



The Silent Symphony

Grade 9 math · Two-step equations, Exponents, Square roots, Integers · Reading level grades 7-9

Detective: _____ Date: _____

The Grand Crescendo Concert Hall has fallen completely silent. Just hours before the grand opening night, someone swapped the Principal Violinist's priceless Stradivarius with a squeaky plastic toy. If we do not find the thief before the conductor's baton rises, the performance will be ruined.

1. Solve each math problem. The answer is a number, and the letter beside it is what that number stands for.
2. In the clue boxes, write that letter in every box showing the same number, then read the secret clue.
3. Use each clue to cross suspects off the list. The one suspect left at the end is the culprit!

My answer: the The Phantom Conductor is _____

Possible suspects

Cross off a row as each clue rules it out. The one left at the end is the culprit.

NAME	MAIN INSTRUMENT	STAGE GEAR	CONDUCTING STYLE	HAIR COLOR	MUSICAL DISTRACTION
Antonio Vivaldi	Silver Trumpet	Tuning Fork Blade	Left Hand Dominant	Ebony Black	Sudden Silence
Franz Schubert	Grand Pipe Organ	Sonic Pitch Pipe	Right Hand Dominant	Auburn Copper	Metronome Beats
Wolfgang Amadeus Mozart	Grand Pipe Organ	Echo Amplifier	Left Hand Dominant	Ebony Black	Metronome Beats
Ludwig van Beethoven	Timpani Drums	Echo Amplifier	Left Hand Dominant	Powdered White	Metronome Beats
Maurice Ravel	Harpsichord	Sheet Music Shield	Right Hand Dominant	Auburn Copper	Sudden Silence
Pyotr Ilyich Tchaikovsky	Timpani Drums	Tuning Fork Blade	Left Hand Dominant	Auburn Copper	Sudden Silence
Richard Wagner	Timpani Drums	Tuning Fork Blade	Right Hand Dominant	Powdered White	Sudden Silence
Edward Elgar	Harpsichord	Echo Amplifier	Right Hand Dominant	Ebony Black	Metronome Beats
Johannes Brahms	Grand Pipe Organ	Echo Amplifier	Left Hand Dominant	Auburn Copper	Sudden Silence
Joseph Haydn	Silver Trumpet	Laser Baton	Left Hand Dominant	Auburn Copper	Metronome Beats
Giuseppe Verdi	Silver Trumpet	Echo Amplifier	Right Hand Dominant	Powdered White	Off Key Notes
Antonin Dvorak	Silver Trumpet	Sheet Music Shield	Left Hand Dominant	Auburn Copper	Off Key Notes
Igor Stravinsky	Silver Trumpet	Echo Amplifier	Right Hand Dominant	Ebony Black	Off Key Notes
Frederic Chopin	Golden Flute	Laser Baton	Right Hand Dominant	Auburn Copper	Sudden Silence
Felix Mendelssohn	Grand Pipe Organ	Sheet Music Shield	Left Hand Dominant	Auburn Copper	Off Key Notes
Sergei Rachmaninoff	Timpani Drums	Sheet Music Shield	Left Hand Dominant	Auburn Copper	Sudden Silence
Claude Debussy	Harpsichord	Tuning Fork Blade	Left Hand Dominant	Auburn Copper	Sudden Silence
Johann Sebastian Bach	Golden Flute	Sonic Pitch Pipe	Left Hand Dominant	Auburn Copper	Metronome Beats
Gustav Mahler	Silver Trumpet	Tuning Fork Blade	Left Hand Dominant	Auburn Copper	Sudden Silence
Jean Sibelius	Grand Pipe Organ	Laser Baton	Left Hand Dominant	Powdered White	Off Key Notes
Franz Liszt	Timpani Drums	Sheet Music Shield	Left Hand Dominant	Ebony Black	Metronome Beats

CLUE 1 Two-step equations

To unlock the backstage dressing room, you need to solve the key signature equation where twice the number of sharps plus three equals eleven.

Solve each problem, then write its letter in every clue box that shows the same number.

