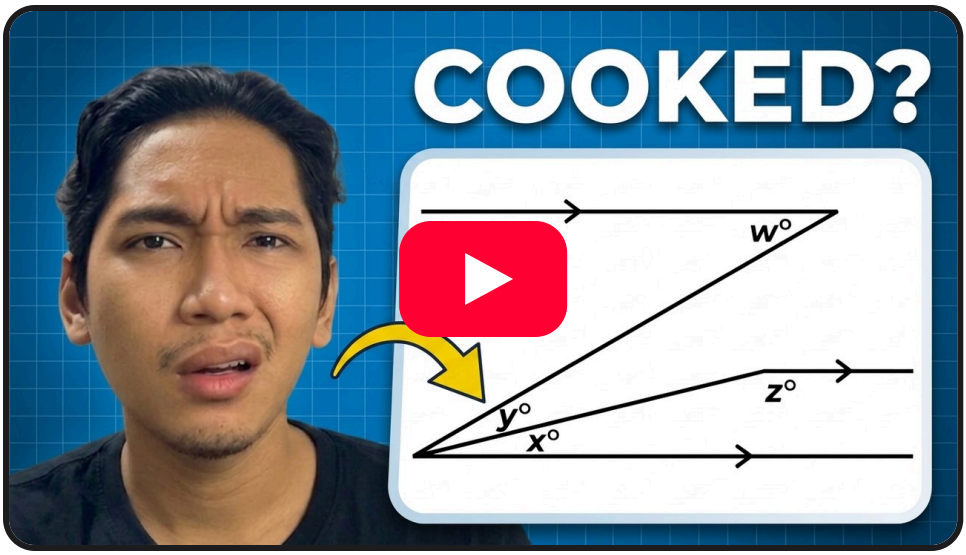
NOVEMBER 7, 2026 · SAT MATH

Every November SAT question from my video. All solved.

Step by step, in plain words, with every Desmos trick I use and **the trap** each question is built to catch you with.



WATCH Tap the video to see me solve every one, start to finish.

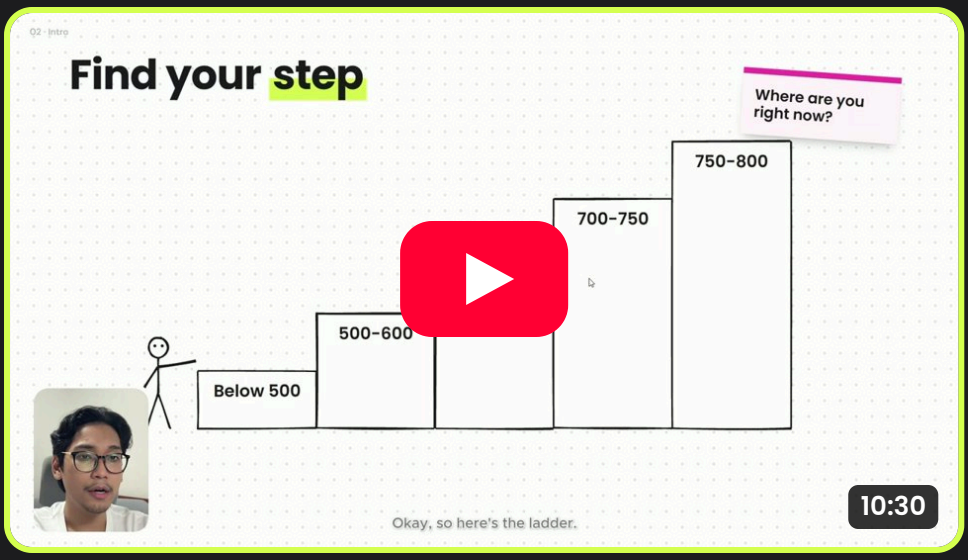
HOW TO USE IT

Try each question **before** you scroll to my working. Getting it wrong first is what makes it stick.

THE 750 GUARANTEE

750 in SAT Math, or I teach you free until you get there.

1-on-1 with a tutor who scored 800, even if math has always been hard. Not everyone qualifies. Your free 25-minute call shows if you do.



WATCH FIRST Why your SAT Math score is stuck, and what to do at your level.

See if you qualify →

A NOTE BEFORE YOU START

Quick reminder: these are **not** real SAT questions. Students remembered them after November 7 and shared them online, so a number or a word might be a little different. Not the real SAT. Totally not.

The test is over, so don't use this to check your answers. Use it to learn the **principle** behind each question. If you're taking the December SAT, that's what carries over.

