1. Expand and simplify the following.

(a) $-2x(x+5)+(5-x)(x+3)$

$-2x^2-10x+(5-x)(x+3)$

$-2x^2-10x+5x+15-x^2-3x$

$-3x^2-8x+15$

$-3x^2-8x+15$ (2)

(b) $13b(2a+c)+b-2(3a+4c)$

$26ab+13bc+b-6a-8c$ (2)

2. Factorise the following expressions.

(a) x^2-x-56

Award full marks if no working is shown but the correct answer is given

$7\times-8=-56$
$7+(-8)=-1$

$(x+7)(x-8)$ (2)

(b) b^2-25

Recognize difference of two squares

Award full marks if no working is shown but the correct answer is given

$(b+5)(b-5)$ (2)

3. Donald took a loan of £40,000.

For the first 3 years, he paid 3% compound interest p.a. For the next 3 years, he paid 2% compound interest p.a.

Calculate how much interest he paid after 6 years. Give your answer to the nearest pound.

$$Final = Original * Multiplier^{years}$$

$$Final = 40{,}000 * (1.03)^3 = 43709.08$$

$$Final = 43{,}709 * (1.02)^3 = 46384.42\ldots$$

$$46384.42\ldots - 40000 = 6384.42\ldots$$

If answer is incorrect, 1 mark as part of method for correctly recalling formula

£6384 ..... (3)

4. Sally's monthly salary increased by 20% in 2020 and by 15% in 2023.

She now earns AED 25,000 per month.

Calculate her monthly salary before 2020. Give your answer to the nearest dirham.

$$(1.2)(1.15)x = 25{,}000$$

$$1.38x = 25{,}000$$

$$x = \frac{25{,}000}{1.38}$$

$$x = 18115.94203$$

$AED\ 18116$ ..... (3)

5. Solve the following equations. Give your answer as a simplified fraction where appropriate.

(a) $\frac{8+x}{2} - 5x = 3$

$8 + x - 10x = 6$

$8 - 9x = 6$

$-9x = 6 - 8$

$-9x = -2$

$x = \frac{2}{9}$

Do not accept decimal answers.

$x = \frac{2}{9}$ ..... (3)

(b) $12x = \frac{18+x}{12} - \frac{x-4}{7}$

$12x = \frac{7(18+x) - 12(x-4)}{84}$

$1008x = 7(18+x) - 12(x-4)$

$1008x = 126 + 7x - 12x + 48$

$1008x = 174 - 5x$

$1013x = 174$

$x = \frac{174}{1013}$

Do not accept decimal answers.

$x = \frac{174}{1013}$ ..... (4)

6. Make x the subject of the following formulas.

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

$4t - 2v + 3 = 3x$

$\frac{4t - 2v + 3}{3} = x$

$x = \frac{4t - 2v + 3}{3}$ ..... (2)

(b) $-t = \frac{9x + 4v}{3}$

$-3t = 9x + 4v$

$-3t - 4v = 9x$

$\frac{-3t - 4v}{9} = x$

$x = \frac{-3t - 4v}{9}$ ..... (3)

(c) $(3x + 4v)^2 = \frac{3t - 4}{4}$

$3x + 4v = \sqrt{\frac{3t - 4}{4}}$

Accept equivalent answers (i.e, single fraction)

$3x = \frac{\sqrt{3t - 4}}{2} - 4v$

$x = \frac{\sqrt{3t - 4}}{6} - \frac{4v}{3}$

$x = \frac{\sqrt{3t - 4}}{6} - \frac{4v}{3}$ ..... (4)

7. 30 students in a class attempted an exam. Their scores are shown in the frequency table below.

Score, s	Frequency
$0 < s \leq 10$ 5	1
$10 < s \leq 20$ 15	5
$20 < s \leq 30$ 25	9
$30 < s \leq 40$ 35	12
$40 < s \leq 50$ 45	3
	30

5
75
225
420
135
860
+

(a) Identify the modal class of the frequency table.

$30 < s \leq 40$ (1)

(b) Estimate the mean score. Give your answer to 2 decimal places.

$\frac{860}{30} = \frac{86}{3} = 28.66\ldots$

Do not accept fraction answers.

28.67 (4)

(c) Estimate the median score.

