

## year 10 higher passport to success - due

Question 1 - ( 4 marks available )

Simplify the following:

a)  $4^9 \times 4^3$

b)  $6^5 \times 6^2$

c)  $8^6 \div 8$

d)  $7^8 \div 7^6$

Question 2 - ( 4 marks available )

Simplify the following.

a)  $3 \times a \times 2 \times b$

b)  $c^5 \times c$

c)  $2y^4 \times 5y^3$

d)  $3gh^2 \times 4g^3h^3$

Question 3 - ( 2 marks available )

Simplify  $xz^3 \times 4x^4z^5$

Question 4 - ( 2 marks available )

Expand and simplify  $2(x + 7) + 3(x + 1)$

Question 5 - ( 2 marks available )

Expand and simplify  $(x + 2)(x + 1)$

Question 6 - ( 4 marks available )

Factorise fully the following:

a)  $x^2 + 2x$

b)  $2x^2 - 6x$

c)  $15x - 10x^3$

d)  $9x^2 + 3x^3$

Question 7 - ( 6 marks available )

Factorise the following:

a)  $x^2 + 3x - 4$

b)  $x^2 - 2x - 3$

c)  $x^2 + 2x - 8$

Question 8 - ( 6 marks available )

Solve the following:

a)  $2(x + 3) = x - 4$

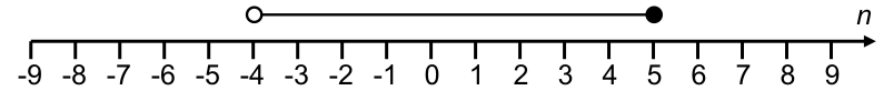
b)  $4(5x - 2) = 2(9x + 3)$

Question 9 - ( 3 marks available )

Solve the inequality  $7y + 2 < 5y + 12$

Question 10 - ( 2 marks available )

What is the inequality shown?



Question 11 - ( 2 marks available )

$n$  is an integer.

Write the values of  $n$  such that  $-15 < 3n \leq 6$

Question 12 - ( 2 marks available )

A number,  $x$ , rounded to 2 decimal places is 7.42

Write down the error interval for  $x$ .

Question 13 - ( 3 marks available )

Harry invests £6000 in a savings account.  
The account pays 3.4% compound interest per year.

Work out the value of his investment after 3 years.  
Give your answer to the nearest penny.

Question 14 - ( 3 marks available )

Express  $x^2 + 4x - 7$  in the form  $(x + a)^2 - b$  where  $a$  and  $b$  are integers.

Question 15 - ( 2 marks available )

Express 250 as the product of its prime factors.  
Write the prime factors in ascending order.

Question 16 - ( 3 marks available )

Expand and simplify  $(2x + 1)(x - 2)(x + 3)$

Question 17 - ( 4 marks available )

Here are four equations connecting  $x$  and  $y$ .  
 $k$  is a constant.

Match each equation to one of the statements A, B, C or D.

Equation 1	Equation 2	Equation 3	Equation 4
$y = kx^2$	$y = \frac{k}{x^2}$	$y = \frac{k}{x}$	$y = kx$

- A  $y$  is directly proportional to  $x$
- B  $y$  is directly proportional to  $x^2$
- C  $y$  is inversely proportional to  $x$
- D  $y$  is inversely proportional to  $x^2$

Question 18 - ( 3 marks available )

$y$  is directly proportional to  $x$ .

When  $y = 30$ ,  $x = 6$

- a) Work out an equation connecting  $y$  and  $x$ .
- b) Work out the value of  $y$  when  $x = 12$ .

Question 19 - ( 3 marks available )

$y$  is inversely proportional to  $x$ .

When  $y = 7$ ,  $x = 9$

- a) Work out an equation connecting  $y$  and  $x$ .
- b) Work out the value of  $y$  when  $x = 21$ .

Question 20 - ( 2 marks available )

Use  $a = \sqrt{2}$        $b = \sqrt{5}$        $c = \sqrt{10}$

to work out the value of  $\frac{ac}{b}$

Give your answer in it simplest form.