Tan

ON EVERY QUESTION

The question

The same one I solve in the video. Try it on paper first.

My full working

One step at a time, plus a screenshot of my screen from the video.

The trap

The wrong answer built to catch you, so it can't catch you twice.

The video

Stuck? Every answer has a link. Tap it and watch me solve it.

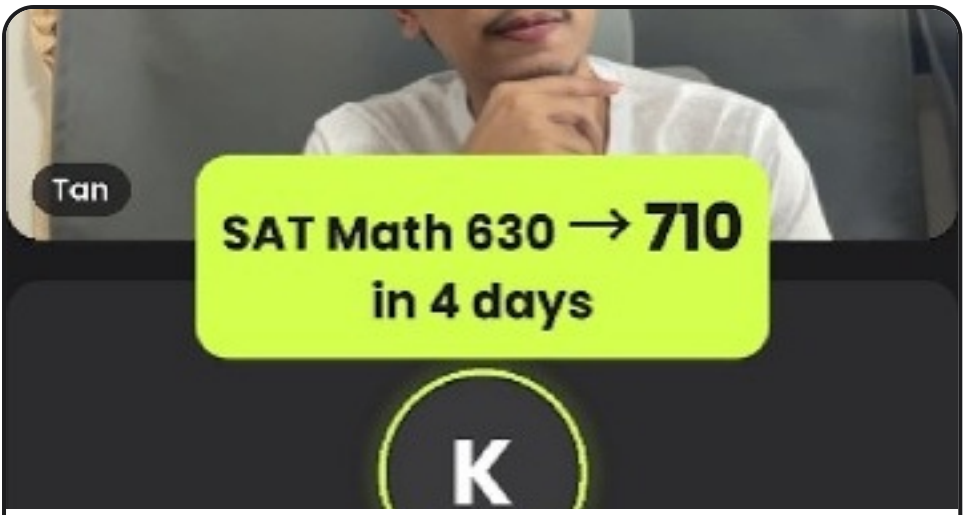


Hi, I'm Tan

In grade 4 I needed extra math every day. Then I got an 800.

In grade 4, I was so weak at math that my teacher kept me after school for extra lessons, **every single day**. That kid later taught himself to an SAT Math 800, and has spent the last two years tutoring students 1-on-1, from "what is 2 minus 5?" to 750s.

So **I get it**. Wherever math broke for you, we go back there and build up, **at your pace**.



630 → 710 in 4 days

"I never would've been able to do it without you."

Watch Keertana's testimonial →

A FEW STUDENTS WHO PUT THIS TO WORK

Shared with permission. Every score and quote below is real.

630 → 710

Keertana

“I just checked my score and hit 710 in math.” Four days of lessons before her test.

580 → 750

Mossy

“Thank you so much for teaching me so well, bro.” Stuck at 580–620 for months after a big-name prep course.

650 → 710

Alisa

“Hit my target, 710! You teach SO well.” Two weeks after we started.

01

QUESTION 1 · GEOMETRY

Triangle side lengths

In triangle XYZ, $XY = 105$ and $YZ = 107$. Which of the following could **NOT** be the length of $\overline{XZ}$?

A 2

B 3

C 105

D 106

Try it first. *My working is on the next page.*

01

MY WORKING · 1 OF 2

Triangle side lengths

THE KEY IDEA

Triangle inequality: any two sides of a triangle add up to **more** than the third side. Not equal. More.

1. Sketch it. $XY = 105$, $YZ = 107$, and XZ is the side we test. The real question is: can these three lengths make a triangle?