T			T											T			
12	17	18	12	17	9	18	16	7	11	18	6	14	11	12	19	6	18

T															
12	17	18	18	2	17	11	22	4	10	21	9	16	9	18	15

$3x + 7 = 43, x = \square \rightarrow \boxed{\text{T}}$

$9x + 5 = 167, x = \square \rightarrow \boxed{\text{E}}$

$7x + 11 = 116, x = \square \rightarrow \boxed{\text{R}}$

$9x + 2 = 146, x = \square \rightarrow \boxed{\text{F}}$

$4x + 3 = 79, x = \square \rightarrow \boxed{\text{U}}$

$8x + 3 = 179, x = \square \rightarrow \boxed{\text{A}}$

$5x + 8 = 43, x = \square \rightarrow \boxed{\text{D}}$

$9x + 11 = 47, x = \square \rightarrow \boxed{\text{M}}$

$5x + 2 = 107, x = \square \rightarrow \boxed{\text{L}}$

$3x + 4 = 34, x = \square \rightarrow \boxed{\text{P}}$

$2x + 6 = 24, x = \square \rightarrow \boxed{\text{I}}$

$8x + 2 = 138, x = \square \rightarrow \boxed{\text{H}}$

$2x + 6 = 28, x = \square \rightarrow \boxed{\text{O}}$

$2x + 8 = 12, x = \square \rightarrow \boxed{\text{C}}$

$6x + 7 = 91, x = \square \rightarrow \boxed{\text{N}}$

$9x + 2 = 56, x = \square \rightarrow \boxed{\text{S}}$

Scratch space:

CLUE 2

The decibel meter on the soundboard shows that the volume of the mysterious sound scales as two to the power of the missing rehearsal number.

Solve each problem, then write its letter in every clue box that shows the same number.

The diagram illustrates the process of finding the greatest common factor (GCF) of 169 and 153. It shows two rows of boxes representing the prime factorization of each number.

Row 1 (169): 169 is decomposed into 16 and 153. The number 16 is highlighted in orange and labeled with a 'T'. Below the boxes are the values 16, 289, and 484.

Row 2 (153): 153 is decomposed into 121 and 32. The number 121 is highlighted in orange and labeled with a 'T'. Below the boxes are the values 125, 512, 16, 441, and 4.

Row 3 (169): 169 is decomposed into 16 and 153. The number 16 is highlighted in orange and labeled with a 'T'. Below the boxes are the values 64, 484, 169, and 16.

Row 4 (153): 153 is decomposed into 121 and 32. The number 121 is highlighted in orange and labeled with a 'T'. Below the boxes are the values 64, 484, 169, and 16.

Row 5 (169): 169 is decomposed into 16 and 153. The number 16 is highlighted in orange and labeled with a 'T'. Below the boxes are the values 64, 484, 169, and 16.

Row 6 (153): 153 is decomposed into 121 and 32. The number 121 is highlighted in orange and labeled with a 'T'. Below the boxes are the values 512, 400, 100, 343, 49, 121, 484, 441, and 4.

Row 7 (169): 169 is decomposed into 16 and 153. The number 16 is highlighted in orange and labeled with a 'T'. Below the boxes are the values 121, 64, 512, 400, and 400.

$4^2 = \square \rightarrow \boxed{\text{T}}$

$$8^2 = \boxed{} \rightarrow \boxed{\text{L}}$$

$$20^2 = \boxed{} \rightarrow \boxed{\text{S}}$$

$11^2 = \boxed{} \rightarrow \boxed{\text{G}}$

$$10^2 = \boxed{} \rightarrow \boxed{\text{M}}$$

$13^2 = \boxed{} \rightarrow \boxed{\text{F}}$

$7^3 = \boxed{} \rightarrow \boxed{\text{U}}$

$21^2 = \boxed{} \rightarrow \boxed{0}$

$$17^2 = \boxed{} \rightarrow \boxed{\text{H}}$$

$$22^2 = \boxed{} \rightarrow \boxed{\text{E}}$$

$2^9 = \boxed{} \rightarrow \boxed{\text{A}}$

$$2^2 = \boxed{} \rightarrow \boxed{\text{N}}$$

$5^3 = \square \rightarrow \boxed{\mathbf{B}}$

$7^2 = \square \rightarrow \boxed{\text{D}}$

Scratch space:

CLUE 3 Square roots

The thief left a square-shaped sheet of manuscript paper on the conductor's podium, with a total area of sixty-four square inches.

Solve each problem, then write its letter in every clue box that shows the same number.

