

Revision Booklet 4

Topics

1. Mean
2. Index Notation
3. Standard Form
4. Inequalities
5. Quadratic Functions

Name _____

1. Find the mean of 2, 3, 7, 12 and 26

$$(2 + 3 + 7 + 12 + 26) \div 5 \rightarrow 50 \div 5 \rightarrow \text{Mean} = 10$$

2. The mean of 6 numbers is 12. If five of these numbers are 8, 10, 11, 13.5 and 17, what is the sixth number?

$$\begin{aligned}(8 + 10 + 11 + 13.5 + 17 + ?) \div 6 &= 12 \\ \rightarrow (59.5 + ?) \div 6 &= 12 \\ \rightarrow 59.5 + ? &= 12 \times 6 \\ \rightarrow 59.5 + ? &= 72 \\ \rightarrow ? &= 72 - 59.5 \\ \rightarrow ? &= 12.5\end{aligned}$$

3. The table below shows the data for vehicles passing a speed camera in a 40 mph limit area. Calculate the estimated mean for this data use sigma notation in the correct places on the table

Speed (s)	Frequency	Mid (s)	f x s
$10 \leq s < 20$	3	15	45
$20 \leq s < 30$	12	25	300
$30 \leq s < 40$	48	35	1680
$40 \leq s < 50$	11	45	495
$50 \leq s < 60$	6	55	330
	$\Sigma f = 80$		$\Sigma fs = 2850$