2. Try choice A, $XZ = 2$. Check **every** pair of sides against the third one.

$$105 + 107 = 212 > 2 \quad \checkmark$$

$$107 + 2 = 109 > 105 \quad \checkmark$$

$$105 + 2 = 107 \not> 107 \quad \times$$

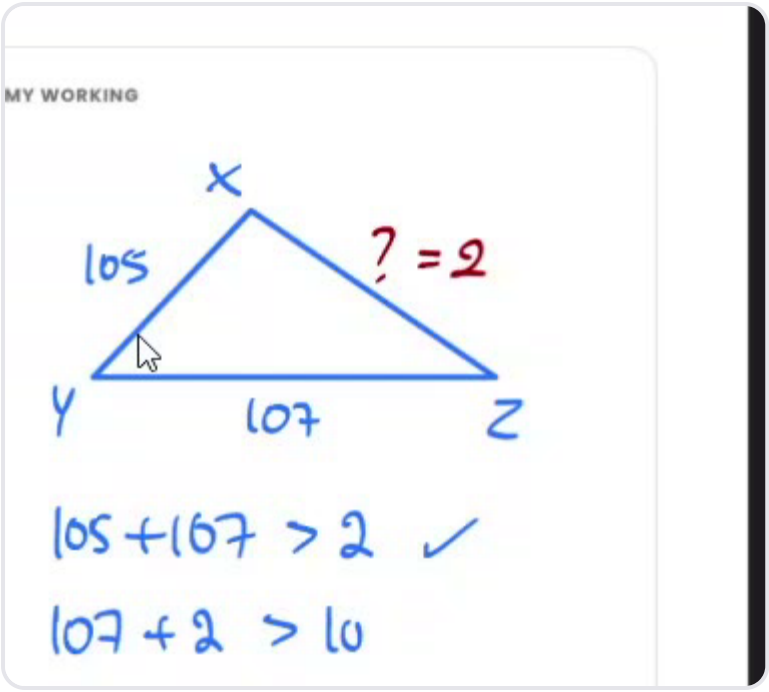
3. One false is enough. $105 + 2$ isn't greater than 107, it's **equal**. The sides would lie flat, so no triangle. XZ can't be 2.

My working continues on the next page ↓

01

MY WORKING · 2 OF 2

Triangle side lengths



MY WORKING My sketch and the pair checks. One pair fails, so 2 is out.

THE TRAP

Thinking “equal is close enough”. $105 + 2 = 107$ makes a flat line, not a triangle. 3 works $(108 > 107)$, 2 doesn’t.

ANSWER **A.** 2

Watch me solve this one on YouTube

02

QUESTION 2 · ALGEBRA

A ratio and a total

A scientist uses 5,250 cubic centimeters of sand and cement, where the ratio of the volume of sand to the volume of cement is 5 to 2. If s and c represent the volumes, in cubic centimeters, of sand and cement, respectively, which system of equations represents this situation?

A $2s = 5c$ and $s + c = 5{,}250$

B $5s = 2c$ and $s + c = 5{,}250$

C $s = c$ and $s + 5c = 5{,}250$

D $s = c$ and $5s + c = 5{,}250$

Try it first. *My working is on the next page.*

02

MY WORKING · 1 OF 2

A ratio and a total

THE KEY IDEA

A **total** gives you an adding equation. A **ratio** gives you a fraction. Then cross-multiply.

1. Sand plus cement is 5,250 in total:

$$s + c = 5{,}250$$

2. That's only in A and B. Now the ratio. Sand to cement is 5 to 2, so turn it into a fraction:

$$\frac{s}{c} = \frac{5}{2}$$

3. Cross-multiply: 2 times s, and c times 5.

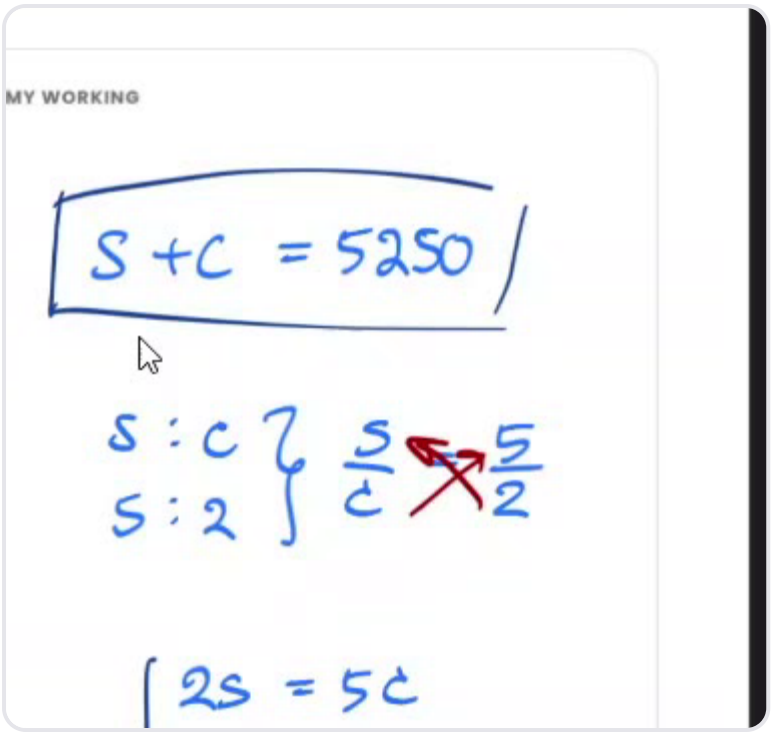
$$2s = 5c$$

My working continues on the next page ↓

02

MY WORKING · 2 OF 2

A ratio and a total



MY WORKING Total first, then the ratio as a fraction, then cross-multiply.