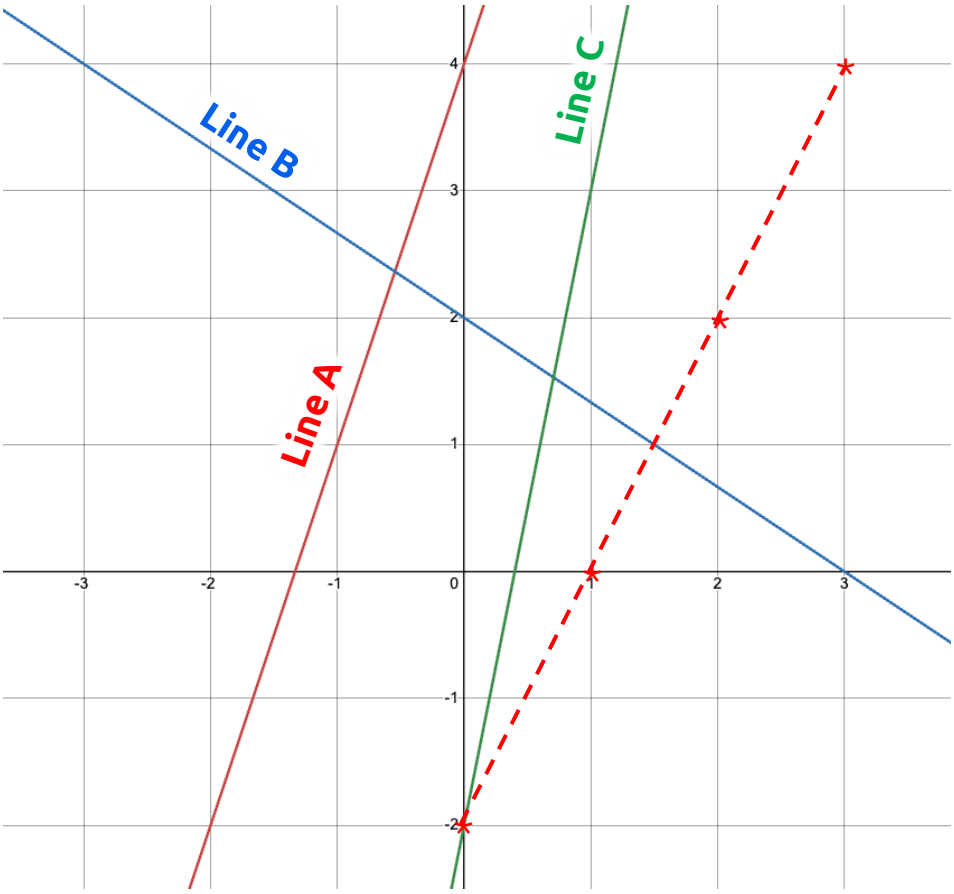
$\frac{30}{2} = 15$ $\quad 15 = 1 + 5 + 9$

Accept any answer between 20 and 40

Median lies in (or between) $20 < s \leq 30$ and $30 < s \leq 40$

30 (1)

8. 3 lines are shown on the graph below.



(a) Determine the equation of each line. Give your answer in the form $y = mx + c$.

For each equation award 1 mark for correct gradient and 1 mark for correct y-intercept.

Line A: $y = 3x + 4$

Line B: $y = \frac{-2}{3}x + 2$

Line C: $y = 5x - 2$ (6)

(b) For the equation $y = 2x - 2$, complete the table of values and construct its graph for values of x from 0 to 3.

x	0	1	2	3
y	-2	0	2	4

(3)

(c) There are two equations for lines below.

Line 1 $y = -2x + 4$

Line 2 $y = 5x + 4$

Chose true or false for the following statements.

	True	False
(i) Both lines intersect the y-axis at the same point.	✓	
(ii) Line 2 slopes downwards.		✓
(iii) Line 2 has a higher gradient than line 1.	✓	

(3)

(d) Calculate the midpoints of the lines joining the following pairs of points.

(i) (20,45) and (30,65)

$$\left(\frac{20+30}{2}\right), \left(\frac{45+65}{2}\right)$$

$$\left(\frac{50}{2}\right), \left(\frac{110}{2}\right)$$

$$(25,55)$$

$(25,55)$ ..... (2)

(i) (6,9) and (-2,4)

$$\left(\frac{6+(-2)}{2}\right), \left(\frac{9+4}{2}\right)$$

$$\left(\frac{4}{2}\right), \left(\frac{13}{2}\right)$$

$$(2,6.5)$$

Accept fraction equivalent for y-coordinate.

