The Amber Fossil Fiasco

Whodunnit? · Linear Functions & Systems Name: _____

Fossil Night at the Brontosaur Bay Natural History Museum was a sellout. At the stroke of eight the lights dipped for the dinosaur roar show, and when they came back up the display case in the Hall of Giants was empty. The **Golden Tear**, a hundred-million-year-old piece of amber with a perfectly preserved dragonfly inside, was gone!

Six people had after-hours access that evening, each was seen in a different part of the museum, and there are six clever ways to carry a fossil out past the security desk. You are the lead detective. Find out **who** took it, **where** they were, and **how** they got it away.

How to crack the case

1. Your teacher will post **10 clue cards** around the room. Each card has a math problem and four answer choices. Every choice is paired with a clue.
2. Solve the problem on the **Show Your Work** page. Find your answer among the choices and read the clue next to it. If your answer is not there, check your work.
3. Use the clue to cross out suspects, places or methods on the case board below. Write the card number beside what it cleared.
4. After all 10 cards, exactly one suspect, one place and one method are left. Those three boxes name the culprit. If you end up with none, or more than one, a clue went wrong: recheck your math!

The Suspects	The Places	The Methods
☐ Odette Marsh Paleontologist	☐ Dinosaur Hall	☐ Hidden in a dinosaur-egg replica
☐ Rafferty Boone Night Guard	☐ Fossil Lab	☐ Swapped for a resin copy
☐ Imelda Sato Fossil Preparator	☐ Gift Shop	☐ Folded into a souvenir T-shirt
☐ Cornelius Finch Gift Shop Manager	☐ Sandbox Dig Site	☐ Tucked inside a plaster skull cast
☐ Zuri Abara Tour Guide	☐ Ice Age Café	☐ Packed in a field-supply crate
☐ Percival Hogg Museum Trustee	☐ Loading Dock	☐ Rolled up in a banner

The culprit is _____ in _____ using _____

Show Your Work

The Amber Fossil Fiasco · Show every step in the matching box.

Name: _____

1. Choice _____	**2.** Choice _____
3. Choice _____	**4.** Choice _____
5. Choice _____	**6.** Choice _____
7. Choice _____	**8.** Choice _____
9. Choice _____	**10.** Choice _____

Clue #1

The Amber Fossil Fiasco

Write the equation of the line through the two points. Any form is fine.

$(-3, 4)$ and $(5, -2)$

A. $y = -\frac{3}{4}x + 4$	The plaster skull casts were tapped one by one with a mallet. Every one rang solid, with nothing inside.
B. $y = -\frac{3}{4}x + \frac{7}{4}$	Odette Marsh was cataloguing bones in the Fossil Lab. The door scanner logged her badge every few minutes.
C. $y = -\frac{3}{4}x + \frac{25}{4}$	Odette Marsh was unloading a crate at the Loading Dock. The delivery driver has her signature at that exact minute.
D. $y = -\frac{4}{3}x$	Percival Hogg was admiring the Triceratops in the Dinosaur Hall. Three docents chatted with him the whole hour.

Solve the problem, find your answer, and read its clue. Cross it off on your case board.

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Clue #2

The Amber Fossil Fiasco

Write the equation of the line perpendicular to the given line that passes through the point $(6, -1)$.

$3x - 5y = 20$

A. $y = \frac{3}{5}x - \frac{23}{5}$	Percival Hogg was borrowing a magnifying glass in the Fossil Lab. The sign-out sheet has his name in blue ink.
B. $y = \frac{5}{3}x - 11$	Security opened the skull cast on the display stand. It was a hollow shell of plaster and nothing else.
C. $y = -\frac{3}{5}x + \frac{13}{5}$	Rafferty Boone was checking delivery trucks at the Loading Dock. The gate log has his initials on every entry.
D. $y = -\frac{5}{3}x + 9$	The dinosaur-egg replica was cracked open at the front door. Inside was only foam padding and a price tag.

Solve the problem, find your answer, and read its clue. Cross it off on your case board.

Clue #3

The Amber Fossil Fiasco

The museum's Fossil Camp charges a flat registration fee plus a fixed price for each night. The table shows the total cost for three stays. Find the cost of an 11-night stay.

Nights	2	5	9
Cost ($)	110	215	355

A. $495	Every plaster cast in the education cart was tapped and shaken. Each was solid plaster, with no hidden hollow.
B. $425	Rafferty Boone was helping a school group at the Sandbox Dig Site. Twenty-three kids and two teachers can vouch for him.
C. $605	Imelda Sato was waiting for a courier at the Loading Dock. A security camera shows her there until the lights came up.
D. $385	Percival Hogg was buying a postcard at the Gift Shop. The receipt is stamped at the exact minute of the theft.

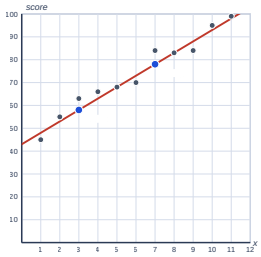
Solve the problem, find your answer, and read its clue. Cross it off on your case board.

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Clue #4

The Amber Fossil Fiasco

The scatter plot shows hours of practice (x) and test score (y) for museum guide trainees. The line of best fit passes through the two labeled points. Use the line to predict the score of a trainee who practices 9 hours.



A. 45	Percival Hogg was digging for plastic bones at the Sandbox Dig Site. Two parent volunteers sat beside him.
B. 103	Cornelius Finch was signing for a shipment of mugs at the Loading Dock. The shipping clerk wrote down the time.
C. 70	A volunteer X-rayed the skull casts at the museum clinic. The images showed plaster all the way through.
D. 88	The resin copy was found on its shelf, still sealed in its numbered box. Nobody swapped it.