S						S										
17	7	22	22	8	15	17	3	10	8	15	6	8	12	3	10	10
									S		S					
11	4	8	8	14	8	25	16	8	17	7	17	23	8	6	25	

$\text{sqrt}(289) = \square \rightarrow$ S	$\text{sqrt}(100) = \square \rightarrow$ L	$\text{sqrt}(484) = \square \rightarrow$ D
$\text{sqrt}(16) = \square \rightarrow$ R	$\text{sqrt}(625) = \square \rightarrow$ T	$\text{sqrt}(64) = \square \rightarrow$ E
$\text{sqrt}(36) = \square \rightarrow$ C	$\text{sqrt}(121) = \square \rightarrow$ F	$\text{sqrt}(529) = \square \rightarrow$ P
$\text{sqrt}(9) = \square \rightarrow$ I	$\text{sqrt}(225) = \square \rightarrow$ N	$\text{sqrt}(196) = \square \rightarrow$ Z
$\text{sqrt}(256) = \square \rightarrow$ H	$\text{sqrt}(144) = \square \rightarrow$ W	$\text{sqrt}(49) = \square \rightarrow$ U

Scratch space:

CLUE 4 Integers

To track the suspect's path, trace their movements up and down the elevator shafts, recording the positive gains and negative drops in floor levels.

Solve each problem, then write its letter in every clue box that shows the same number.

A							A									A		
38	6	5	28	28	27	13	38	29	39	29	13	34	3	15	13	38	34	35
	A																	
40	38	3	24	27	8	15	5	34	15	11	27	13	27	27	35			

$$33 - (-5) = \boxed{} \rightarrow \boxed{\text{A}}$$

$$31 - (-4) = \boxed{} \rightarrow \boxed{\text{D}}$$

$$(-11) + 50 = \boxed{} \rightarrow \boxed{\text{B}}$$

$$(-3) + 31 = \boxed{} \rightarrow \boxed{\text{P}}$$

$$(-7) + 13 = \boxed{} \rightarrow \boxed{\text{C}}$$

$$18 - (-6) = \boxed{} \rightarrow \boxed{\text{L}}$$

$$(-13) + 16 = \boxed{} \rightarrow \boxed{\text{S}}$$

$$(-5) + 34 = \boxed{} \rightarrow \boxed{\text{U}}$$

$$(-12) + 46 = \boxed{} \rightarrow \boxed{\text{N}}$$

$$(-13) + 21 = \boxed{} \rightarrow \boxed{\text{F}}$$

$$(-12) + 27 = \boxed{} \rightarrow \boxed{\text{T}}$$

$$(-12) + 52 = \boxed{} \rightarrow \boxed{\text{W}}$$

$$(-8) + 13 = \boxed{} \rightarrow \boxed{\text{O}}$$

$$(-7) + 20 = \boxed{} \rightarrow \boxed{\text{R}}$$

$$(-9) + 36 = \boxed{} \rightarrow \boxed{\text{E}}$$

$$(-15) + 26 = \boxed{} \rightarrow \boxed{\text{H}}$$

Scratch space:

CLUE 5**Two-step equations - the last clue**

The final cipher is locked inside the ticket booth registry, where three times the price of a VIP seat minus fifty dollars yields a total of one hundred.

First solve each problem. Then find each answer in the numbered list below and cross that sentence out. One sentence will be left - that is exactly what the villain did!

Step 1 - solve these:

$3x + 4 = 19, x = \boxed{}$

$6x + 9 = 45, x = \boxed{}$

$4x + 10 = 14, x = \boxed{}$

$8x + 3 = 67, x = \boxed{}$

$3x + 3 = 39, x = \boxed{}$

$6x + 10 = 28, x = \boxed{}$

$6x + 7 = 73, x = \boxed{}$

$3x + 11 = 32, x = \boxed{}$

$9x + 1 = 37, x = \boxed{}$

$7x + 6 = 69, x = \boxed{}$

$2x + 1 = 21, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain struck a thundering roll on the timpani drums, then pried open the instrument locker with a tuning fork blade.
2. The villain jammed the keys of the harpsichord, then pried open the instrument locker with a tuning fork blade.
3. The villain jammed the keys of the harpsichord, then blocked the security guards with a sheet music shield.
4. The villain blew a deafening blast on the golden flute, then pried open the instrument locker with a tuning fork blade.
5. The villain struck a thundering roll on the timpani drums, then blocked the security guards with a sheet music shield.
6. The villain played a triumphant fanfare on the silver trumpet, then pried open the instrument locker with a tuning fork blade.
7. The villain blew a deafening blast on the golden flute, then sliced through the curtain cords with a laser baton.
8. The villain played a triumphant fanfare on the silver trumpet, then blocked the security guards with a sheet music shield.
9. The villain blew a deafening blast on the golden flute, then baffled the acoustic tiles with an echo amplifier.
10. The villain blew a deafening blast on the golden flute, then blocked the security guards with a sheet music shield.
11. The villain played a triumphant fanfare on the silver trumpet, then baffled the acoustic tiles with an echo amplifier.
12. The villain rumbled the floorboards with the grand pipe organ, then sliced through the curtain cords with a laser baton.