Question 21 - ( 2 marks available )

Work out the mean of these numbers

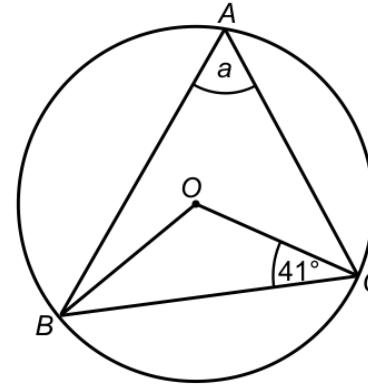
$$\sqrt{27} \quad \sqrt{48} \quad \sqrt{75}$$

Give your answer in the form  $a\sqrt{3}$  where  $a$  is an integer.

Question 22 - ( 3 marks available )

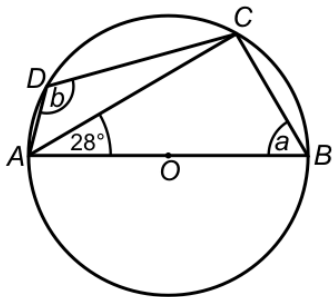
The diagram shows a circle, centre  $O$ .

Work out the value of  $a$ .



Question 23 - ( 4 marks available )

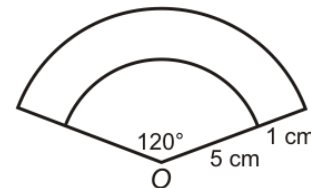
In the circle,  $O$  is the centre and  $AB$  is a diameter.



- Work out the size of angle  $a$ .
- Work out the size of angle  $b$ .

Question 24 - ( 4 marks available )

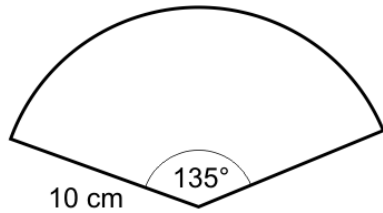
The diagram shows two circular arcs with centre  $O$ .



How much longer is the big arc than the small arc?  
Give your answer to 1 decimal place.

Question 25 - ( 3 marks available )

The diagram shows a sector of a circle radius 10 cm.



Find the area of the sector, giving your answer correct to 1 decimal place.

Question 26 - ( 2 marks available )

Write down in terms of  $n$ , an expression for the  $n$ th term of the following sequences:

a) 2 5 8 11 14

b) 9 11 13 15 17

Question 27 - ( 2 marks available )

Write down in terms of  $n$ , an expression for the  $n$ th term of the following sequences:

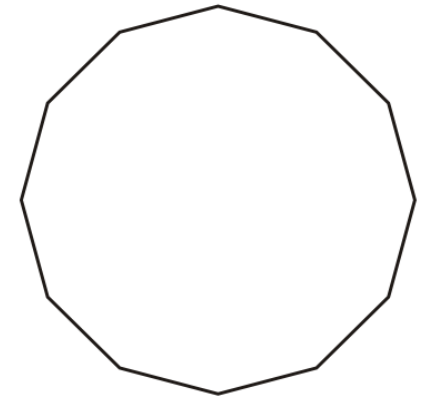
a) 12 10 8 6 4

b) 25 20 15 10 5

Question 28 - ( 2 marks available )

The diagram shows a regular dodecagon.

Work out the size of **one** interior angle.



Question 29 - ( 2 marks available )

Write the recurring decimal  $0.\dot{1}\dot{5}$  as a fraction in its simplest form.

Question 30 - ( 4 marks available )

The table shows the age, in years, of employees in a company.

Age ( $a$ ) in years	Frequency
$18 \leq a < 20$	3
$20 \leq a < 22$	2
$22 \leq a < 24$	7
$24 \leq a < 26$	8
$26 \leq a$	0

a) Find the modal class interval.  $\dots \leq a < \dots$

b) Work out an estimate of the mean age of these employees.