Solve the problem, find your answer, and read its clue. Cross it off on your case board.

Clue #5

The Amber Fossil Fiasco

Solve the system. Write your answer as an ordered pair (a, c), where a is the price of an adult ticket and c is the price of a child ticket, both in dollars.

$$\text{Saturday: } 2a + 3c = 55$$

$$\text{Sunday: } 5a + 2c = 88$$

A. (8, 13)	Zuri Abara was leading a late tour group through the Loading Dock. Eleven guests have her in their photos.
B. (16, 4)	The cast of the Velociraptor skull was cut in half at the workshop. It was solid plaster, with no cavity.
C. (14, 9)	Imelda Sato was repairing a rib cast in the Dinosaur Hall. The hall camera shows her on a ladder the whole hour.
D. (9, 14)	Percival Hogg was ordering a latte at the Ice Age Café. The barista wrote his name on the cup and the time on the ticket.

Solve the problem, find your answer, and read its clue. Cross it off on your case board.

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Clue #6

The Amber Fossil Fiasco

Decide how many solutions the system has: one, none or infinitely many.

$$9x - 6y = 15$$

$$6x - 4y = 10$$

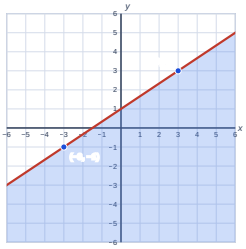
A. none	Percival Hogg was reading the labels in the Dinosaur Hall. A tour group of nine says he stood with them the entire hour.
B. exactly two	The plaster skull casts were carried to the lab and checked. Every one was solid, with no hollow space at all.
C. infinitely many	Every souvenir T-shirt in the display was unfolded and shaken out. Only cotton came out.
D. exactly one	Rafferty Boone was walking the Loading Dock with his flashlight. Two truck drivers watched him make the round.

Solve the problem, find your answer, and read its clue. Cross it off on your case board.

Clue #7

The Amber Fossil Fiasco

Write the inequality for the graph. The boundary is a solid line through the two labeled points. Any form is fine.



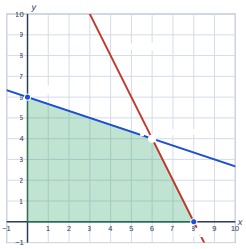
A. $y \le \frac{2}{3}x + 1$	Cornelius Finch was ringing up souvenirs at the Gift Shop. The register log shows a sale every few seconds.
B. $y \le \frac{3}{2}x + 1$	A curator tapped the mammoth skull cast with a hammer. It was solid plaster, and nothing was tucked inside.
C. $y < \frac{2}{3}x + 1$	Odette Marsh was inspecting a shipment of bones at the Loading Dock. The receiving form is signed in her handwriting.
D. $y \ge \frac{2}{3}x + 1$	Percival Hogg was talking with the lab staff in the Fossil Lab. The lab supervisor jotted down every word.

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Clue #8

The Amber Fossil Fiasco

The museum workshop makes x skull casts and y egg kits each week. Mold time limits them to $2x + y \le 16$ and painting time to $x + 3y \le 18$, with $x \ge 0$ and $y \ge 0$. The profit is $P = 40x + 55y$ dollars. The feasible region is shown. Find the maximum weekly profit.



A. \$460	The field-supply crate was pried open by the curator. It held trowels, brushes and half a sandwich.
B. \$490	Imelda Sato was sorting packing foam at the Loading Dock. A coworker says they worked side by side.
C. \$650	The set of skull casts for the school program was opened up. Every one was just a plain plaster shell.
D. \$330	Percival Hogg was choosing a souvenir mug at the Gift Shop. The shop camera shows him at the counter the whole time.

Clue #9

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The gift shop sells posters (p), mugs (m) and kits (k) at fixed prices. Three orders are shown. Find the price of each item as an ordered triple (p, m, k).

Order A: $2p + m + k = 79$

Order B: $p + 3m + k = 107$

Order C: $p + m + 2k = 102$

A. (12, 20, 35)	Zuri Abara was serving hot cocoa to guests at the Ice Age Café. The receipt printer has her name on every order.
B. (22, 18, 31)	Cornelius Finch was restocking pallets at the Loading Dock. The forklift log has his name at that exact minute.
C. (16, 22, 25)	Percival Hogg was building a sandcastle with children at the Sandbox Dig Site. The photographer has him in every picture.
D. (12, 35, 20)	Police searched the cast storage room. Every plaster skull was solid and labeled, and none had been touched.

Solve the problem, find your answer, and read its clue. Cross it off on your case board.

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Clue #10

The Amber Fossil Fiasco

Plan A costs \$85 plus \$12 per visit. Plan B costs \$35 plus \$17 per visit. Write an inequality for the number of visits x for which Plan A is the cheaper plan.

Plan A cost < Plan B cost

A. $x < 10$	Percival Hogg was sipping cocoa at the Ice Age Café. The cashier remembers because he left a very large tip.
B. $x > -10$	The skull casts were scanned with a handheld detector at the workshop. None of them showed anything but plaster.
C. $x \geq 10$	Zuri Abara was loading the tour bus at the Loading Dock. The bus driver signed her departure sheet.
D. $x > 10$	The banner was unrolled across the floor of the Hall of Giants. It was just painted canvas.

Solve the problem, find your answer, and read its clue. Cross it off on your case board.