

# [Consecutive numbers investigation](https://assignbuster.com/consecutive-numbers-investigation/)

Take three consecutive numbers; square the middle number, multiply the first by the third number. What do you notice?

2, 3, 4 are consecutive numbers they follow on from each other. The next number is one more than.

2, 3, 4

32 = 3\*3 = 9

2\*4 = 8

Difference 1

The numbers above are consecutive numbers; the difference between them is one.

18, 19, 20

192 = 19\*19 = 361

18\*20 = 360

Difference 1

97, 98, 99

982 = 98\*98 = 9604

97\*99 = 9603

Difference 1

117, 118, 119

1182 = 118\*118 = 13924

117\*119 = 13923

Difference 1

It appears that it will work every time. I have tried it four times and it works all right so far.

I will now try decimals.

1. 2, 2. 2, 3. 2

2. 22 = 2. 2\*2. 2 = 4. 84

1. 2\*3. 2 = 3. 84

Difference 1

10. 9, 11. 9, 12. 9

11. 92 = 11. 9\*11. 9 = 141. 61

10. 9\*12. 9 = 140. 61

Difference 1

It would appear that it works using decimals.

I will now try negative numbers.

-8, -7, -6

-72 = -7\*-7 = 49

-8\*-6 = 48

Difference 1

-5, -4, -3

-42 = -4\*-4 = +16

-5\*-3 = +15

Difference 1

I have found out that it also works with negative numbers. I will now hope to show that it works with algebra.

X, X+1, X+2

1st \*3rd = X\*(x+2) = X2= 2X

2nd squared = (X+1)2 = (X+1)(X+1)

(X +1)(X+1) = X2 + 1 + 1X + 1X

= X2 + 2X + 1

The only difference is +1. It shows that the difference will always be 1.

I am now going to see what happens if I make the gap 2.

Gap 2

3, 5, 7

3\*7 = 21

52 = 5×5 = 25

Difference 4

5, 7, 9

5\*9 = 45

72 = 7\*7 = 49

Difference 4

17, 19, 21

17\*21 = 357

192 = 19\*19 = 361

Difference 4

It would appear that it would work every time. I have tried it three times and it is working all right so far.

I will now try decimals

9. 9, 11. 9, 13. 9

9. 9\*13. 9 = 137. 61

11. 92 = 11. 9\*11. 9 = 141. 61

Difference 4

7. 1, 9. 1, 11. 1

7. 1\*11. 1 = 78. 81

9. 12 = 9. 1\*9. 1 = 82. 81

Difference 4

13. 6, 15. 6, 17. 6

13. 6\*17. 6 = 239. 36

15. 62 = 15. 6\*15. 6 = 243. 36

Difference 4

It would appear that it works using decimals.

I will now try negative numbers.

-1, 1, 3

-1\*3 = -3

12 = 1\*1 = 1

Difference 4

-10, -8, -6

-10\*-6 = 60

-82 = -8\*-8 = 64

Difference 4

I have found out that it also works with negative numbers.

I will now hope to show that it works with algebra.

X, X+2, X+4

X\*(X+4)= X2 + 4X

(X+2)2 = (X+2)(X+2)= X2 + 4 + 2x + 2 X

= X2 + 4X + 4

The only difference is +4. It shows that the difference will always be 4.

Gap 3

5, 8, 11

5\*8 = 55

82 = 8\*8 = 64

Difference 9

2, 5, 8

2\*8 = 16

52 = 5\*5 = 25

Difference 9

9, 12, 15

9\*15 = 135

122 = 12\*12 = 144

Difference 9

It appears that it will work every time. I have tried it three times and it works all right so far.

I will now try decimals.

2. 5, 5. 5, 8. 5

2. 5\*8. 5 = 21. 25

5. 52 = 5. 5\*5. 5 = 30. 25

Difference 9

4. 2, 7. 2, 10. 2

4. 2\*10. 2 = 42. 84

7. 22 = 7. 2\*7. 2 = 51. 84

Difference 9

9. 9, 12. 9, 15. 9

9. 9\*15. 9 = 157. 41

12. 92 = 12. 9\*12. 9 = 166. 41

Difference 9

It would appear that it works using decimals.

I will now try negative numbers.

-10, -7, -4

-10\*-4 = 40

-72 = -7\*-7 = 49

Difference 9

-1, 2, 5

-1\*5 = -5

22 = 2\*2 = 4

Difference 9

I have found out that it also works with negative numbers.

I will hope to show that it works with algebra.

X, X+3, X+6

X\*(X+6)= X2 + 6X

(X+3)2 =(X= 3)(X+3) = X2 + 6+ 3X + 3X

= X2 + 6X + 9

The only difference is +9. This shows that the difference will always be nine.

Gap 4

5, 9, 13

5\*13 = 65

92 = 9\*9 = 81

Difference 16

2, 6, 10

2\*10 = 20

62 = 6\*6 = 36

Difference 16

9, 13, 17

9\*17 = 153

132 = 13\*13 = 169

Difference 16

It appears that it will work every time. I have tried it three times and it works all right so far.

I will now try decimals.

