



KING EDWARD VI
HANDSWORTH GRAMMAR
SCHOOL FOR BOYS



KING EDWARD VI
ACADEMY TRUST
BIRMINGHAM

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Mathematics
Unit 18 Booklet

HGS Maths



Tasks



Dr Frost Course



Name: _____

Class: _____

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1 Advanced Data Handling

Ungrouped Frequency Tables

25 packets of sweets were opened. The numbers of sweets in the packets were:

11, 8, 9, 12, 10, 10, 9, 8, 9, 13, 9, 11, 10, 10, 12, 12, 10, 10, 10, 11, 12, 8, 9, 8, 9

Construct a frequency table to show this data:

Number of sweets	Frequency

Mode of Ungrouped Data

Worked Example

Determine the modal score:

Score	Frequency
0	2
1	3
2	1
3	2
4	2
5	4

Your Turn

Determine the modal score:

Score	Frequency
0	4
1	6
2	2
3	4
4	4
5	8

Range of Ungrouped Data

Worked Example

Determine the range of the scores:

Score	Frequency
0	2
1	3
2	1
3	2
4	2
5	4

Your Turn

Determine the range of the scores:

Score	Frequency
0	4
1	6
2	2
3	4
4	4
5	8

Median of Ungrouped Data

Fluency Practice

Number
of pieces
of data: Position
of the
median:

(a) 4, 10, 11, 12, 12, 15, 20



(b) 4, 10, 11, 12, 12, 15



(c) 10, 11, 12, 12, 15



(d) 10, 11, 12, 12



(e) 1, 3, 6, 8, 9, 12



Number of pieces of data:	Position of the median:
7	
11	
10	
41	
24	
	8
	3.5
	40
	21.5

Fluency Practice

Number of pets	Frequency	Which pieces of data are in this category?
0	3	1 st 2 nd 3 rd
1	2	4 th 5 th
2	4	

Number of pets	Frequency	Which pieces of data are in this category?
0		1 st 2 nd
1		3 rd
2		4 th 5 th 6 th 7 th 8 th
3		9 th 10 th
4		11 th 12 th 13 th

Number of pets	Frequency	Which pieces of data are in this category?
0	8	
1	9	
2	13	
3	12	
4	9	

Number of pets	Frequency	Which pieces of data are in this category?
0	5	
1	1	
2	3	

Number of pets	Frequency	Which pieces of data are in this category?
0		1 st
1		2 nd 3 rd 4 th
2		5 th 6 th 7 th 8 th
3		9 th 10 th
4		11 th 12 th

Number of pets	Frequency	Which pieces of data are in this category?
0		1 st to 13 th
1		14 th to 29 th
2		30 th to 59 th
3		60 th to 80 th
4		81 st to 92 nd

Number of pets	Frequency	Which pieces of data are in this category?
0	2	
1	1	
2	5	

Number of pets	Frequency	Which pieces of data are in this category?
0	21	1 st to 21 st
1	15	22 nd to...
2	18	
3	25	
4	32	

Number of pets	Frequency	Which pieces of data are in this category?
0	1	
1	3	
2	3	

Number of pets	Frequency	Which pieces of data are in this category?
0	10	
1	12	
2	15	
3	20	
4	5	

Worked Example

Calculate the median score:

Score	Frequency
0	2
1	3
2	1
3	2
4	2
5	4

Your Turn

Calculate the median score:

Score	Frequency
0	4
1	6
2	2
3	4
4	4
5	8

Worked Example

Calculate the median score:

Score	Frequency
0	2
1	3
2	1
3	2
4	2
5	7

Your Turn

Calculate the median score:

Score	Frequency
0	9
1	6
2	2
3	4
4	4
5	8

Mean of Ungrouped Data

Worked Example

Calculate the mean score:

Score	Frequency
0	2
1	3
2	1
3	2
4	2
5	4

Your Turn

Calculate the mean score:

