiple of 6 and the sum of the digits is a multiple of 2.

25. Evaluate $\frac{45}{16-7} + 10$.

26. Using the facts that $\sqrt{1521} = 39$ and $13^2 = 169$.

Which statement is not true?

☐ $\sqrt{1521} \div \sqrt{169} = 3$

☐ $\sqrt{1521} \times \sqrt{169} = 705$

☐ $\sqrt{1521} + \sqrt{169} = 52$

☐ $\sqrt{1521} - \sqrt{169} = 26$

27.

Given that $9 \times 14^2 = 1764$. What is the value of $\sqrt{1764}$?☐ 42☐ 48☐ 63☐ 126

28.

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

$$89 + 121 \boxed{} 420 - 220$$

29.

Which of the following statements is true?

Statement I

$$3^3 > 5^2$$

Statement II

$$\sqrt{81} \neq 3^2$$

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

30.

Which is **not** true?

☐ $\sqrt{5} + \sqrt{7} = \sqrt{7} + \sqrt{5}$

☐ $\sqrt{5} - \sqrt{7} = \sqrt{7} - \sqrt{5}$

☐ $\sqrt{7} \times \sqrt{5} = \sqrt{5} \times \sqrt{7}$

☐ $\sqrt{5} \times \sqrt{7} = \sqrt{7} \times \sqrt{5}$

31.

For any three numbers p , q and r , which statement is **not** always true?

☐ $p \times q \times r = (p \times q) \times r$

☐ $p \times q \times r = p \times (q \times r)$

☐ $p \times q \div r = (p \times q) \div r$

☐ $(p \div q) \div r = p \div (q \div r)$

32.

$$\sqrt{60 - 35} \div 5 + 2^3 =$$

☐ 7☐ 9☐ 13☐ 14

33.

Find the value of $\frac{60 - (3^3 \times 2)}{18 - 15}$.

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

35. Find the lowest common multiple of 32 and 24.

36. Which statement is true about the number 30?

Statement A: 30 is the highest common factor of 150 and 210.

Statement B: 30 is the lowest common multiple of 3 and 15.

☐ Both statements are true.

☐ Neither statement is true.

☐ Only Statement A is true.

☐ Only Statement B is true.

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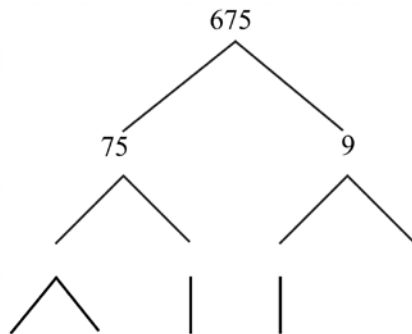
***Write all working and answers in the spaces provided on this test paper.
Marks may not be awarded if working out and/or answers are not clear.
Marks allocated are shown beside each question.
Calculators are allowed.***

Marks

1.

(a) Complete the factor tree below.

2



(b) Hence write the prime factorisation of 675.

1

.....

(c) Another number has a prime factorisation of $2 \times 3 \times 3 \times 5 \times 5$.
What is the number, and what is the lowest common multiple of this
number and 675?

2

.....

.....

Marks

2. Consider the pattern below.

Line 1 $1 = 1$

Line 2 $4 = 1 + 3$

Line 3 $9 = 1 + 3 + 5$

Line 4 $16 = 1 + 3 + 5 + 7$

- (a) What name could describe the set of numbers on the left of the equal sign in the pattern.

1

.....

- (b) Write Line 5 and Line 8 of the pattern above.

2

.....

.....

- (c) You are asked to write Line 50 of the pattern.

2

- (i) What would be the number on the left of the equal sign?

.....

.....

- (ii) What would be the last number in the sum on the right of the equal sign?

.....

.....

3. Complete the following calculations using the correct order of operations.

(a) $\frac{19 + 26}{9}$.

1

.....
.....

(b) $(6 \times 8 + 2) \times 9$.

1

.....
.....

(c) $(15 - 9) \times (18 + 12)$.

1

.....
.....

(d) $[\{(15 - 10)^2 + 5\} \div 6] + 4$.

1

.....
.....