THE TRAP

B, $5s = 2c$**.** It copies the 5 and 2 straight onto s and c. Cross-multiplying **swaps** them.

ANSWER **A.** $2s = 5c$ **and** $s + c = 5{,}250$

Watch me solve this one on YouTube

03

QUESTION 3 · ALGEBRA

Perpendicular lines

In the xy-plane, line k and line ℓ are perpendicular and intersect at the point $(2, 5)$. If line k is defined by the equation $y = mx + b$, where m and b are constants and $m > 1$, which of the following points lies on line ℓ?

A $\left(3,\ 5 - \frac{1}{m}\right)$

B $\left(3,\ 5 + \frac{1}{m}\right)$

C $(3,\ 5 - m)$

D $(3,\ 5 + m)$

Try it first. *My working is on the next page.*

03

MY WORKING · 1 OF 2

Perpendicular lines

THE KEY IDEA

Perpendicular slopes are **opposite reciprocals**: flip it and change the sign. Slope m becomes $-\frac{1}{m}$.

1 New to this type? Sketch it. Two lines crossing at $(2, 5)$ at a right angle. Line k has slope m, so line ℓ has slope:

$$m \ \rightarrow \ -\frac{1}{m}$$

$$\ell: \ y = -\frac{1}{m}x + c$$

2 **Desmos way.** Put $(2, 5)$ in a table and type the line with tilde, $y_1 \sim -\frac{1}{m}x_1 + c$. Then plot a choice point and drag the m slider (keep $m > 1$). Choice A stays on the line for **every** m. B, C, D fall off.

3 **No-Desmos way.** Slope means: when x goes up by 1, y changes by the slope. Every choice has $x = 3$, so x goes from 2 to 3, up by 1. The slope is negative, so y goes **down** by $\frac{1}{m}$ from 5.

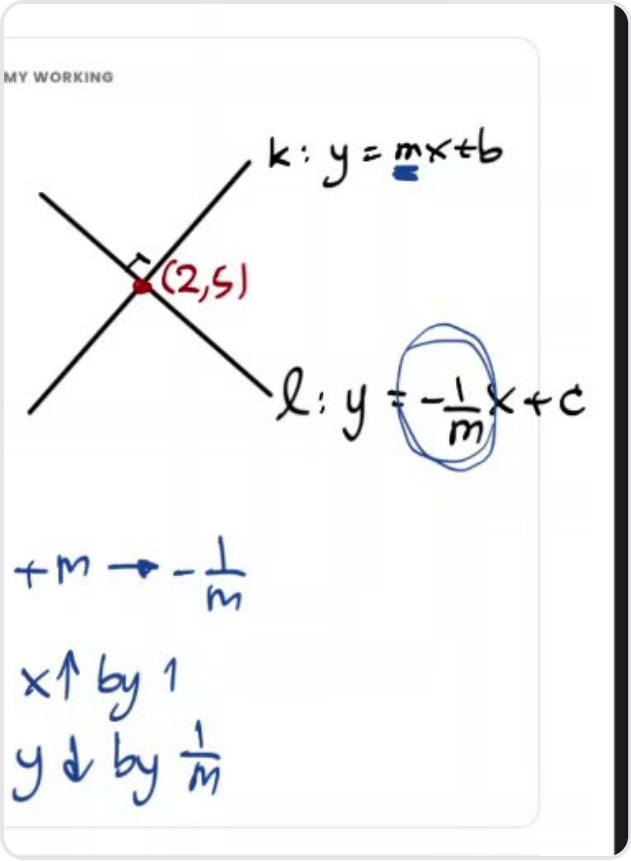
$$(2, \ 5) \ \rightarrow \ \left(3, \ 5 - \frac{1}{m}\right)$$

My working continues on the next page ↓

03

MY WORKING · 2 OF 2

Perpendicular lines



MY WORKING Opposite reciprocal, then "x up by 1, y down by $\frac{1}{m}$".

THE TRAP

B, $5+\frac{1}{m}$**.** Right size, wrong direction. The slope of ℓ is negative, so y goes down.

ANSWER **A.** $\left(3,\ 5-\frac{1}{m}\right)$

Watch me solve this one on YouTube

04

QUESTION 4 · ALGEBRA

x-intercept with a constant k

Line j in the xy-plane passes through the points $\left(0, \frac{9}{38}\right)$ and $\left(\frac{76}{k}, -\frac{6}{k} + \frac{9}{38}\right)$, where k is a constant. What is the x-coordinate of the x-intercept of line j?