Score	Frequency
0	4
1	6
2	2
3	4
4	4
5	8

Fill in the Gaps

Data Set				Frequency Table		
7	7	7	7	<i>Value</i>	<i>Frequency</i>	<i>Value × Frequency</i>
7			8	7	6	42
8	8	8	8	8	9	72
8				9	5	45
9	9	9	9	<i>Totals</i>	20	159
Mean				159 ÷ 20 = 7.95		

Data Set				Frequency Table		
4	4	4	4	<i>Value</i>	<i>Frequency</i>	<i>Value × Frequency</i>
				4	13	
				5	2	
				6	5	
				<i>Totals</i>		
Mean				÷ =		

Data Set				Frequency Table		
2	2	2	2	<i>Value</i>	<i>Frequency</i>	<i>Value × Frequency</i>
2	3	3	3	2		
3	3	3	3	3		
4	4	4	4	4		
4	4	4	4	<i>Totals</i>	20	
Mean				÷ 20 =		

Data Set				Frequency Table		
12	12	12	12	<i>Value</i>	<i>Frequency</i>	<i>Value × Frequency</i>
12	12	12	12	12		
12	12	12	12	13		
12	14	14	14	14		
14	14	14	14	<i>Totals</i>		
Mean				÷ =		

Fill in the Gaps

Data Set				Frequency Table		
4	5	5	5	<i>Value</i>	<i>Frequency</i>	<i>Value × Frequency</i>
5	6	6	6	4		
6	6	6	7	5		
7	7	7	7	6		
7	7	7	7	7		
7	7	7	7	<i>Totals</i>		
Mean				÷	=	

Data Set				Frequency Table		
				<i>Value</i>	<i>Frequency</i>	<i>Value × Frequency</i>
				2.5	8	
				2.6	3	
				2.7		
				2.8	5	
				<i>Totals</i>	20	
Mean				÷	=	

Data Set				Frequency Table		
				<i>Value</i>	<i>Frequency</i>	<i>Value × Frequency</i>
				8	5	
				9	8	
				10		
				11	6	
				<i>Totals</i>	24	
Mean				÷	=	

Data Set				Frequency Table		
				<i>Value</i>	<i>Frequency</i>	<i>Value × Frequency</i>
				3	2	
				4		
				5		
				6	12	
				<i>Totals</i>	24	
Mean				÷	=	5.25

Worked Example

The table gives information about the numbers of badges gained by the girls in a Guide group.

- a) Write down the mode.
- b) Find the range.
- c) Work out the median
- d) Calculate the mean.

Number of badges	Frequency
0	2
1	8
2	4
3	3
4	5
5	3

Fill in the Gaps

Class		Total Frequency (class size)	Most common age (modal age)	Oldest student	Youngest student	Range of ages	Total of all their ages	Mean age	Median age
A	Age	Frequency							
	5	3							
	6	7							
B	Age	Frequency	20						
	7	3							
	8								
	9	9							
C	Age	Frequency	30	13		10	3		
	10								
	11	14							
	12								
	13								
D	Age	Frequency		10 and 11	12		2	108	10.8

Grouped Frequency Tables

80 people take part in a survey. Their ages are shown in the frequency table. How many respondents are in their thirties?

Age range	Frequency
$20 \leq \text{age} < 30$	8
$30 \leq \text{age} < 40$	
$40 \leq \text{age} < 50$	12
$50 \leq \text{age} < 60$	16
$60 \leq \text{age} < 70$	11
$70 \leq \text{age} < 80$	10
$80 \leq \text{age} < 90$	9
	80

Modal Class of Grouped Data

Worked Example

Determine the modal class interval:

Mass, x (kg)	Frequency
$0 < x \leq 10$	5
$10 < x \leq 20$	3
$20 < x \leq 40$	2
$40 < x \leq 46$	6
$46 < x \leq 50$	7

Your Turn

Determine the modal class interval:

Mass, x (kg)	Frequency
$0 < x \leq 10$	15
$10 < x \leq 20$	6
$20 < x \leq 40$	4
$40 < x \leq 46$	12
$46 < x \leq 50$	8

Range of Grouped Data

Worked Example

Determine the upper and lower bounds for the range:

