

Year 10 Mock Topics 1-8 Test

WORKED  
SOLUTIONS

Name:

Q1.

Tom and Amy set the alarms on their phones to sound at 6.45 am.

Both alarms sound together at 6.45 am.

Tom's alarm then sounds every 9 minutes.

Amy's alarm then sounds every 12 minutes.

At what time will both alarms next sound together?

$$\text{LCM of } 9 \text{ and } 12 = 36$$

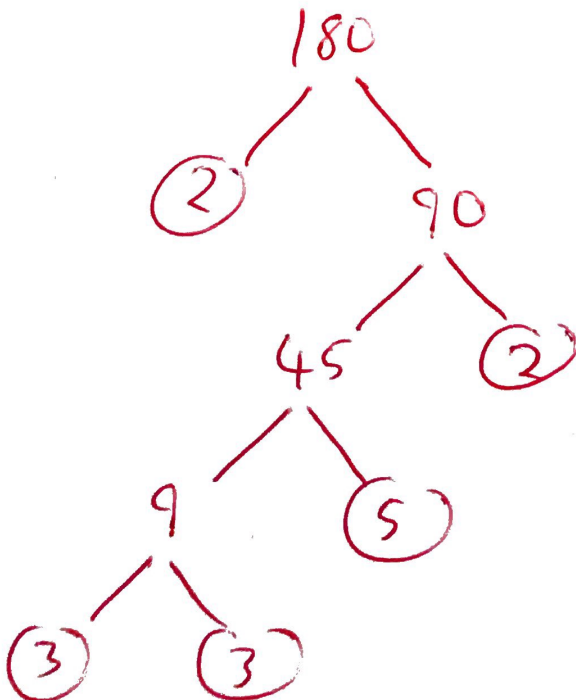
$$6:45 + 36 \text{ mins} = 7:21 \text{ am}$$

7:21

(Total for question = 3 marks)

Q2.

Express 180 as a product of its prime factors.



$$180 = 2 \times 2 \times 3 \times 3 \times 5$$

(Total for Question is 3 marks)

Q3.

(a) Express 180 as a product of its prime factors.

DUPPLICATED  
QUESTION

(3)

Martin thinks of two numbers.

He says,

"The Highest Common Factor (HCF) of my two numbers is 6

The Lowest Common Multiple (LCM) of my two numbers is a multiple of 15"

(b) Write down **two** possible numbers that Martin is thinking of.

6 and 30 have HCF 6 and LCM 30

6 30

(2)

(Total for Question is 5 marks)

Q4.

(a) Work out  $+8 - 6$

2  
(1)

(b) Work out  $-5 - 4$

-9  
(1)

(c) Work out  $-12 \div +4$

$$\frac{-12}{4} = -3$$

(1)

(Total for Question is 3 marks)

Q5.

(a) Simplify  $3y + 2x - 4 + 5x + 7$

$$3y + 7x + 3$$

(1)

(b) Factorise  $2x^2 - 4x$

$$2x(x-2)$$

(2)

(c) Expand and simplify  $11 - 3(x + 2)$

$$= 11 - 3x - 6$$

$$= 5 - 3x$$

(2)

(d) Expand and simplify  $(x - 6)(3x + 7)$

$$= 3x^2 + 7x - 18x - 42$$

$$= 3x^2 - 11x - 42$$

(2)

(Total for Question is 7 marks)

Q6.

(a) Simplify  $2a + 4b + 3a - b$

$5a + 3b$

(2)

(b) Expand  $5(m + 2)$

$5m + 10$

(1)

(c) Simplify  $a^5 \times a^4$

$a^9$

(1)

(Total for Question is 4 marks)

Q7.

(a) Expand  $2m(m + 3)$

$2m^2 + 6m$

(1)

(b) Factorise fully  $3xy^2 - 6xy$

$3xy(y - 2)$

(2)

(Total for Question is 3 marks)

Q8.

(a) Expand and simplify  $3(x + 4) + 2(5x - 1)$

$= 3x + 12 + 10x - 2$

$= 13x + 10$

(2)

(b) Expand and simplify  $(2x + 1)(x - 4)$

$$= 2x^2 - 8x + x - 4$$
$$= 2x^2 - 7x - 4$$

(c) Factorise completely  $6y^2 - 9xy$

$$3y(2y - 3x)$$

(2)

(2)

(Total for Question is 6 marks)

Q9.