A $\frac{3}{38}$

B $6k$

C $\frac{9}{38}$

D 3

Try it first. *My working is on the next page.*

04

MY WORKING · 1 OF 2

x-intercept with a constant k

THE KEY IDEA

Two points on a line? **Table + linear regression.**
A letter you don't know, like k? **Make it up.**

1. Type both points into a Desmos table. We don't know k, so make it up. Say $k = 1$.

$$(0,\ \tfrac{9}{38}) \qquad \left(\tfrac{76}{k},\ -\tfrac{6}{k} + \tfrac{9}{38}\right)$$

2. Hit **linear regression**. That's the line when $k = 1$. Zoom out and read where it crosses the x-axis: $x = 3$.

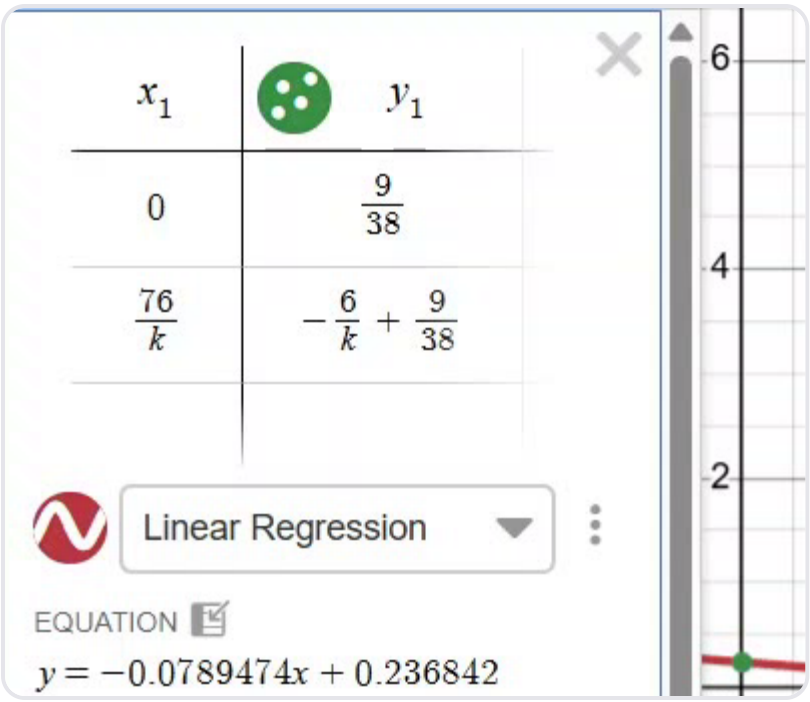
3. Now change k. 10, 4, anything. The x-intercept never moves. It's always 3.

My working continues on the next page ↓

04

MY WORKING · 2 OF 2

x-intercept with a constant k



DESMOS The two points in a table with k as a slider, then linear regression.

THE TRAP

Thinking the answer must have k in it because the points do. Drag the slider: the intercept stays at 3.

ANSWER **D.** 3

Watch me solve this one on YouTube

05

QUESTION 5 · ALGEBRA

A linear model with two rates

A linear model estimates the height, in centimeters (cm), of a Madake bamboo culm, or stem, from the top of the soil x hours after it was first measured. The model estimates that the height of the bamboo culm was 118 cm when it was first measured and that for the next 3 hours, the height increased by 4 cm per hour. The model estimates that during the next 24 hours, the height increased by 2 cm per hour. Which equation best represents this model, where h is the estimated height, in cm, and $3 \leq x \leq 27$?

A $h = 2x + 118$

B $h = 2x + 124$

C $h = 4x + 118$

D $h = 2x + 130$

Try it first. *My working is on the next page.*

05

MY WORKING · 1 OF 3

A linear model with two rates

THE KEY IDEA

Write the hours out. The equation they want only covers the **+2 per hour** part, after hour 3.

1. Start at 118. For the first 3 hours it grows 4 cm every hour:

$$0\text{ hr} : 118 \quad 1 : 122 \quad 2 : 126 \quad 3 : 130$$

2. Then for the next 24 hours, 2 cm every hour:

$$4\text{ hr} : 132 \quad 5 : 134 \quad 6 : 136 \quad \ldots$$

3. $3 \leq x \leq 27$ is that second part. To find a line you only need two points. Put $(4, 132)$ and $(5, 134)$ in a table and hit linear regression.