Mass, x (kg)	Frequency
$0 < x \leq 10$	5
$10 < x \leq 20$	3
$20 < x \leq 40$	2
$40 < x \leq 46$	6
$46 < x \leq 50$	7

Your Turn

Determine the upper and lower bounds for the range:

Mass, x (kg)	Frequency
$10 < x \leq 20$	5
$20 < x \leq 30$	3
$30 < x \leq 50$	2
$50 < x \leq 56$	6
$56 < x \leq 60$	7

Median Class of Grouped Data

Worked Example

Determine the median class interval:

Mass, x (kg)	Frequency
$0 < x \leq 10$	5
$10 < x \leq 20$	3
$20 < x \leq 40$	2
$40 < x \leq 46$	6
$46 < x \leq 50$	7

Your Turn

Determine the median class interval:

Mass, x (kg)	Frequency
$0 < x \leq 10$	15
$10 < x \leq 20$	6
$20 < x \leq 40$	4
$40 < x \leq 46$	12
$46 < x \leq 50$	8

Median of Grouped Data

Worked Example

Jack collects the heights of 100 flowers and records the data in the table below.

Height (y cm)	Frequency
$40 < y \leq 50$	7
$50 < y \leq 60$	14
$60 < y \leq 70$	59
$70 < y \leq 80$	11
$80 < y \leq 90$	9

Use interpolation to estimate the median.
Give your answer correct to 1 decimal place.

Your Turn

James collects the heights of 80 flowers and records the data in the table below.

Height (x cm)	Frequency
$35 < x \leq 40$	4
$40 < x \leq 45$	9
$45 < x \leq 50$	26
$50 < x \leq 55$	13
$55 < x \leq 60$	8
$60 < x \leq 65$	20

Use interpolation to estimate the median.
Give your answer correct to 1 decimal place.

Midpoint of Two Numbers

Worked Example

Numbers	Midpoint
40 and 60	

Your Turn

Numbers	Midpoint
40 and 70	

Intelligent Practice

Numbers	Midpoint
1. 8 and 10	
2. 7 and 11	
3. 2 and 16	
4. 22 and 36	
5. 22 and 46	
6. 22 and 47	
7. 22 and 48	
8. 21 and 48	
9. 21 and 47	
10. 42 and 94	

Numbers	Midpoint
11. 142 and 194	
12. 14.2 and 19.4	
13. 7.1 and 9.7	
14. 7 and 9.6	
15. -9.6 and -7	
16. -9.9 and -7	
17. -9.9 and -6.9	
18. -6.9 and 9.9	
19. $-6\frac{3}{4}$ and $9\frac{3}{4}$	
20. $-6\frac{3}{5}$ and $9\frac{3}{4}$	

Estimated Mean of Grouped Data

Worked Example

Calculate an estimate for the mean:

Mass, x (kg)	Frequency
$0 < x \leq 8$	3
$8 < x \leq 16$	6
$16 < x \leq 24$	7
$24 < x \leq 32$	4

Your Turn

Calculate an estimate for the mean:

Mass, x (kg)	Frequency
$0 < x \leq 8$	3
$8 < x \leq 16$	0
$16 < x \leq 24$	7
$24 < x \leq 32$	4

Fill in the Gaps

Value	Frequency	Midpoint	Midpoint \times Freq
10 $\leq x <$ 12	6	11	66
12 $\leq x <$ 14	9	13	117
14 $\leq x <$ 16	5	15	75
Totals	20		258
Estimate of Mean	258 \div 20 =		

Value	Frequency	Midpoint	Midpoint \times Freq
20 $\leq x <$ 30	9	25	225
30 $\leq x <$ 40	7	35	
40 $\leq x <$ 50	4	45	
Totals	20		
Estimate of Mean	\div 20 =		

Value	Frequency	Midpoint	Midpoint \times Freq
20 $\leq x <$ 24	6	22	
24 $\leq x <$ 28	10		
28 $\leq x <$ 32	5		
32 $\leq x <$ 36	4		
Totals	25		
Estimate of Mean	\div =		

