

Chapter 2: Basic Sums

Extra questions

Arithmetic:

1. $4 + 5 + 6 - 2$
2. $15 \times 3 - 8 \times 5 + 1$
3. $(4 \times 7) \times 4 - 3 \times (8 - 4) + 2^2$

Algebra:

4. Simplify: $3a + 5a - 2a + 5b$
5. Simplify: $3a \times 4a - 2a \times 5a + a \times 2b - 2a \times 4b$
6. Simplify: $4y + 5z - 3y^2 - 2z^2 + 4yz$

Powers:

7. Simplify: $a^2 \times a^3 \times a^6$
8. Simplify: $a^3 \times a^5 - a^2/a^4 + a^3$
9. Simplify: $p^5 - 2p(p^2 - p^4) + 2p^3 - 3p^5 + 10$

Graphs:

10. Construct a graph of $y = 2x + 10$
11. Construct a graph of $y = 20 + 2.5x$
12. Construct a graph of $y = x^2 - 16x + 60$

Roots:

13. Find the roots of $x^2 + 5x + 6 = 0$
14. Find the roots of $x^2 - 16x + 60 = 0$
15. Find the roots of $-3x^2 + 20x - 25 = 0$
16. Find the roots of $-0.5x^2 + 10x - 40 = 0$

Simultaneous Equations:

17. Solve this pair of equations: $3x + 2y = 13$
 $6x + 5y = 28$
18. Solve this pair of equations: $6x + 10y = 48$
 $5x - 5y = 12$
19. Solve this pair of equations: $a + 2b = 92$
 $a + 10b = 60$

Frequency Counts:

20. Construct a frequency distribution from the following data:

1	1	1	4	1	1	4	2	1	1
3	2	4	3	3	6	3	2	5	3
2	3	3	4	2	3	2	3	5	5
3	3	2	3	2	3	6	4	1	2
5	3	6	4	1	6	2	3	3	2
2	5	4	2	6	3	4	1	2	2
5	4	1	2	3	6	2	3	3	5
4	1	3	3	7	3	2	3	4	1
4	3	5	5	1	7	7	7	3	8
3	2	4	3	5	2	4	5	5	3

Extra answers

Arithmetic

1. Just add and subtract as it appears = $15 - 2 = 13$
2. Multiply first to get $45 - 40 + 1$; then add & subtract = $5 + 1 = 6$
3. Start with the brackets and the power; $28 \times 4 - 3 \times 4 + 4$, now multiply to get $112 - 12 + 4$; finally add & subtract to give **104**

Algebra:

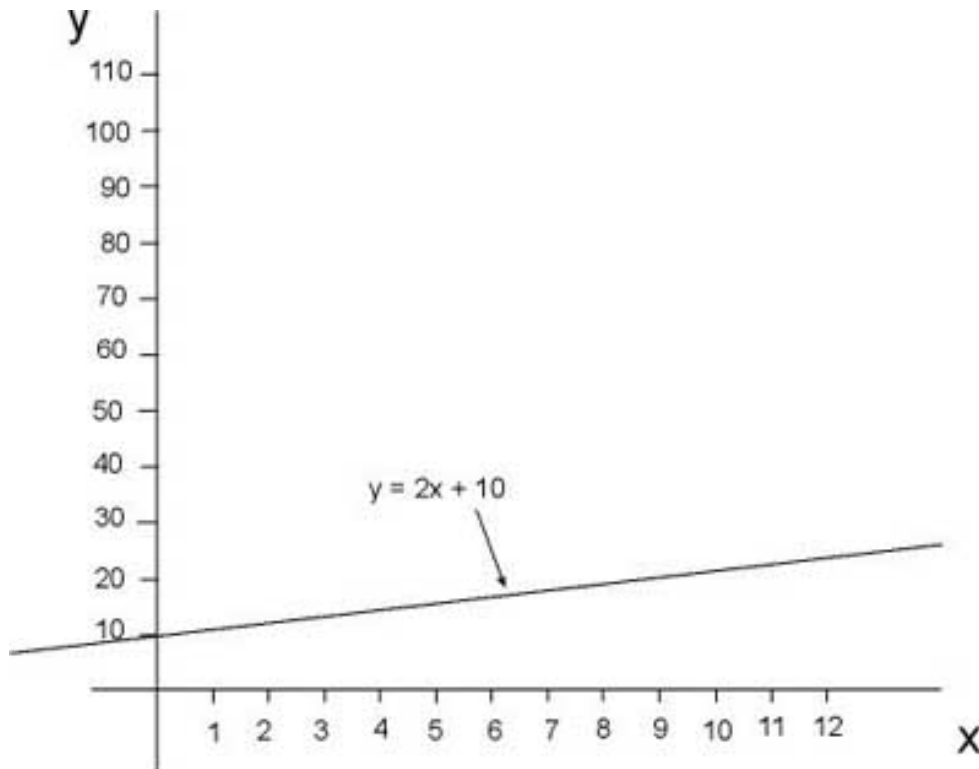
4. Collect all of the a's together (called like terms); **$6a + 5b$**
5. Multiply out the terms first to get: $12a^2 - 10a^2 + 2ab - 8ab$, then collect like terms together: **$2a^2 - 6ab$**
6. Each term is different from the others, so the expression cannot be simplified.