2. 5, 6. 5, 10. 5

2. 5\*10. 5 = 26. 25

6. 52 = 6. 5\*6. 5 = 42. 25

Difference 16

4. 2, 8. 2, 12. 2

4. 2\*12. 2 = 51. 24

8. 22 = 8. 2\*8. 2 = 67. 24

Difference 16

7. 1, 11. 1, 15. 1

7. 1\*15. 1 = 107. 21

11. 12 = 11. 2\*11. 2 = 123. 21

Difference 16

It would appear that it works using decimals.

I will now try negative numbers.

-1, 3, 7

-1\*7 = -7

32 = 3\*3 = 9

Difference 16

-10, -6, -2

-10\*-2 = 20

-62 = 6\*6 = 36

Difference 16

I have found out that it also works with negative numbers.

I will now hope to show that it works with algebra.

X, X+4, X+8

X\*(X+8) = X2 = 8X

(X+4)2=(X+4)(X+4)= X2+8+4X+4X

= X2+8X+16

The only difference is +16. It shows that the difference will always be 16.

Gap 5

5, 10, 15

5\*15 = 75

102 = 10\*10 = 100

Difference 25

2, 7, 12

2\*12 = 24

72 = 7\*7 = 49

Difference 25

9, 14, 19

9\*19 = 171

142 = 14\*14 = 196

Difference 25

It appears that it will work every time. I have tried it three times and it works all right so far.

I will now try decimals.

2. 5, 7. 5, 12. 5

2. 5\*12. 5 = 31. 25

7. 52 = 7. 5\*7. 5 = 56. 25

Difference 25

4. 2, 9. 2, 14. 2

4. 2\*14. 2 = 59. 64

9. 22 = 9. 2\*9. 2 = 84 64

Difference 25

7. 1, 12. 1, 17. 1

7. 1\*17. 1 = 121. 41

12. 12 = 12. 1\*12. 1 = 146. 41

Difference 25

It would appear that it works using decimals.

I will now try negative numbers.

-1, 4, 9

-1\*9 = -9

42 = 4\*4 = 16

Difference 25

-10, -5, 0

-10\*0 = 0

-52 = -5\*-5 = 25

Difference 25

I have found out that it also works with negative numbers.

I will now hope to show that it works with algebra.

X, X+5, X+10

X\*(X+10)= X2= 10X

(X+5)2=(X+5)(X+5)= X2 + 10 + 5X + 5X

= X2 +10X + 25

The only difference is + 25 This shows that the difference will always be 25.

Gap

Difference

1

1

2

4

3

9

4

16

5

25

Problem 2

Gap 1

Two consecutive numbers square the first, square the second. What do you notice?

5, 6

52 = 5\*5 = 25

62 = 6\*6 = 36

Difference 11

7, 8

72 = 7\*7 = 49

82 = 8\*8 = 64

Difference 15

10, 11

102 = 10\*10 = 100

112 = 11\*11 = 121

Difference 21

I will now try decimals to see if it works the same.

2. 5, 3. 5

2. 52 = 2. 5\*2. 5 = 6. 25

3. 52 = 3. 5\*3. 5 = 12. 25

Difference 6

4. 5, 5. 5

4. 52 = 4. 5\*4. 5 = 20. 25

5. 52 = 5. 5\*5. 5 = 30. 25

Difference 10

7. 2, 8. 2

7. 22 = 7. 2\*7. 2 = 51. 84

8. 22 = 8. 2\*8. 2 = 67. 24

Difference 15. 4

I have found out that it also works with decimals.

I will now try negative numbers.

-5, -6

-52 = -5\*-5 = 25

-62 = -6\*-6 = 36

Difference 11

-9, -10

-92 = -9\*-9 = 81

-102 = -10\*-10 = 100

Difference 19

-2, -3

-22 = -2\*-2 = 4

-32 = -3\*-3 = 9

Difference 5

It would appear that it works using negative numbers.

I will now hope to show that it works with using algebra

X, X+1

X2 (X+1)2

(X+1)2(X+1)

X2 + 2 + 1X+2X

X2+2X+3

Difference 2X+1

I have noticed that the two consecutive numbers are the difference when added together.

Gap 2

2, 4

22 = 2\*2 = 4

42 = 4\*4 = 16

Difference 12

6, 8

62 = 6\*6 = 36

82 = 8\*8 = 64

Difference 28

3, 5

32 = 3\*3 = 9

52 = 5\*5 = 25

Difference 16

I will now try decimals.

2. 5, 4. 5

2. 52 = 2. 5\*2. 5 = 6. 25

4. 52 = 4. 5\*4. 5 = 20. 25

Difference 14

5. 5, 7. 5

5. 52 = 5. 5\*5. 5 = 30. 25

7. 52 = 7. 5\*7. 5 = 56. 25

Difference 26

15. 9, 17. 9

15. 92 = 15. 9\*15. 9 = 252. 81

17. 92 = 17. 9\*17. 9 = 320. 41

Difference 67. 6

It would appear that it works using decimals.

I will now try negative numbers.