Value	Frequency	Midpoint	Midpoint \times Freq
5 $\leq x <$ 10	7		
10 $\leq x <$ 15	7		
15 $\leq x <$ 20	8		
20 $\leq x <$ 25	3		
Totals	25		
Estimate of Mean	\div =		

Fill in the Gaps

Value	Frequency	Midpoint	Midpoint × Freq
100 ≤ x < 120	7		
120 ≤ x < 140	12		
140 ≤ x < 160			
160 ≤ x < 180	2		
Totals	30		
Estimate of Mean	÷	=	

Value	Frequency	Midpoint	Midpoint × Freq
0 ≤ x < 2			3
2 ≤ x < 4			9
4 ≤ x < 6			40
6 ≤ x < 8			42
Totals	20		
Estimate of Mean	÷	20	=

Value	Frequency	Midpoint	Midpoint × Freq
0 ≤ x <			40
≤ x <			240
≤ x <			275
≤ x < 40			
Totals			
Estimate of Mean	÷	40	= 18.25

Value	Frequency	Midpoint	Midpoint × Freq
≤ x <			
≤ x <			
≤ x <		55	1430
≤ x <		65	780
Totals			
Estimate of Mean	÷	50	= 54.2

In each table, values are grouped into classes of equal width.

Worked Example

Bob asked each of 40 friends how many minutes they took to get to work. The table shows some information about his results.

- Write down the modal class.
- Work out the upper and lower bounds for the range.
- Work out the class in which the median lies.
- Calculate an estimate for the median.
- Calculate an estimate for the mean.

Time taken (m minutes)	Frequency
$0 < m \leq 10$	3
$10 < m \leq 20$	8
$20 < m \leq 30$	11
$30 < m \leq 40$	9
$40 < m \leq 50$	9

Extra Notes

2 Expand Binomials

Worked Example

Expand and simplify:

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

Your Turn

Expand and simplify:

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

Worked Example

Expand and simplify:

$$(5x + 2)(7x - 3)(x - 4)$$

Your Turn

Expand and simplify:

$$(5x + 4)(7x - 3)(x - 2)$$

Worked Example

Expand and simplify:
 $(3x - 2)^3$

Your Turn

Expand and simplify:
 $(4x - 3)^3$

Fill in the Gaps

Expanded Expression	Factorised Expression
$2x + 8$	$2(x + 4)$
	$3(x - 2)$
	$x(x + 7)$
$5x + 35$	
$8x - 12$	
	$2x(x - 5)$
$x^2 - x$	
$10x^2 + 2x$	$5x(3 - x)$
$6x + 9y$	
	$4xy(x + 2)$
$6xy - 4y^2$	
	$(x + 2)(x + 3)$
	$(x + 5)(x - 3)$
$x^2 + 8x + 15$	
$x^2 + 3x + 2$	

Expanded Expression	Factorised Expression
$x^2 - 7x + 10$	
	$(x - 6)(x + 4)$
	$(x + 7)(x - 7)$
$x^2 + 2x - 15$	
$x^2 - 25$	
	$(2x + 1)(x + 5)$
$x^2 - x - 6$	
$x^2 + 3x$	
$4x^2 - 25$	$(3x - 1)(x - 2)$
	$(x + 5)^2$
$7x^2 + 10x + 3$	
	$(3x - 1)^2$
$4x^2 + 4x + 1$	
$5x^2 - 14x - 3$	
	$(x - 2)^3$

Extra Notes

3 Solving Quadratics

Multiplication by Zero

$$(a - 3) \times 2 = 0$$

$$a = \underline{\hspace{2cm}}$$

$$(a - 7) \times a = 0$$

$$a = \underline{\hspace{2cm}}$$

$$a \times a = 0$$

$$a = \underline{\hspace{2cm}}$$

$$(a + 5)(a - 3) = 0$$

$$a = \underline{\hspace{2cm}}$$

$$a^2 + 6a + 8 = 0$$

$$a = \underline{\hspace{2cm}}$$

$$a^2 + 8a + 16 = 0$$

$$a = \underline{\hspace{2cm}}$$

Worked Example

What values of x satisfy the equation $x(x - 9) = 0$?