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ANSWERS

Question	Working and Answer
1.	Two hundred and sixty thousand, five hundred and ninety.
2.	Two thousand four hundred and two = 2402 Required number = $2402 - 5 = \mathbf{2397}$
3.	$2 \times 100\,000 + 5 \times 10\,000 + 3 \times 100 + 8 \times 10 = \mathbf{250\,380}$ 4th Answer
4.	$170\,060 = 1 \times 100\,000 + 7 \times 10\,000 + 6 \times 10$
5.	$58 = 1 \times 58$ and 2×29 so is composite $59 = 1 \times 59$ only so is prime 3rd Answer
6.	<div style="display: flex; justify-content: space-between;"> <div> <p>These are not prime</p> <p>$9 = 3 \times 3$</p> <p>$18 = 6 \times 3$</p> <p>$27 = 9 \times 3$</p> <p>$39 = 3 \times 13$</p> </div> <div> <p>These are prime</p> <p>11</p> <p>17</p> <p>23</p> <p>31</p> </div> </div> <p>9, <u>11</u>, <u>17</u>, 18, <u>23</u>, 27, <u>31</u>, 39</p>
7.	$\begin{array}{r} 537 + \\ \underline{286} \\ \mathbf{823} \end{array}$

Question	Working and Answer
8.	$\begin{array}{r} 245 \\ - 78 \\ \hline 167 \end{array}$ 1st Answer
9.	$\begin{array}{r} 175 \\ \times 9 \\ \hline 1575 \end{array}$
10.	$\begin{array}{r} 89 \\ 7 \overline{) 623} \end{array}$ 2nd Answer
11.	$\begin{aligned} 2 \times 3 \times 3 \times 5 &= 2 \times 5 \times 3 \times 3 \\ &= 10 \times 9 \\ &= \mathbf{90} \end{aligned}$
12.	$42\,368 = \mathbf{42\,000}$ (nearest thousand)
13.	$\begin{aligned} 120 - 8 \times 7 &= 120 - 56 \\ &= 64 \end{aligned}$ 2nd Answer
14.	$90 = 1 \times 90 = 2 \times 45 = 3 \times 30 = 5 \times 18 = 6 \times 15 = 9 \times 10$ Factors in order 1, 2, 3, 5, 6, 9, 10, 15, 18, 30, 45, 90
15.	$\begin{aligned} 420 &= 42 \times 10 = 7 \times 6 \times 2 \times 5 = 7 \times 2 \times 3 \times 2 \times 5 \\ &= 2 \times 2 \times 3 \times 5 \times 7 \end{aligned}$ 1st Answer
16.	$\begin{aligned} 770 &= 10 \times 77 \\ &= \mathbf{2 \times 5 \times 7 \times 11} \end{aligned}$
17.	$64 = 8^2$ and $64 = 4^3$ 4th Answer
18.	21, 22, 24, 25, 26, 27, 28, 30, 32, 33, 34, 35, 36, 38 and 39 There are 15 composite numbers. 4th Answer

Question	Working and Answer
19.	$5^3 = 5 \times 5 \times 5 = 25 \times 5 = 125$
20.	$3 \times 3 \times 3 \times 3 \times 3 = \boxed{3}^{\boxed{5}}$
21.	$64 = 8^2$ So next is $9^2 = 81$
22.	$6^2 = 36$ and $7^2 = 49$, so $\sqrt{41}$ lies between 6 and 7.
23.	The number is divisible by 2 if the last digit is 0, 2, 4, 6 or 8 and by 5 if last digit is 5 or 0. So divisible by both if last digit is 0, (ie divisible by 10) so 130. 4th Answer
24.	If it is a multiple of 6, it is a multiple of 2 and of 3. Test for divisibility by 2 is if the last digit is a multiple of 2. Test for divisibility by 3 is if the sum of the digits is a multiple of 3. So for 6 it is both of these. 3rd Answer
25.	$\frac{45}{16-7} + 10 = \frac{45}{9} + 10$ $= 5 + 10$ $= 15$
26.	Since $13^2 = 169$, $\sqrt{169} = 13$ $\sqrt{1521} \div \sqrt{169} = 39 \div 13 = 3 \text{ } T$ $\sqrt{1521} \times \sqrt{169} = 13 \times 39 = 507 \neq 705 \text{ } F$ $\sqrt{1521} + \sqrt{169} = 39 + 13 = 52 \text{ } T$ $\sqrt{1521} - \sqrt{169} = 39 - 13 = 26 \text{ } T$ 2nd Answer
27.	$\sqrt{1764} = \sqrt{3^2 \times 14^2} = \sqrt{3^2} \times \sqrt{14^2}$ $= 3 \times 14$ $= 42$ 1st Answer