(a) Expand and simplify  $3(y - 2) + 2(y + 5)$

$$= 3y - 6 + 2y + 10$$

$$5y + 4$$

(2)

(b) Simplify  $\frac{w^5}{w^3}$

$$w^2$$

(1)

(c) Factorise  $5x + 20$

$$5(x + 4)$$

(1)

(Total for question = 4 marks)

Q10.

(a) Make  $t$  the subject of the formula

$$2(a + t) = 5t + 7$$

$$2a + 2t = 5t + 7$$

$$2a = 3t + 7$$

$$2a - 7 = 3t$$

$$t = \dots \frac{2a - 7}{3} \dots$$

(b) Solve the simultaneous equations

$$3x - 4y = 8 \quad \times 3 \quad 9x - 12y = 24 \quad \textcircled{1}$$

$$9x + 5y = -1.5 \quad \textcircled{2}$$

$$\textcircled{1} - \textcircled{2} \quad -17y = 25.5$$

$$\therefore y = -1.5$$

$$(\Rightarrow \textcircled{1}) \quad 3x + 6 = 8$$

$$3x = 2$$

$$x = \frac{2}{3}$$

$$x = \dots \frac{2}{3} \dots$$

$$y = \dots -1.5 \dots$$

(3)

(Total for Question is 6 marks)



Q11.

Gemma has the same number of sweets as Betty. *Both start with  $x$*

Gemma gives 24 of her sweets to Betty.  
Betty now has 5 times as many sweets as Gemma.

Work out the total number of sweets that Gemma and Betty have.

$$x + 24 = 5(x - 24)$$

$$x + 24 = 5x - 120$$

$$144 = 4x$$

$$36 = x$$

$\therefore$  Both start with 36 each

72

(Total for question = 4 marks)

Q12.

$ABC$  is a triangle.

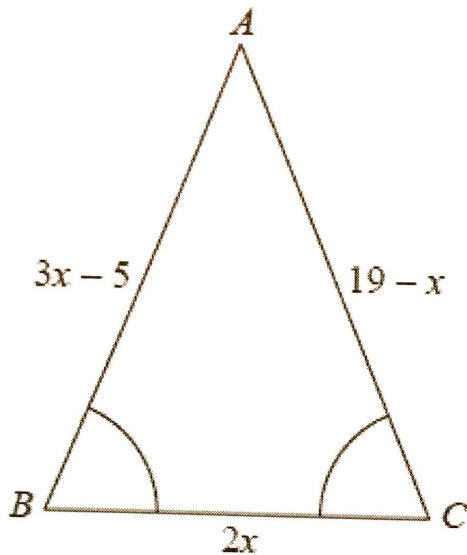


Diagram **NOT**  
accurately drawn

Angle  $ABC =$  angle  $BCA$ .  $\therefore AB = AC$

The length of side  $AB$  is  $(3x - 5)$  cm.

The length of side  $AC$  is  $(19 - x)$  cm.

The length of side  $BC$  is  $2x$  cm.

Work out the perimeter of the triangle.

Give your answer as a number of centimetres.

$$3x - 5 = 19 - x$$

$$4x - 5 = 19$$

$$4x = 24$$

$$x = 6$$

$$\therefore \text{Perimeter} = 13 + 13 + 12$$

..... 38 ..... cm

(Total for Question is 5 marks)



Q13.

(a) Write down the reciprocal of 5

$$\frac{1}{5}$$

(1)

(b) Evaluate  $3^{-2}$

$$= \frac{1}{3^2}$$

$$\frac{1}{9}$$

(1)

(c) Calculate  $9 \times 10^4 \times 3 \times 10^3$

Give your answer in standard form.

$$= 27 \times 10^7$$
$$= 2.7 \times 10^8$$

$$2.7 \times 10^8$$

(2)

(Total for Question is 4 marks)

Q14.

(a) Write down the value of  $27^{1/3}$

$$= \sqrt[3]{27}$$

$$= 3$$

(1)

(b) Find the value of  $25^{-1/2}$

$$= \frac{1}{25^{1/2}} = \frac{1}{\sqrt{25}}$$

$$\frac{1}{5}$$

(2)

(Total for Question is 3 marks)