Powers:

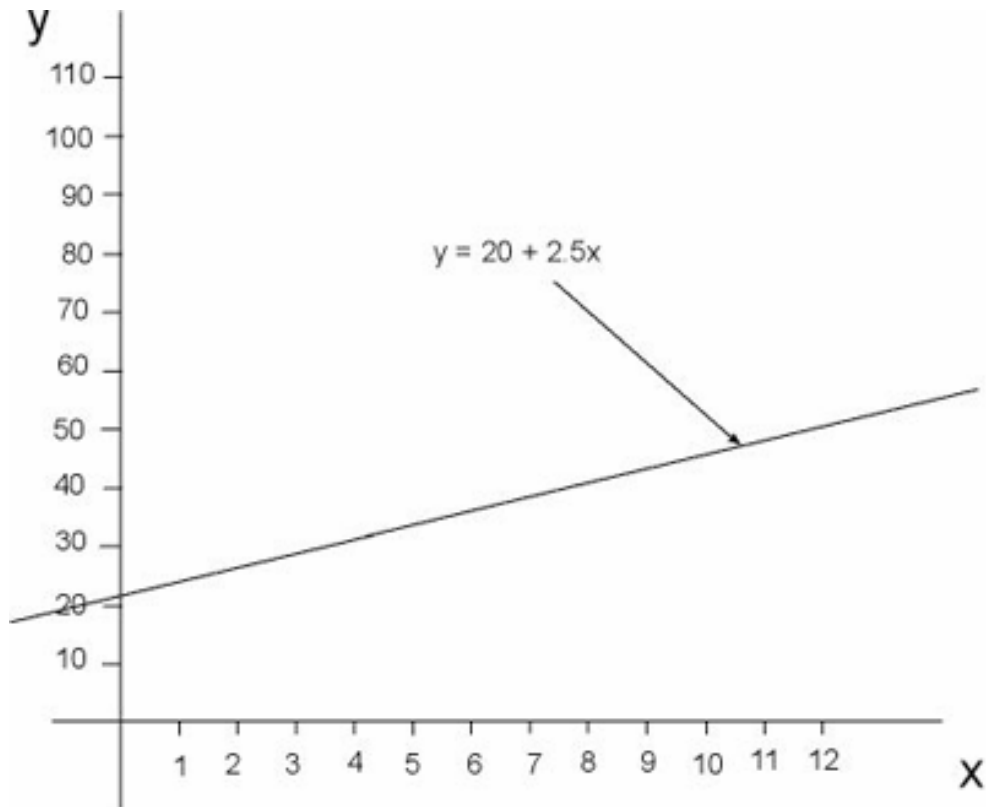
7. Add powers, since it is always a; $a^{2+3+6} = a^{11}$
8. The only "trick" here is to notice that there are additions and subtractions as well as multiplications and divisions. We cannot combine terms with different powers using addition and subtraction, so we simplify the other two elements $a^{3+5} - a^{2+4} + a^3 = a^8 - a^6 + a^3$
9. Again we start with the brackets to get: $p^5 - 2p^3 + 2p^5 + 2p^3 - 3p^5 + 10$ We can then collect terms together: $3p^5 - 3p^5 - 2p^3 + 2p^3 + 10$, which gives an answer of **10**