$$\text{Estimated Mean} = 2850 \div 80 \rightarrow \text{Est. Mean} = 35.625$$

4. Simplify $(3xy^3)^2$ $9x^2y^6$

5. Evaluate a) 64^0
1

b) $64^{1/3}$
 $\sqrt[3]{64} = 4$

6. Write using fractional index $\sqrt[3]{y^2}$
 $y^{2/3}$

7. Write in standard index form

a) 130 000 000

1.3×10^8

b) 0.000023

2.3×10^{-5}

8. Write as ordinary numbers

a) 2.5×10^5

250000

b) 5.7×10^{-4}

0.00057

9. Evaluate and give your answer in standard index form

a) $(1.2 \times 10^7) + (2.3 \times 10^5)$

1.223×10^7

b) $(6.7 \times 10^{-6}) + (4.3 \times 10^{-4})$

4.367×10^{-4}

c) $(2.5 \times 10^4) - (2.3 \times 10^3)$

2.27×10^4

d) $(7.5 \times 10^{-3}) - (7.2 \times 10^{-4})$

6.78×10^{-3}

10. Evaluate giving your answers in standard form

$\frac{2.5 \times 10^6 \times 6 \times 10^{-4}}{5 \times 10^{-3}}$

3×10^5

11. Write down the integers that satisfy the inequalities

a) $-4 \leq x < 3$ $-4, -3, -2, -1, 0, 1, 2$

b) $-10 < 5x \leq 15$ $-1, 0, 1, 2, 3$

c) $-11 < 3x < 13$ $-3, -2, -1, 0, 1, 2, 3, 4$

12. Solve the inequalities

a) $5x + 2 \leq 17$

$$5x \leq 17 - 2$$

$$5x \leq 15$$

$$x \leq 3$$

b) $5x - 2 \geq 3x + 10$

$$5x - 3x \geq 10 + 2$$

$$2x \geq 12$$

$$x \geq 6$$

c) $3x + 4 < 7x - 16$

$$4 + 16 < 7x - 3x$$

$$20 < 4x$$

$$4x > 20$$

$$x > 5$$

d) $5x - 3 > 7x + 13$

$$-3 - 13 > 7x - 5x$$

$$-16 > 2x$$

$$2x < -16$$

$$x > -4$$

13. Multiply out (Expand) the brackets on the following:

a. $3(x + 2)$

$$3x + 6$$

b. $5(2y - 4)$

$$10y - 20$$

c. $t(t + 3)$

$$t^2 + 3t$$

d. $2d(d - 5)$

$$2d^2 - 10d$$

e. $(a + 2)(b + 3)$

$$ab + 3a + 2b + 6$$

f. $(x - 3)(x + 4)$

$$x^2 + x - 12$$

g. $(x + 5)(x - 5)$

$$x^2 - 25$$

h. $(3x + 5)(2x + 3)$

$$6x^2 + 9x + 10x + 15$$

$$\rightarrow 6x^2 + 19x + 15$$

14. Factorise the following

a. $3x + 15$

$$3(x + 5)$$

b. $15y - 12$

$$3(5y - 4)$$

c. $t^2 + 5t$

$$t(t + 5)$$

d. $12d^2 - 6d$

$$6d(2d - 1)$$

e. $b^2 - 25$

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

f. $x^2 + x - 6$

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