-7, -9

-72 = -7\*-7 = 49

-92 = -9\*-9 = 81

Difference 32

-15, -17

-152 = -15\*-15 = 225

-172 = -17\*-17 = 289

Difference 64

I have found out that it also works with negative numbers.

I will now hope that it works using algebra.

X, X+2

X2 (X+2)2

(X+2)2(X+2)

X2+4+2X+2X

X2+4X+4

Difference 4X+4

The pattern here is, add two consecutive numbers together and then double them to get your difference.

Gap 3

5, 8

52 = 5\*5 = 25

82 = 8\*8 = 64

Difference 39

8, 11

82 = 8\*8 = 64

112 = 11\*11 = 121

Difference 57

18, 21

182 = 18\*18 = 324

212 = 21\*21 = 441

Difference 117

It would appear that it works every time, I have tried it three times and it works all right so far. But this time they is a different pattern.

I will now try decimals.

2. 4, 5. 4

2. 42 = 2. 4\*2. 4 = 5. 76

5. 42 = 5. 4\*5. 4 = 29. 16

Difference 23. 4

21. 6, 24. 6

21. 62 = 21. 6\*21. 6 = 466. 56

24. 62 = 24. 6\*24. 6 = 605. 16

Difference 138. 6

58. 9, 61. 9

58. 92 = 58. 9\*58. 9 = 3469. 21

61. 92 = 61. 9\*61. 9 = 3831. 61

Difference 362. 4

I seems to work with decimals I will now try negative numbers.

-99, -102

-992 = -99\*-99 = 9801

-1022 = -102\*-102 = 10404

Difference 603

I have found out that it also works with negative numbers.

I will now hope to show that it works with algebra.

X, X+3

X2 (X+3)

(X+3)2(X+3)

X2+6+3X+6X

X2+6X+9X

Difference 6X+9

Instead of adding the consecutive numbers together and multiplying by 2 you multiply it by 3.

Gap 4

5, 9

52 = 5\*5 = 25

92= 9\*9 = 81

Difference 56

14, 18

142 = 14\*14 = 196

182 = 18\*18 = 324

Difference 128

30, 34

302 = 30\*30 = 900

342 = 34\*34 = 1156

Difference 256

It would appear that it works every time. I have tried it three times and it works all right so far. But this time they is a different pattern.

I am now going to try decimals.

5. 0, 9. 0

5. 02 = 5. 0\*5. 0 = 25

9. 02 = 9. 0\*9. 0 = 81

Difference 56

14. 7, 18. 7

14. 72 = 14. 7\*14. 7 = 216. 09

18. 72 = 18. 7\*18. 7 = 349. 69

Difference 113. 6

16. 1, 20. 1

16. 12 = 16. 1\*16. 1 = 259. 21

20. 12 = 20. 1\*20. 1 = 404. 01

Difference 144. 8

It would appear that it works with decimals.

I will now try negative numbers.

-6, -10

-62 = -6\*-6 = 36

-102 = -10\*-10 = 100

Difference 64

-42, -46

-422 = -42\*-42 = 1764

-462 = -46\*-46 = 2116

Difference 352

-23, -27

-232 = -23\*-23 = 529

-272 = -27\*-27 = 729

Difference 200

I have found out that it also works with negative numbers.

I will now hope to show that it works with algebra.

X, X+4

X2 (X+4)2

(X+4)2(X+4)

X2+4X+4X+16

X2+8X+16

Difference 8X+16

Instead of adding the consecutive numbers together and multiplying by 3 you multiply it by 4.

Gap 5

5, 10

52 = 5\*5 = 25

102 = 10\*10 = 100

Difference 75

15, 20

152 = 15\*15 = 225

202 = 20\*20 = 400

Difference 175

40, 45

402 = 40\*40 = 1600

452 = 45\*45 = 2025

Difference 425

It would appear that it works every time. I have tried it three times and it works all right so far. But this time they is a different pattern.

I will now try decimals.

5. 7, 10. 7

5. 72 = 5. 7\*5. 7 = 32. 49

10. 72 = 10. 7\*10. 7 = 114. 49

Difference 82

15. 1, 20. 1

15. 12 = 15. 2\*15. 2 = 228. 01

20. 12 = 20. 1\*20. 1 = 404. 01

Difference 176

42. 4, 47. 4

42. 42 = 42. 4\*42. 4 = 1797. 76

47. 42 = 47. 4\*47. 4 = 2246. 76

Difference 449

It would appear that it works using decimals.

I will now try negative numbers.

-50, -55

-502 = -50\*-50 = 2500

-552 = -55\*-55 = 3025

Difference 525

-10, -15

-102 = -10\*-10 = 100

-152 = -15\*-15 = 225

Difference 125

-22, -27

-222 = -22\*-22 = 484

-272 = -27\*-27 = 729

Difference 245

I have found out that it also works with negative numbers.

I will now hope to show that it works using algebra.

X, X+5

X2 (X+5)2

(X+5)2(X+5)

X2+5X+5X+25

X2+10X+25

Difference 10X+25

Instead of adding the consecutive numbers together and multiplying by 4 you multiply it by 5.

Gap

Difference

1

2X+1

2

4X+4

3

6X+9

4

8X+16

5

10X+25