Graphs:

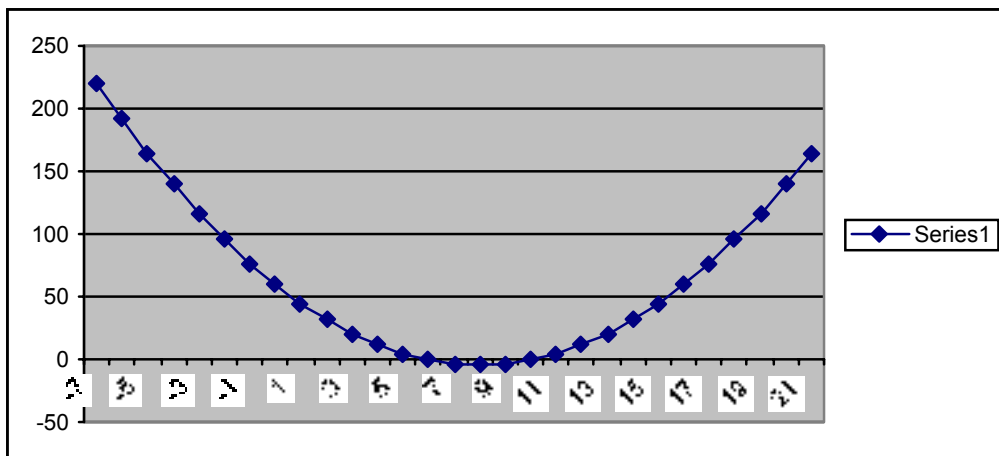
10. a graph of $y = 2x + 10$



11. a graph of $y = 20 + 2.5x$



12. a graph of $y = x^2 - 16x + 60$



Roots:

13. Factors of 6 are 1 and 6, -1 and -6, 3 and 2, -3 and -2, but the only pair which add up to +5 are 2 and 3, so we can break the equation down into 2 brackets : $(x + 2)(x + 3) = 0$ The roots are therefore where $(x + 2) = 0$ and $(x + 3) = 0$, giving **$x = -2$ and $x = -3$**

14. We can create two brackets $(x - 6)(x - 10)$ from the equation. This will give roots of **$x = 6$ and $x = 10$**

15. With this function ($-3x^2 + 20x - 25 = 0$), we have $a = -3$, $b = 20$ and $c = -25$ and can use the formula to find the roots:

$$\frac{-20 \pm \sqrt{20^2 - 4(-3)(-25)}}{2(-3)} = \frac{-20 \pm \sqrt{400 - 300}}{-6} = \frac{-20 \pm 10}{-6}$$

$$= \frac{-30}{-6} \text{ and } \frac{-10}{-6}$$

5 and 1.66667

16. Again we identify a , b and c and use the formula:

$$\frac{-10 \pm \sqrt{100 - 4(-0.5)(-40)}}{-1} = \frac{-10 \pm \sqrt{20}}{-1} =$$

14.472 and 5.53

Simultaneous Equations:

17. $3x + 2y = 13$

$6x + 5y = 28$

Multiply the first equation by 2 to get $6x + 4y = 26$. This can now be subtracted from the other equation to get $y = 2$. Substituting into the first equation gives $3x + 4 = 13$, so $3x = 9$ and $x = 3$

So $x = 3$ and $y = 2$

18. $6x + 10y = 48$

$5x - 5y = 12$

Multiply the second equation by 2 to get

$10x - 10y = 24$

then add the two equations together

$16x = 72$, so $x = 4.5$

Substituting gives $y = 2.1$

So $x = 4.5$ and $y = 2.1$

19. $a + 2b = 92$

$a + 10b = 60$

Since the coefficient of a is the same, we just subtract the first from the second:

$8b = -32$, so **$b = -4$ and by substitution, $a = 100$**

Frequency Counts:

20. The numbers which appear in the table are from 1 to 8. Putting these into a table and counting up gives:

Number	Frequency
1	14
2	20
3	29
4	14
5	12
6	6
7	4
8	1
Total	100