g. $x^2 + 2x - 15$

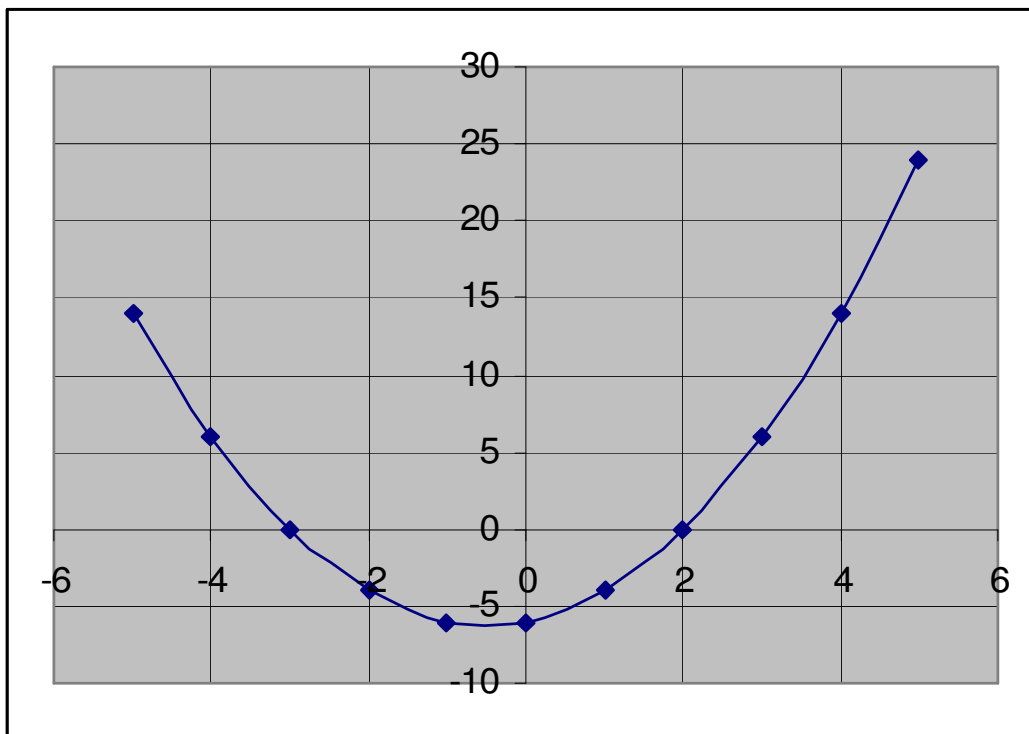
$$(x + 5)(x - 3)$$

h. $x^2 - 3x - 28$

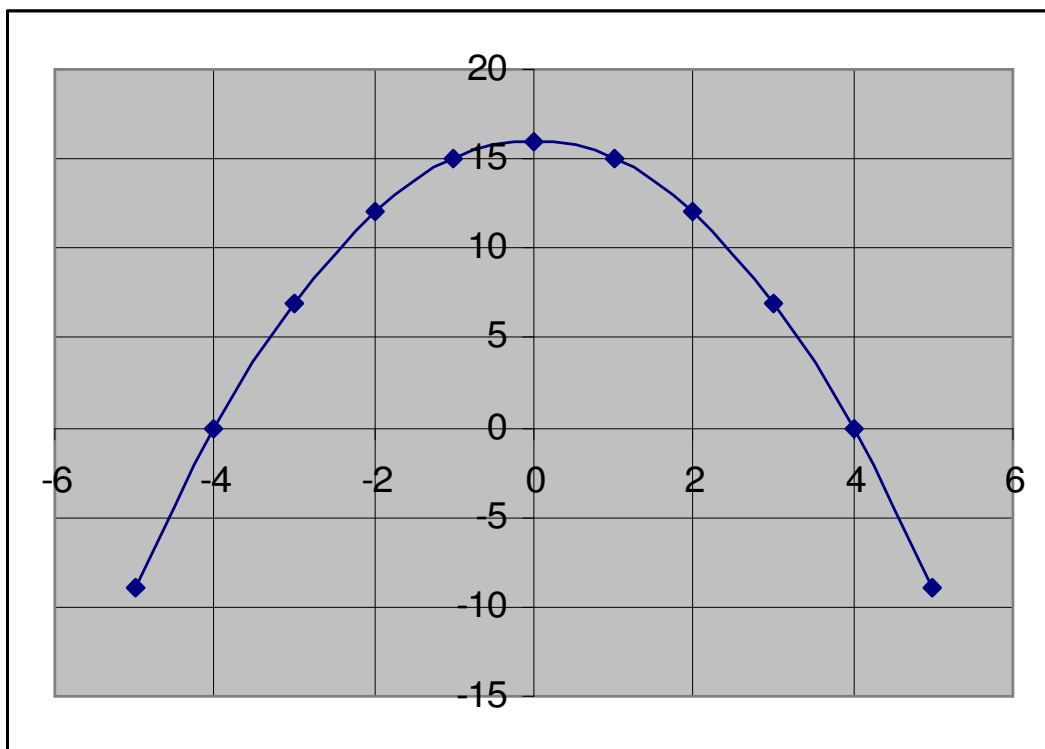
$$(x - 7)(x + 4)$$

15. Use the tables below to help find the x and y values for **a) $y = x^2 + x - 6$** and **b) $y = 16 - x^2$** and then plot the graphs on the squared section provided

$y = x^2 + x - 6$											
x	-5	-4	-3	-2	-1	0	1	2	3	4	5
x^2	25	16	9	4	1	0	1	4	9	16	25
$x^2 + x$	20	12	6	2	0	0	2	6	12	20	30
$x^2 + x - 6$	14	6	0	-4	-6	-6	-4	0	6	24	24
y	14	6	0	-4	-6	-6	-4	0	6	24	24



$y = 16 - x^2$											
x	-5	-4	-3	-2	-1	0	1	2	3	4	5
x^2	25	16	9	4	1	0	1	4	9	16	25
$16 - x^2$	-9	0	7	12	15	16	15	12	7	0	-9
y	-9	0	7	12	15	16	15	12	7	0	-9



14. Solve by factorising these quadratic equations

a.	$O = x^2 + 5x + 6$	g.	$O = x^2 + 2x + 1$
	$O = (x + 3)(x + 2)$ $x = -3 \text{ and } -2$		$O = (x + 1)(x + 1)$ $x = -1 \text{ and } -1$
b.	$O = x^2 - x - 6$	h.	$O = x^2 - 2x + 1$
	$O = (x - 3)(x + 2)$ $x = 3 \text{ and } -2$		$O = (x - 1)(x - 1)$ $x = 1 \text{ and } 1$
c.	$O = x^2 + 2x - 15$	i.	$O = x^2 + 6x - 16$
	$O = (x + 5)(x - 3)$ $x = -5 \text{ and } 3$		$O = (x + 8)(x - 2)$ $x = -8 \text{ and } 2$
e.	$O = x^2 + x - 12$	j.	$O = x^2 + 3x - 70$
	$O = (x + 4)(x - 3)$ $x = -4 \text{ and } 3$		$O = (x + 10)(x - 7)$ $x = -10 \text{ and } 7$
f.	$O = x^2 + 5x - 24$	k.	$O = x^2 + 5x - 36$
	$O = (x + 8)(x - 3)$ $x = -8 \text{ and } 3$		$O = (x + 9)(x - 4)$ $x = -9 \text{ and } 4$

15. Simplify this fraction $\frac{x^2 - x - 6}{x^2 - 2x - 3}$

$$\frac{(x - 3)(x + 2)}{(x - 3)(x + 1)} \rightarrow \frac{x + 2}{x + 1}$$

16. Solve these by completing the square

a.	$O = x^2 + 4x + 1$	g.	$O = x^2 + 4x - 1$
	-0.27 and -3.73		0.12 and -4.12
b.	$O = x^2 - 2x - 1$	h.	$O = x^2 - 2x - 3$
	-0.41 and 2.41		-1 and 3
c.	$O = x^2 + 6x - 10$	i.	$O = x^2 + 8x + 16$
	1.35 and -7.35		-4 and -4
e.	$O = x^2 + 6x + 2$	j.	$O = x^2 + 10x - 5$
	-5.65 and -0.35		-10.48 and 0.48
f.	$O = x^2 + 8x + 12$	k.	$O = x^2 - 8x - 12$
	-6 and -2		-1.29 and 9.29