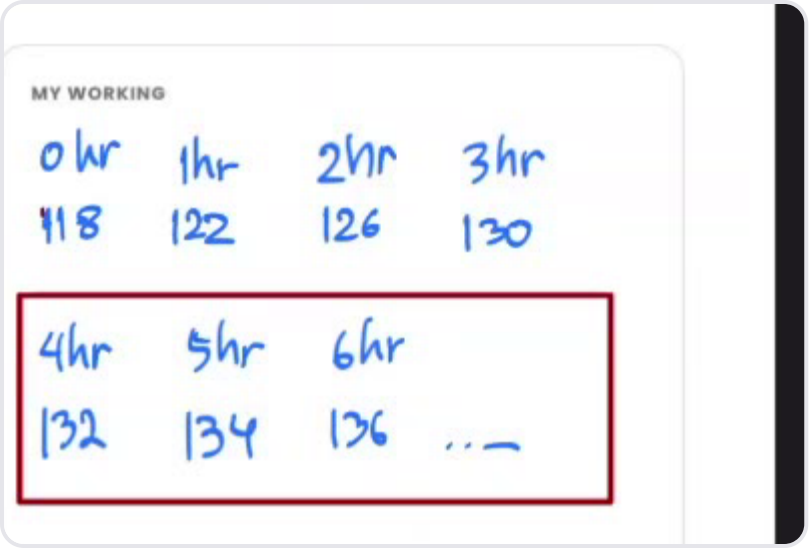
$$y = 2x + 124$$

My working continues on the next page ↓

05

MY WORKING · 2 OF 3

A linear model with two rates



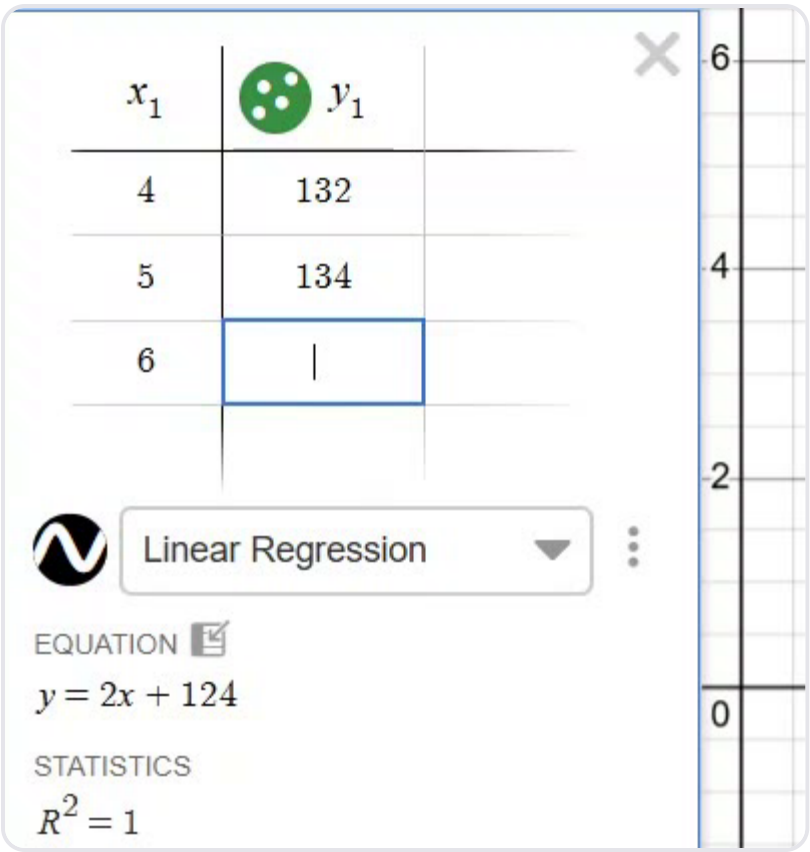
MY WORKING The hours written out. The red box is the part the equation models.

My working continues on the next page ↓

05

MY WORKING · 3 OF 3

A linear model with two rates



DESMOS Two points, linear regression. Add $(6, 136)$ and it's still the same line.

THE TRAP

A, $2x + 118$**.** 118 is the starting height, but this line starts after hour 3. Run it back to $x = 0$ and it hits 124, not 118.

ANSWER **B.** $h = 2x + 124$

Watch me solve this one on YouTube

06

QUESTION 6 · PROBLEM-SOLVING AND DATA

Percent change over two years

In 2022, the population of American spadefoot toads in a monitored area was estimated to be 20% more than in 2021, and in 2023, the population was estimated to be 17% more than in 2022. If the population of American spadefoot toads in this area was estimated to be t times as much in 2021 as in 2023, which of the following is closest to the value of t?