Your Turn

What values of x satisfy the equation $(x + 6)x = 0$?

Worked Example

What values of x satisfy the equation $(x - 9)(x + 5) = 0$?

Your Turn

What values of x satisfy the equation $(x + 6)(x - 5) = 0$?

Worked Example

Solve the equation
 $(2x - 3)(3x + 1) = 0$

Your Turn

Solve the equation
 $(3x + 2)(2x - 1) = 0$

Worked Example

Solve the equation
 $x^2 + 2x - 8 = 0$

Your Turn

Solve the equation
 $x^2 + 2x - 15 = 0$

Worked Example

Solve the equation

$$x^2 - 49 = 0$$

Your Turn

Solve the equation

$$x^2 - 64 = 0$$

Worked Example

Solve the equation
 $3x^2 + 2x = 0$

Your Turn

Solve the equation
 $2x^2 - 3x = 0$

Worked Example

Solve the equation
 $x^2 - 4x + 4 = 0$

Your Turn

Solve the equation
 $x^2 + 14x + 49 = 0$

Worked Example

Solve the equation
 $5x^2 + 13x - 6 = 0$

Your Turn

Solve the equation
 $5x^2 + 7x - 6 = 0$

Worked Example

Solve the equation

$$4x^2 - 9 = 0$$

Your Turn

Solve the equation

$$16x^2 - 81 = 0$$

Worked Example

Solve the equation
 $x^2 - x = 12$

Your Turn

Solve the equation
 $x^2 = 2x + 3$

Worked Example

Solve the equation

$$12x^2 + 10x - 12 = 0$$

Your Turn

Solve the equation

$$18x^2 - 15x - 18 = 0$$

Worked Example

Solve the equation
 $x(x - 2) = 15$

Your Turn

Solve the equation
 $(x - 3)(x + 2) = 6$

Worked Example

I think of a positive number x , square it and then add three times the number I first thought of. If the answer is 54, form an equation in x and solve it to find the number I first thought of.

Worked Example

A rectangle is 4cm longer than it is wide. If it is $x\text{cm}$ wide and has an area of 77cm^2 , form an equation in x and solve it to find the dimensions of the rectangle.

Worked Example

The sum of two numbers is 13 and the sum of their squares is 97. Find the numbers.

Worked Example

Solve:

a) $x^2 - 28 = 53$

b) $5\sqrt{x} = 20$

Your Turn

Solve:

a) $\frac{\sqrt{x}}{3} = 4$

b) $24 + x^3 = 88$

Quadratic Formula

a general quadratic equation can always be written:

$$ax^2 + bx + c = 0$$

the solutions to a general quadratic equation are:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

a is the number in front of the x^2

b is the number in front of the x

c is the (constant) number

Worked Example

Write down the values of a , b and c in:

a) $5x^2 + 2x - 3 = 0$

b) $x^2 + 2x - 3 = 0$

c) $x^2 + 2x = 4x - 3$

Your Turn

Write down the values of a , b and c in:

a) $5x^2 - 2x + 3 = 0$

b) $x^2 - 2x + 3 = 0$

c) $x^2 - 2x = -4x + 3$

Intelligent Practice

Questions	<i>a</i>	<i>b</i>	<i>c</i>
$3x^2 + 5x + 1 = 0$			
$0 = 3x^2 + 5x + 1$			
$0 = 3x^2 + 5x + 2$			
$3x^2 + 4x + 2 = 0$			
$0 = 3x^2 + 4x - 2$			
$3x^2 - 4x + 2 = 0$			
$x^2 - 4x + 2 = 0$			
$x^2 + 2 - 4x = 0$			
$1 + 2x - 4x^2 = 0$			
$1 + 2x = 4x^2$			

