

## 1.02 Maths Competency Test

Name:

Class:

Date:

- For the multiple choice questions, please indicate your answer by circling the letter of your choice.
- You should select **only one** answer for each question.
- If you make a mistake and wish to change your answer, please place the **incorrect selection** in brackets [ ] and circle your revised answer.
- Calculator use is not permitted.
- Please show **ALL YOUR WORK** in the space provided for each question.

**Question 1.** Complete the following equality sentences using **integers**.

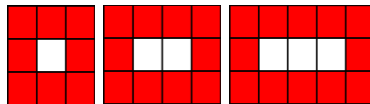
(i)  $17 + 3 = \square + 4$

(ii)  $17 + 3 = \square + \square + 4$

(iii)  $17 + 3 = \square + \square + 26$

Show your work here

**Question 2.** The first three stages of a pattern are shown below. Each stage is made up of a certain number of white tiles and a certain number of shaded tiles.



Assuming the pattern continues:

- (i) Draw the next stage of the pattern.
- (ii) In a particular stage of the pattern there are 20 shaded tiles. How many white tiles are in this stage of the pattern?
- (iii) Is it possible in this pattern to have 85 shaded tiles on the outside? Explain your reasoning.
- (iv) Write down the relationship (using words or symbols) between the number of white tiles and the number of shaded tiles in any stage of the pattern. State clearly the meaning of any symbols where used.

**Question 3.**  $2x + 3y + 4x - 2y$  is equivalent to which of the following?

(a)  $7x$

(b)  $6x - y$

(c)  $11xy$

(d)  $6x + y$

Show your work here

**Question 4.**  $36 - 6 \div 2 + 8$  is equal to which of the following?

- (a) 3                      (b) 23                      (c) 41                      (d) 25

Show your work here

**Question 5.** Apples cost  $a$  cents each. Bananas cost  $b$  cents each.

If I buy 3 apples and 2 bananas, what does  $3a + 2b$  represent?

- (a) 3 apples and 2 bananas      (b) The total amount of fruit I buy      (c) The total cost of 3 apples and 2 bananas

Show your work here

**Question 6.** Which of the following is equivalent to  $3x + 3x$  ?

- (a)  $6x^2$                       (b)  $9x$                       (c)  $9x^2$                       (d)  $6x$

Show your work here

**Question 7.** Which of the following is equivalent to  $2(2x - 5)$  ?

- (a)  $4x - 5$                       (b)  $4x - 10$                       (c)  $14x$                       (d)  $2x - 10$

Show your work here

**Question 8.** Which of the following is equivalent to  $y = -4x$  ?

- (a)  $x = \frac{y}{-4}$                       (b)  $x = \frac{y}{4}$                       (c)  $x = y + 4$

Show your work here

**Question 9.** Which of the following is equivalent to  $(x + 3)^2$  ?

- (a)  $x^2 + 3^2$       (b)  $x^2 + 6$       (c)  $x^2 + 6x + 6$       (d)  $x^2 + 6x + 9$       (e)  $x^2 + 9$

Show your work here

**Question 10.** Which of the following is an equivalent expression to  $\frac{5a+20}{5}$  ?

- (a)  $a + 4$                       (b)  $a + 20$                       (c)  $5a + 4$                       (d)  $a = -4$

Show your work here

**Question 11.** When an odd number is added to an odd number the total will be? Explain why.

- (a) Always an odd number                      (b) Always an even number  
(c) Sometimes an odd number                      (d) Sometimes an even number

Show your explanation here

**Question 12.** Which of the following is equivalent to  $\frac{x}{2} + \frac{x}{3}$  ?

- (a)  $\frac{2x}{5}$                       (b)  $\frac{x^2}{5}$                       (c)  $\frac{5x}{6}$                       (d)  $\frac{2x}{6}$

Show your work here

**Question 13.** Which of the following is true, for  $a$  not equal to  $b$  and  $a, b \in R$

- (a)  $a - b = b - a$                       (b)  $a - b = -a + b$                       (c)  $a - b = -1(b - a)$

Show your work here

**Question 14.** John sells cars. He receives a basic weekly wage of €400 and he also gets commission of €50 for every car he sells per week. What is his total weekly wage if he sells  $x$  cars per week?

- (a)  $400x + 50$                       (b)  $400 + 50x$                       (c)  $450x$                       (d)  $400$

Show your work here

**Question 15.** Which of the following is equal to  $(x^5)^2$  ?

- (a)  $x^{25}$                       (b)  $x^{52}$                       (c)  $x^7$                       (d)  $x^{10}$

**Show your work here**

**Question 16.** Which of the following is equal to  $5^0$  ? Explain why.

- (a) 1                      (b) 0                      (c) 5                      (d) 50

**Show your explanation here**

**Question 17.** A length of wood is 6 metres long. It is cut into two pieces. One of the pieces is  $x$  metres long.  
How long is the other piece?

- (a)  $(x - 6)$  metres    (b) 3 metres    (c) I can't say as I don't know what  $x$  is.    (d)  $(6 - x)$  metres

**Show your work here**

**Question 18.** I bought a pencil and a marker. The marker cost €1 more than the pencil.

The cost of both items was €1.40. How much did the pencil cost?

- (a) €0.40                      (b) €1.20                      (c) €0.20

**Show your work here**

**Question 19.** Considering the equation  $r = 25 + s$ , which of the following is true, for  $s \neq 0$  ?

- (a)  $r$  is greater than  $s$     (b)  $s$  is greater than  $r$     (c)  $r = 25$     (d) I cannot tell which is greater.

**Show your work here**

**Question 20.** In a hospital, there are 5 times as many nurses as doctors. If we let  $n$  equal the number of nurses and  $d$  equal the number of doctors, which one of the following is correct?

- (a)  $5n = d$                       (b)  $\frac{n}{d} = 5$                       (c)  $\frac{d}{n} = \frac{5}{1}$                       (d)  $n = 5 + d$

**Show your work here**