A 0.712

B 0.730

C 1.370

D 1.404

Try it first. *My working is on the next page.*

06

MY WORKING · 1 OF 3

Percent change over two years

THE KEY IDEA

"20% more" means **times 1.2**. "a is k times as much as b" means $a = kb$.

1. Call 2021 x. Then multiply your way forward:

$$2021 : x \qquad 2022 : 1.2x \qquad 2023 : 1.17(1.2x)$$

2. "t times as much in 2021 as in 2023". Use $a = kb$: 2021 $=$ t times 2023.

$$x = t\left(1.17(1.2x)\right)$$

3. Type it into Desmos with a tilde and it gives t straight away.

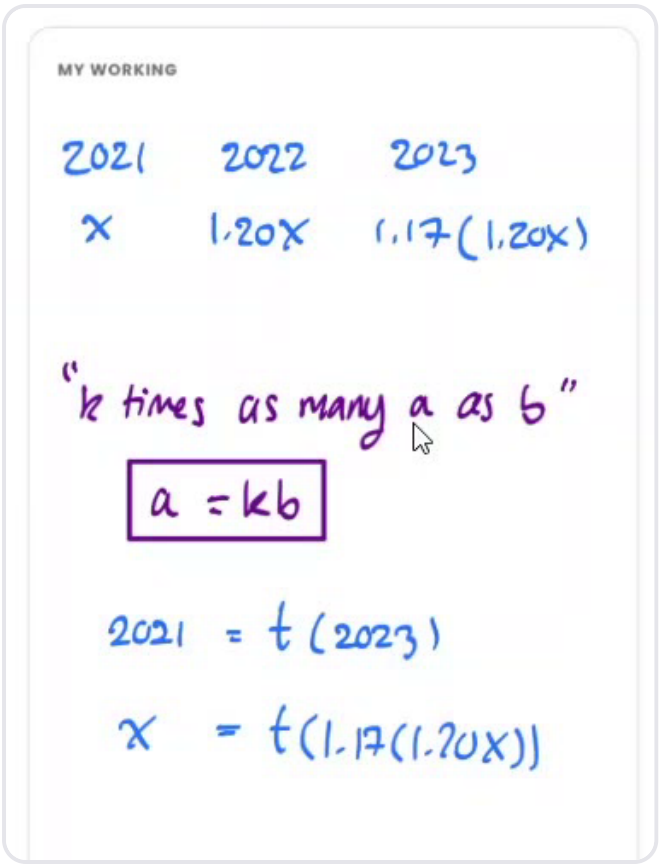
$$t \approx 0.712$$

My working continues on the next page ↓

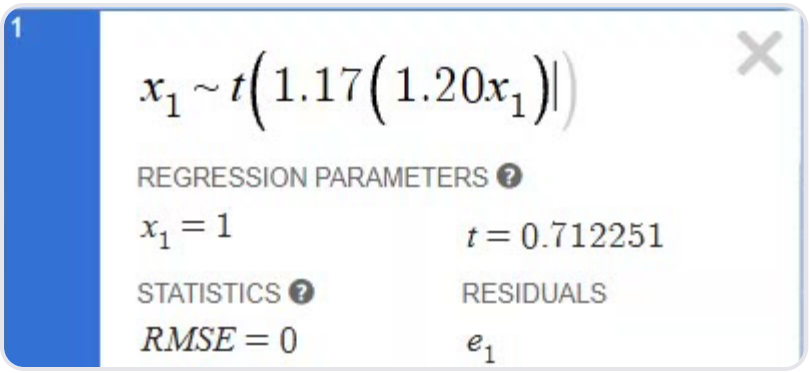
06

MY WORKING · 2 OF 3

Percent change over two years



MY WORKING Each year multiplied forward, then the $a = kb$ sentence turned into math.



DESMOS Same equation in Desmos: $t = 0.712$.

My working continues on the next page ↓

06

MY WORKING · 3 OF 3

Percent change over two years

THE TRAP

D, 1.404. That's 1.2×1.17, 2023 compared to 2021. The question asks it **backwards**.