Intelligent Practice

Questions	<i>a</i>	<i>b</i>	<i>c</i>
$2x = 4x^2 + 1$			
$1 = 4x^2 + 2$			
$4x^2 + 2x = 0$			
$4x^2 + 2 = 0$			
$2(2x^2 + 1) = 0$			
$-2(2x^2 + 1) = 0$			
$-2(2x^2 + 1) = 2x$			
$-2(2x^2 + 1) = 2x + 2$			
$-2(2x^2 + 1) = x^2 + 2x + 2$			
$-2(2x^2 + x + 1) = x^2 + 2x + 2$			

Discriminant

The expression $b^2 - 4ac$ in the quadratic formula is called the discriminant, because it can "discriminate" between the possible types of answer:

- When $b^2 - 4ac$ is positive, we get two real solutions
- When $b^2 - 4ac$ is zero, we get just one real solution (both answers are the same)
- When $b^2 - 4ac$ is negative, we get a pair of complex solutions

Worked Example

Given that

$$a = 5, b = 6, c = -7$$

work out the value of

$$b^2 - 4ac$$

Your Turn

Given that

$$a = -6, b = 7, c = 8$$

work out the value of

$$b^2 - 4ac$$

Worked Example

Use the formula to solve the equation $x^2 - 9x - 2 = 0$ giving your answers correct to two decimal places.

Your Turn

Use the formula to solve the equation $x^2 - 2x - 9 = 0$ giving your answers correct to two decimal places.

Worked Example

Use the formula to solve the equation $3x^2 + 7x - 2 = 0$ giving your answers correct to two decimal places.

Your Turn

Use the formula to solve the equation $3x^2 - 9x + 2 = 0$ giving your answers correct to two decimal places.

Worked Example

Solve the equation

$4x^2 = 7x + 1$ giving your answers correct to two decimal places.

Your Turn

Solve the equation

$7x^2 = 4x + 1$ giving your answers correct to two decimal places.

Fill in the Gaps

Quadratic Equation	a, b and c	$b^2 - 4ac$	$x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$	$x = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$	Solutions to 3sf
$x^2 + 5x + 1 = 0$	$a = 1, b = 5, c = 1$	$5^2 - 4 \times 1 \times 1 = 21$	$x = \frac{-5 + \sqrt{21}}{2}$	$x = \frac{-5 - \sqrt{21}}{2}$	
$2x^2 + 5x + 1 = 0$	$a = 2, b = 5, c = 1$	$5^2 - 4 \times 2 \times 1 = 17$			
$2x^2 - 5x + 1 = 0$	$a = 2, b = -5, c = 1$	$(-5)^2 - 4 \times 2 \times 1 = 17$	$x = \frac{5 + \sqrt{17}}{2}$		
$x^2 - 7x + 3 = 0$					
$2x^2 - 7x + 3 = 0$					
$5x^2 + x - 2 = 0$					
	$a = 3, b = 5, c = 2$				
			$x = \frac{-9 + \sqrt{89}}{4}$	$x = \frac{-9 - \sqrt{89}}{4}$	

Fill in the Gaps

Using the
Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- 1) Identify a, b & c and substitute into the quadratic formula.
- 2) **Remember!** The square root of the discriminant can be positive or negative – You must complete the formula for both!
- 3) Give your answers to 2 decimal places

$x^2 + 5x + 3 = 0$	$a = 1$ $b = 5$ $c = 3$	$x = \frac{-() \pm \sqrt{()^2 - 4()()}}{2()}$	$x = \frac{-() \pm \sqrt{()}}{()}$	$x = \frac{-() - ()}{()}$ $x = \frac{-() + ()}{()}$	$x = -0.70$ or $x =$
$x^2 + 6x - 2 = 0$	$a = 1$ $b =$ $c =$	$x = \frac{-() \pm \sqrt{()^2 - 4()()}}{2()}$	$x = \frac{-() \pm \sqrt{()}}{()}$	$x = \frac{-() - ()}{()}$ $x = \frac{-() + ()}{()}$	$x = 0.32$ or $x =$
$2x^2 + 8x + 3 = 0$	$a =$ $b =$ $c =$	$x = \frac{-() \pm \sqrt{()^2 - 4()()}}{2()}$	$x = \frac{-() \pm \sqrt{()}}{()}$		
$4x^2 + 3x - 6 = 0$		$x = \frac{-() \pm \sqrt{()^2 - 4()()}}{2()}$			
$5x^2 - 4x - 8 = 0$					

