Mathematics Entry Test

Senior Test – entry to Y11 Pathway, A levels or IB
For students applying for September 2018

First Name:	Last Name:

Date of Birth: (day/month/year)

Intended Course:

Time Allowed: 1 Hour and 15 Minutes

Instructions to Candidates

- You may not use a calculator
- You are not allowed access to any electronic device for communication, such as a phone or iPod
- You are not allowed access to an electronic translator
- Write your name in the space provided at the top of this page
- Answer all questions in your own handwriting
- Typed (computer) answers will not be accepted
- There is writing space after some questions for you to do your working. In many questions, marks will be given for the correct method, even if your answer is incorrect
- Write your final answer on the line
- The maximum possible score is 100
- All students are retested on arrival and if there is any evidence of cheating they may be asked to leave.

I confirm that the answers on this test paper are all my own work and were completed under examination conditions.

Candidate:

Signed: …… **Date: ……..** (day/month/year)

Invigilator:

Signed: …… **Date: ……..** (day/month/year)

1. Write as simply as possible:

a) $a + a + a$ [2]

Answer: _____

b) $2y + 3z - 5y + 5z$ [2]

Answer: _____

c) $b^3 \times b^4$ [1]

Answer: _____

d) $\frac{4c^3 \times 5c^2}{2c}$ [2]

Answer: _____

2. Remove the brackets and write as simply as possible.

a) $5 (2d - 3e)$ [2]

Answer: _____

b) $(8a - b)(3a + 2b)$ [3]

Answer: _____

c) $6 (2x + 3) - 4 (x - 5)$ [2]

Answer: _____

/14

3. Work out the following and give your answers as simply as possible:

a) $\frac{2}{5} + \frac{3}{4}$ [3]

Answer: _____

b) $3\frac{1}{2} \times \frac{3}{4}$ [3]

Answer: _____

4. Solve these equations in x:

a) $6x + 4 = 34$ [2]

Answer: _____

b) $10 - x = 6$ [2]

Answer: _____

c) $5x - 4 = 3x + 6$ [2]

Answer: _____

/12

5. Find all the possible solutions to the equations:

a) $5x = 3(3x - 2)$ [2]

Answer: _____

b) $\frac{240}{x} = 15$ [2]

Answer: _____

c) $x^2 + 2x - 48 = 0$ [3]

Answer: _____

d) $\frac{5}{x+2} + \frac{3}{x-2} = 1$ [6]

Answer: _____

/13

6. Solve these simultaneous equations algebraically. Show your method clearly.

$3x - 2y = 13$
$x + 3y = 19$ [4]

Answer: _____

7. Write down a **list** of the integers which are solutions of:

$-2 \leq x < 3$ [2]

Answer: _____

8. Find all the solutions for the following equations:

a) $4n + 1 > 10$ [2]

Answer: _____

b) $x^2 - 1 \leq 8$ [3]

Answer: _____

/11

9. Factorise the following as far as possible. Do not try to solve.

a) $6x^2y + 4xy^2$ [2]

Answer: _____

b) $3x^2 - 75$ [2]

Answer: _____

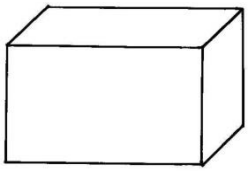
c) $2y^2 - y - 6$ [2]

Answer: _____

d) $4z^2 - 12z + 9$ [2]

Answer: _____

10. A cuboid has dimensions x, $2x$ and $3x$.



a) What is the volume of the cuboid in terms of x? [1]

Answer: _____

b) If the volume is 48 cm^3, what is the value of x? [2]

Answer: _____

c) What is the surface area in terms of x? Include units of measurement. [3]

Answer: _____

d) Using your answer to part b), calculate the surface area of the cuboid. Include units of measurement. [2]

Answer: _____

/16

11. Make x the subject of each of the following formulae:

a) $A = 3x + 1$ [2]

Answer: _____

b) $B = \frac{2x+5}{10-x}$ [5]

Answer: _____

c) $C = \frac{4+x^3}{3}$ [3]

Answer: _____

12. Find all the possible values of the following:

a) 7^0 Answer: _____ [1]

b) $121^{\frac{1}{2}}$ Answer: _____ [2]

c) $\sqrt[3]{125}$ Answer: _____ [2]

/15

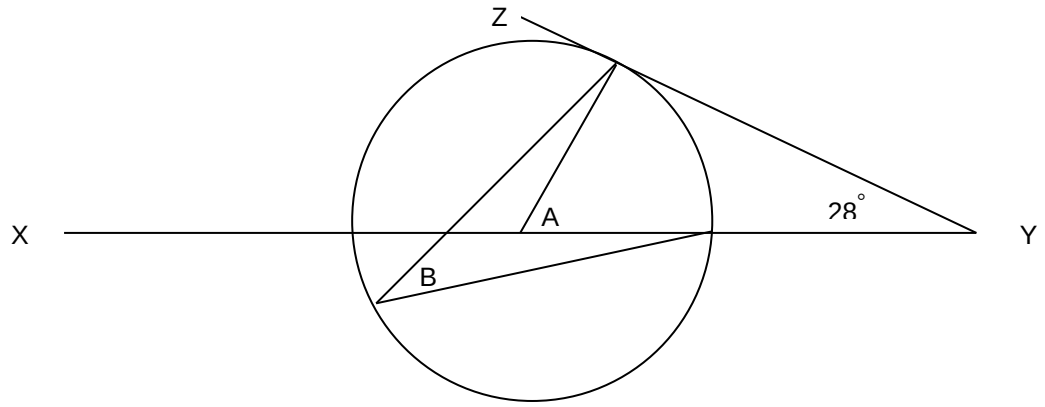
13. What are the next two numbers in each of these sequences?

a) 2, 5, 10, 17, …. Answer: _____ [2]

b) 1, 1, 2, 3, 5, 8, …. Answer: _____ [2]

c) 1, 3, 11, 31, 69,… Answer: _____ [3]

14. Calculate the angles A and B in the diagram. The diagram is not to scale.
The line XY passes through the centre of the circle.
The line YZ is a tangent to the circle. Angle XYZ is 28°.



a) Calculate the angle A. Answer: _____ [2]

b) Give a reason for your answer [2]

Answer: _____

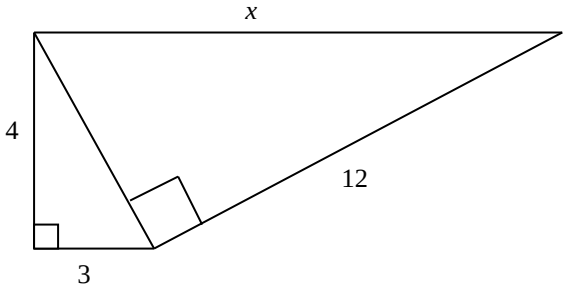
c) Calculate the angle B. Answer: _____ [2]

b) Give a reason for your answer [2]

Answer: _____

15. Find the length of the side marked *x* in the diagram below. (Not to scale.) [4]

Answer: _____



/19

End of examination