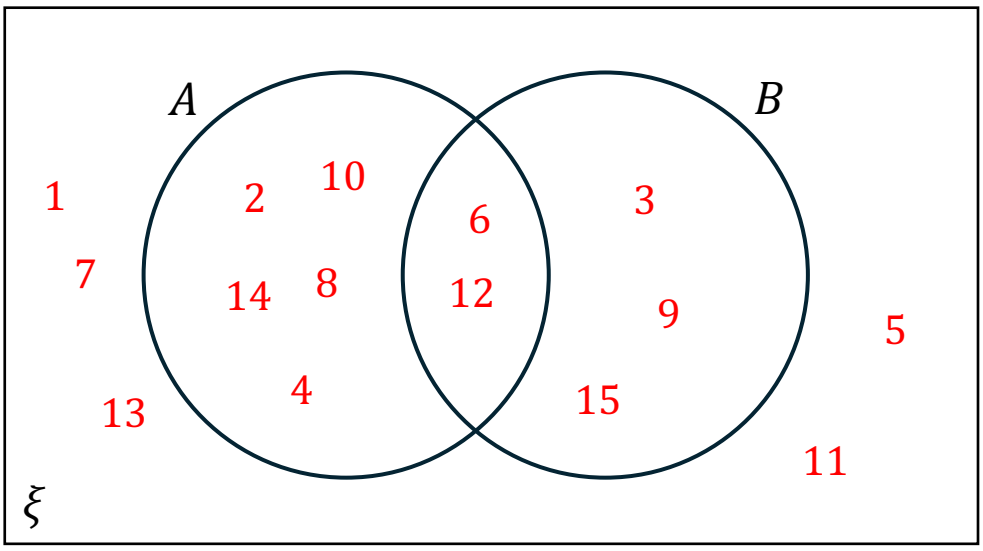
$(2,6.5)$ ..... (2)

9. $\xi = \{1,2,3,4,5,6,7,8,9,10,11,12,13,14,15\}$

$A =$ Multiples of 2

$B =$ Multiples of 3

(a) Complete the Venn diagram below.



(3)

(b) Calculate:

(i) $n(A)$

.....7..... (1)

(ii) $n(A' \cap B)$

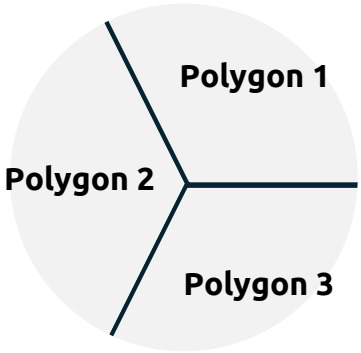
.....3..... (1)

(c) $C =$ Multiples of 5

List the elements of $(A \cap C) \cup (B \cap C)$.

.....10,15..... (2)

10. (a) Three identical regular n-sided polygons meet at a single point, as shown in the diagram below. Find the value of n.



Angles around a point sum to 360˚, hence

$$\frac{360}{3} = 120^\circ$$

Exterior + Interior = 180

$$E + 120 = 180$$

$$E = 60$$

Exterior angles sum to 360˚, hence

$$\frac{360}{60} = 6$$

Award method and answer marks appropriately if the calculation is done using the interior angle (i.e, 180(n-2))

6 ..... (3)

(b) Determine the size of each interior angle of the following. Give your answer to the nearest whole number if necessary.

(i) An 8-sided regular polygon

$$180(n-2)$$

$$180(8-2) = 6 * 180 = 1080$$

$$\frac{1080}{8} = 135^\circ$$

135˚ ..... (3)

(ii) A 11-sided regular polygon

$$180(n-2)$$

$$180(11-2) = 9 * 180 = 1620$$

$$\frac{1620}{11} = 147.272\ldots^\circ$$

147˚ ..... (3)

11. (a) The probability of a biased spinner landing on blue is 0.3.

Saif spins the spinner 200 times. Calculate the expected frequency of landing on blue.

Expected frequency = probability x number of trials

$$0.3 * 200 = 60$$

60 ..... (2)

(b) John choses a number between 8 and 11, both inclusive.

Noor choses a number between 3 and 5, both inclusive.

Murat multiplies the two numbers.

(i) Complete the sample space diagram below.

	8	**9**	**10**	**11**
3	24	27	30	33
4	32	36	(40)	(44)
5	(40)	(45)	(50)	(55)

60

(3)

(ii) Calculate the probability of the result being greater than 39.

$$\frac{6}{12} = \frac{1}{2}$$

Accept equivalent (i.e, 0.5 or 50%)

$\frac{1}{2}$ ..... (2)

End of test