

## DIAGNOSTIC Number and Algebra TEST 1 of 2

Question numbers 10, 11, 15 and 18 are omitted because they refer to material for Higher Students only.

- 1) Calculate the i) Highest Common Factor of 20 and 24  
ii) Lowest Common Multiple of 20 and 24.
- 2) i) What is the first prime number above 20?  
ii) Write 60 as a product of primes.
- 3) Calculate: i)  $-3 \times -2$                       ii)  $-3 - 2$                       iii)  $-3 \div -2$
- 4) Find  $y$  when  $x = -3$  where i)  $y = 4x - 21$                       ii)  $y = -x^2$
- 5) Calculate: i)  $5^8 \times 5^3$                       *Write your answer in index form.*  
ii)  $((a^6)^5) \div a^6$                       *Write your answer in index form.*
- 6) Round 13.145 to i) 3 s.f.                      ii) 4 s.f.
- 7) i) Write 1200 in Standard Form.  
ii) Use your calculator to calculate  $9\,999 \times 9\,999\,999$  and using the full calculator display write down your answer in Standard Form.
- 8) i) Simplify  $30 : 45$                       ii) Divide £22 in the ratio 2 : 3
- 9) Calculate i)  $\frac{2}{3} + \frac{1}{4}$                       ii)  $\frac{5}{7} \div \frac{3}{4}$
- 12) i) Calculate 13% of 200.  
ii) £300 is invested at 5% compound interest for 3 years. No interest is removed. Calculate the value of the investment after 3 years, to the nearest penny.
- 13) A car costs £17,625 including VAT at 17.5%. Calculate the price of the car before VAT.
- 14)  $F$  is in direct proportion to  $x$ .  $F = 3$  when  $x = 8$ . Find  $F$  when  $x = 32$
- 16) Expand i)  $3(x + 2)$                       ii)  $(x + 2)(x + 3)$
- 17) Factorise: i)  $6a + 9$                       ii)  $x^2 - x - 2$
- 19) A number  $x$ , plus 5, all doubled is the same as the number  $x$ , trebled.  
**Set up** an equation involving  $x$ . *You do not need to solve this equation.*
- 20) Solve the equations: i)  $4x - 10 = 12$     ii)  $4(2x - 4) = 24$     iii)  $\frac{4}{x} = 16$
- 21) Make  $y$  the subject of the formula: i)  $x = 2y + 1$   
ii)  $x = 2y^3$   
iii)  $2x + y = xy$

Now mark your work and then mark your grid to see which sections you need to revise. For each question you got COMPLETELY correct mark a ✓ in that section. For example if you got both parts of Q16 correct then put a ✓ in section NA16, else but a ✗. Revise each of your ✗ sections by working through the revision material provided.

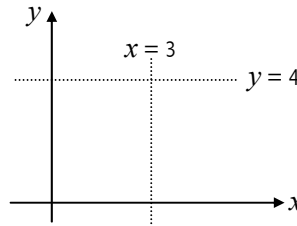
## DIAGNOSTIC Number and Algebra TEST 2 of 2

Question numbers 27, 29, 36 and 37 are omitted because they refer to material for Higher Students only.

- 22) Solve a) i)  $2x + 4 \leq 19$       ii)  $-x > 5$   
 b)  $n$  is an integer. List the values of  $n$  such that  $-4 < 2n \leq 4$ .

- 23) Copy diagram and shade the region satisfying the linear inequalities:

$$x > 0, 0 < y < 4, y > x + 1$$



- 24) What are the next two numbers in the sequence?

- a) 3, 6, 11, 18, 27, 38, ... , ... ,  
 b) 1, 5, 25, 125, ... , ... ,

- 25) Solve  $x^3 + x = 50$  to 2 d.p. using a trial/improvement method.  
 Hint: The solution is close to  $x = 3.5$ .

- 26) Solve the equation  $(x - 6)(x + 7) = 0$

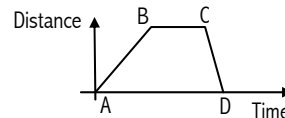
- 28) Solve the simultaneous equations:  
 $4x + 7y = 2$   
 $3x - y = 14$

- 30) Find the  $n^{\text{th}}$  term of the sequence      4, 7, 10, 13, ...

- 31) a) What is the gradient and  $y$ -intercept of the equation  $y = 4x - 5$ ?  
 b) Find the equation of the straight line which passes through the points (0, 5) and (1, 8).

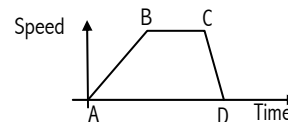
- 32) A)  $y = 2 - 4x$     B)  $2y = -8x$     C)  $y = 4x + 2$     D)  $y = -\frac{1}{4}x - \frac{1}{2}$ .  
 Which of these lines are parallel?

- 33) Vishal's journey is represented by this graph →



- i) a) When is Vishal stationary (stopped)?  
 b) When is he moving fastest?  
 c) What does the gradient of the graph represent?

- ii) a) What does the gradient AB represent in this graph? →  
 b) What does the area ABCD represent in this graph?  
 c) What is happening between B and C in this graph?

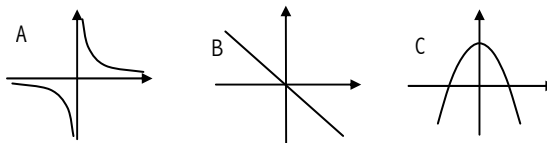


- 34) Copy and complete the table of values for  $y = x^3 - x^2$   
 Use the optional rows in the table if this helps.

$x$	-2	-1	0	1	2
$y = x^3 - x^2$					

- 35) i) What is the reciprocal of  $-3$ ?

- ii) Which graph represents  $y = \frac{1}{x}$  :



Now mark your work and then mark your grid to see which sections you need to revise. For each question you got COMPLETELY correct mark a ✓ in that section. For example if you got both parts of Q33 correct then put a ✓ in section NA33, else but a ✗. Revise each of your ✗ sections by working through the revision material provided.