2) Use the quadratic formula to solve these equations. Give your answers to 2 decimal places.

a) $2x^2 + 9x = -3$

b) $4x^2 - 3 = 7x$

c) $5x = -8 + 5x^2$

Fill in the Gaps

1 Complete the table below.

Q	Equation	a	b	c	Substitution	Simplification	Exact Answer	Answers to 3sf
Ex	$x^2 + 5x + 1 = 0$	1	5	1	$x = \frac{-5 \pm \sqrt{5^2 - 4(1)(1)}}{2(1)}$	$x = \frac{-5 \pm \sqrt{25 - 4}}{2}$	$x = \frac{-5 \pm \sqrt{21}}{2}$	x = -4.79 & x = -0.209
1	$x^2 + 6x + 1 = 0$							
2	$x^2 + 6x + 2 = 0$							
3	$x^2 + 7x + 2 = 0$							
4	$x^2 + 7x - 2 = 0$							
5	$x^2 - 7x - 2 = 0$							
6	$-x^2 - 7x - 2 = 0$							
7	$-x^2 - 7x + 2 = 0$							
8	$2 - 7x - x^2 = 0$							

Fill in the Gaps

9		1	7	3				
10		1	7	4				
11		1	-7	4				
12					$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(-1)(4)}}{2(-1)}$			
13						$x = \frac{-(-8) \pm \sqrt{64 + 16}}{2(-1)}$		
14		-1					$x = \frac{-8 \pm \sqrt{84}}{-2}$	
15	$\frac{1}{2}x^2 + 4x + 5 = 0$	$\frac{1}{2}$						
16	$\frac{1}{2}(x^2 + 4x + 5) = 0$							
17	$\frac{1}{3}(x^2 + 4x + 5) = 0$							
18	$\frac{2x^2 + 4x + 5}{3} = 0$							

Fill in the Gaps

2 Complete the table below.

Q	Equation	a	b	c	Substitution	Simplification	Exact Answer	Answers to 3sf
Ex	$2x^2 + 5x + 1 = 0$	2	5	1	$x = \frac{-5 \pm \sqrt{5^2 - 4(2)(1)}}{2(2)}$	$x = \frac{-5 \pm \sqrt{25 - 8}}{4}$	$x = \frac{-5 \pm \sqrt{17}}{4}$	x = -2.28 & x = -0.219
1	$2x^2 + 6x + 1 = 0$							
2	$2x^2 + 6x + 2 = 0$							
3	$2x^2 + 6x - 2 = 0$							
4	$2x^2 - 6x + 2 = 0$							
5	$2x^2 - 6x - 2 = 0$							
6	$3x^2 - 6x - 2 = 0$							
7	$4x^2 - 6x - 2 = 0$							
8	$4x^2 - 6x + 2 = 0$							

Fill in the Gaps

9	$2 - 6x + 4x^2 = 0$							
10	$2 - 6x - 4x^2 = 0$							
11	$1 - 3x - 2x^2 = 0$							
12	$\frac{1}{2} - \frac{3}{2}x - x^2 = 0$							
13	$\frac{1}{6} - \frac{1}{2}x - \frac{1}{3}x^2 = 0$							
14	$\frac{1}{3}x^2 + \frac{1}{2}x - \frac{1}{6} = 0$							
15	$\frac{1}{3}x^2 + \frac{1}{2}x - \frac{1}{6} = 1$							
16	$\frac{1}{3}x^2 + \frac{1}{2}x - \frac{1}{6} = x$							
17	$\frac{1}{3}x^2 + \frac{1}{2}x - \frac{1}{6} = x^2$							
18	$\frac{1}{3}x^2 + \frac{1}{2}x - \frac{1}{6} = -x^2$							

Extra Notes