Answer Key

The Silent Symphony

Culprit: Claude Debussy

Harpsichord · Tuning Fork Blade · Left Hand Dominant · Auburn Copper · Sudden Silence

Trail: Start 21 → Clue 1 15 → Clue 2 11 → Clue 3 5 → Clue 4 4 → Clue 5 1

Clue 1 (Two-step equations): "THE THIEF DOES NOT USE THE ECHO AMPLIFIER"

$3x + 7 = 43, x = 12$ (T) · $9x + 5 = 167, x = 18$ (E) · $7x + 11 = 116, x = 15$ (R) · $9x + 2 = 146, x = 16$ (F) · $4x + 3 = 79, x = 19$ (U) · $8x + 3 = 179, x = 22$ (A) · $5x + 8 = 43, x = 7$ (D) · $9x + 11 = 47, x = 4$ (M) · $5x + 2 = 107, x = 21$ (L) · $3x + 4 = 34, x = 10$ (P) · $2x + 6 = 24, x = 9$ (I) · $8x + 2 = 138, x = 17$ (H) · $2x + 6 = 28, x = 11$ (O) · $2x + 8 = 12, x = 2$ (C) · $6x + 7 = 91, x = 14$ (N) · $9x + 2 = 56, x = 6$ (S)

Clue 2 (Exponents): "THE LEFT HANDED BATON LEFT A SMUDGE ON GLASS"

$4^2 = 16$ (T) · $8^2 = 64$ (L) · $20^2 = 400$ (S) · $11^2 = 121$ (G) · $10^2 = 100$ (M) · $13^2 = 169$ (F) · $7^3 = 343$ (U) · $21^2 = 441$ (O) · $17^2 = 289$ (H) · $22^2 = 484$ (E) · $2^9 = 512$ (A) · $2^2 = 4$ (N) · $5^3 = 125$ (B) · $7^2 = 49$ (D)

Clue 3 (Square roots): "SUDDEN SILENCE WILL FREEZE THE SUSPECT"

$\sqrt{289} = 17$ (S) · $\sqrt{100} = 10$ (L) · $\sqrt{484} = 22$ (D) · $\sqrt{16} = 4$ (R) · $\sqrt{625} = 25$ (T) · $\sqrt{64} = 8$ (E) · $\sqrt{36} = 6$ (C) · $\sqrt{121} = 11$ (F) · $\sqrt{529} = 23$ (P) · $\sqrt{9} = 3$ (I) · $\sqrt{225} = 15$ (N) · $\sqrt{196} = 14$ (Z) · $\sqrt{256} = 16$ (H) · $\sqrt{144} = 12$ (W) · $\sqrt{49} = 7$ (U)

Clue 4 (Integers): "A COPPER AUBURN STRAND WAS LEFT ON THE REED"

$33 - (-5) = 38$ (A) · $31 - (-4) = 35$ (D) · $(-11) + 50 = 39$ (B) · $(-3) + 31 = 28$ (P) · $(-7) + 13 = 6$ (C) · $18 - (-6) = 24$ (L) · $(-13) + 16 = 3$ (S) · $(-5) + 34 = 29$ (U) · $(-12) + 46 = 34$ (N) · $(-13) + 21 = 8$ (F) · $(-12) + 27 = 15$ (T) · $(-12) + 52 = 40$ (W) · $(-8) + 13 = 5$ (O) · $(-7) + 20 = 13$ (R) · $(-9) + 36 = 27$ (E) · $(-15) + 26 = 11$ (H)

Clue 5 (Two-step equations): surviving statement is box 2 → Claude Debussy

$3x + 4 = 19, x = 5$ · $6x + 9 = 45, x = 6$ · $4x + 10 = 14, x = 1$ · $8x + 3 = 67, x = 8$ · $3x + 3 = 39, x = 12$ · $6x + 10 = 28, x = 3$ · $6x + 7 = 73, x = 11$ · $3x + 11 = 32, x = 7$ · $9x + 1 = 37, x = 4$ · $7x + 6 = 69, x = 9$ · $2x + 1 = 21, x = 10$