Question	Working and Answer
28.	$89 + 121 = 210$ $420 - 220 = 200$ $210 > 200$ $89 + 121 \boxed{>} 420 - 220$
29.	$3^3 = 27 \text{ and } 5^2 = 25$ $3^3 > 5^2$ $27 > 25$ <p>True</p> $\sqrt{81} = 9 \text{ and } 3^2 = 9$ $\sqrt{81} \neq 3^2$ $9 \neq 9$ <p>False</p> <p>Only Statement I is true.</p> <p>3rd Answer</p>
30.	$\sqrt{5} + \sqrt{7} = \sqrt{7} + \sqrt{5} \text{ Addition is commutative.}$ $\sqrt{5} - \sqrt{7} \neq \sqrt{7} - \sqrt{5} \text{ Subtraction is not commutative.}$ $\sqrt{7} \times \sqrt{5} = \sqrt{5} \times \sqrt{7} \text{ Multiplication is commutative.}$ $\sqrt{5} \times \sqrt{7} = \sqrt{7} \times \sqrt{5} \text{ Multiplication is commutative.}$ <p>2nd Answer</p>
31.	<p>Multiplication is Associative, so first 2 are true.</p> <p>Third is true as groupings give the same order of operations</p> <p>Last is not true as division is not associative</p> <p>e.g using $p = 12, q = 6$ and $r = 3$</p> $\begin{aligned} \text{LHS} &= (p \div q) \div r \\ &= (12 \div 6) \div 3 \\ &= 2 \div 3 = \frac{2}{3} \end{aligned}$ $\begin{aligned} \text{RHS} &= p \div (q \div r) \\ &= 12 \div (6 \div 3) \\ &= 12 \div 2 \\ &= 6 \end{aligned}$ <p>4th Answer</p>
32.	$\begin{aligned} \sqrt{60-35} \div 5 + 2^3 &= \sqrt{25} \div 5 + 8 \\ &= 5 \div 5 + 8 \\ &= 1 + 8 \\ &= 9 \end{aligned}$ <p>2nd Answer</p>

Question	Working and Answer
33.	$\frac{60 - (3^3 \times 2)}{18 - 15} = \frac{60 - (27 \times 2)}{3}$ $= \frac{60 - 54}{3}$ $= \frac{6}{3}$ $= 2$
34.	<p>Factors of 36 : 1, 2, 3, 4, 6, 9, 12, 18, 36</p> <p>Factors of 54 : 1, 2, 3, 6, 9, 18, 27, 54</p> <p>HCF = 18</p>
35.	<p>Multiples of 32 : 32, 64, 96, 128, 160, 192,</p> <p>Multiples of 24 : 24, 48, 72, 96, 120,</p> <p>LCM = 96</p>
36.	<p>Factors of 150 : 1, 2, 3, 5, 6, 10, 15, 25, 30, 50, 75, 150</p> <p>Factors of 210 : 1, 2, 3, 5, 6, 7, 10, 14, 15, 21, 30, 35, 42, 70, 105, 210</p> <p>So 30 is HCF of 150 and 210 so Statement A is true</p> <p>Multiples of 3 : 3, 6, 9, 12, 15, 18, 21, 24, 27, 30,</p> <p>Multiples of 15 : 15, 30, 45,</p> <p>So 30 is not the LCM of 3 and 15 so Statement B is false</p> <p>3rd Answer</p>

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		Marks
1.	<p>(a)</p> <pre> graph TD 675 --> 75 675 --> 9 75 --> 25 75 --> 3 25 --> 5 25 --> 5 9 --> 3 9 --> 3 </pre>	2
	<p>(b)</p> $ \begin{aligned} 675 &= 5 \times 5 \times 3 \times 3 \times 3 \\ &= 3 \times 3 \times 3 \times 5 \times 5 \\ &= (3^3 \times 5^2) \end{aligned} $	1
	<p>(c)</p> $ \begin{aligned} 2 \times 3 \times 3 \times 5 \times 5 &= 3 \times 3 \times 2 \times 5 \times 5 \\ &= 9 \times 50 \\ &= 450 \end{aligned} $ <p>The number is 450</p> $LCM = (2 \times 3 \times 3 \times 5 \times 5) \times 3 = 450 \times 3 = 1350$	2
2.	<p>(a) They are square numbers (or perfect squares).</p>	1

	(b) Line 5 $25 = 1 + 3 + 5 + 7 + 9$ Line 8 $64 = 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15$	2 marks (1 for each line)
	(c) (i) $50^2 = 2500$ (ii) There will be 50 terms starting $1 + 3 + 5 + \dots$ So it would end with $(2 \times 50 - 1) = 99$	1 1
3.	(a) $\frac{19 + 26}{9} = \frac{45}{9} = 5$	1
	(b) $(6 \times 8 + 2) \times 9 = (48 + 2) \times 9$ $= 50 \times 9$ $= 450$	1
	(c) $(15 - 9) \times (18 + 12) = 6 \times 30$ $= 180$	1
	(d) $[\{(15 - 10)^2 + 5\} \div 6] + 4 = [\{(5)^2 + 5\} \div 6] + 4$ $= [\{25 + 5\} \div 6] + 4$ $= [30 \div 6] + 4$ $= 5 + 4$ $= 9$	1