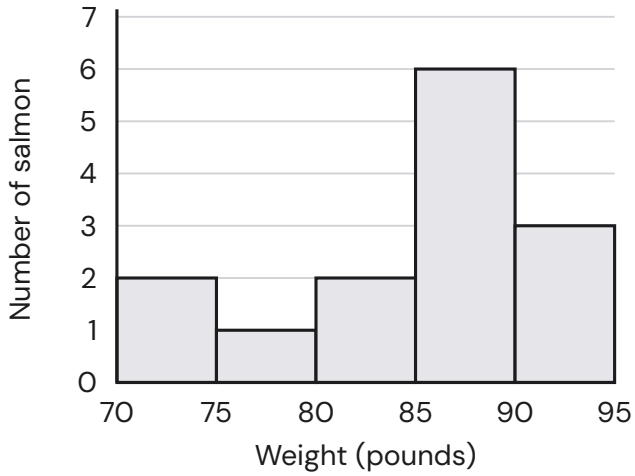
ANSWER **A.** 0.712

Watch me solve this one on YouTube

07

QUESTION 7 · PROBLEM-SOLVING AND DATA

Adding one value to a histogram



The histogram summarizes a data set of the weights, in pounds, of 14 salmon. If an additional weight of 35 pounds is added to the original data set to create a new data set of 15 weights, which of the following measures must be less for the new data set than for the original data set?

I. The median

II. The mean

(A) I only

(B) II only

(C) I and II

(D) Neither I nor II

Try it first. *My working is on the next page.*

07

MY WORKING · 1 OF 2

Adding one value to a histogram

THE KEY IDEA

Mean: one tiny value drags it down, always.
Median: only moves if the middle values move.

1. The weights are 70 to 95 pounds. 35 is way below all of them. Think of four perfect test scores, then a 50 out of 100. Your average drops. So the mean **must** be less. II is true.

2. Median position is $\frac{n+1}{2}$:

$$\text{old: } \frac{14+1}{2} = 7.5\text{th} \qquad \text{new: } \frac{15+1}{2} = 8\text{th}$$

3. The old median sits between the 7th and 8th weights, both in the 85 to 90 bar. But we don't know the exact values. All six weights in that bar could be 87. Then the median doesn't change at all.

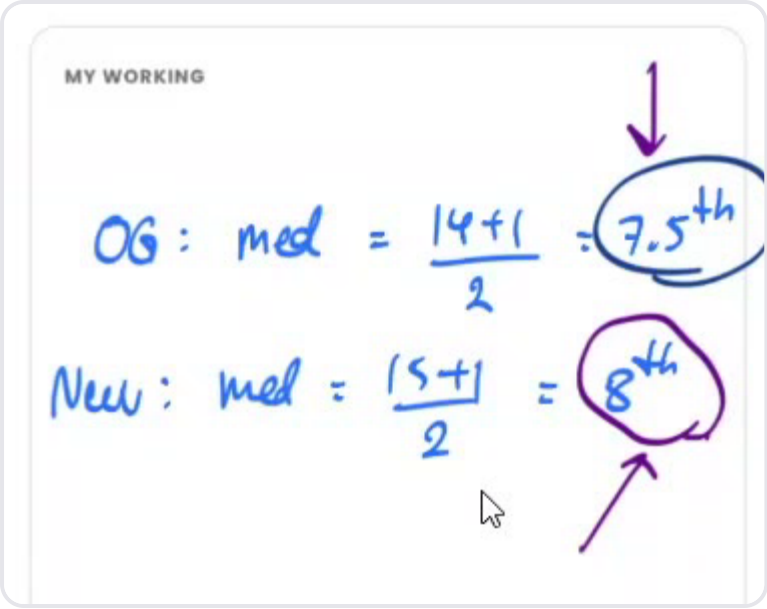
4. "Must be less" means 100% of the time. The median might drop, might not. So only II.

My working continues on the next page ↓

07

MY WORKING · 2 OF 2

Adding one value to a histogram



MY WORKING Median position, old vs new. Not sure it drops, so it can't be a "must".

THE TRAP

C, I and II. The median *can* drop, but "must" means every time. If the 7th and 8th weights are equal, it stays the same.

ANSWER **B. II only**

Watch me solve this one on YouTube

08

QUESTION 8 · ADVANCED MATH

Exponential growth, in minutes

The number of bacteria in a culture can be modeled by the function $P(t) = 240(1.5)^{1.25t}$, where $P(t)$ is the number of bacteria in the culture t hours after the initial observation. According to the model, the number of bacteria increases by 50% every how many minutes?

Grid-in: you type the answer, there are no choices.

Try it first. *My working is on the next page.*

08

MY WORKING · 1 OF 2

Exponential growth, in minutes

THE KEY IDEA

Start value, times 1.5, solve for t, then turn hours into **minutes**. This works on every question like this one.

1. Type the function into Desmos and find the start:

$$P(t) = 240(1.5)^{1.25t}$$

$$P(0) = 240$$

2. Up 50% means times 1.5:

$$240 \times 1.5 = 360$$

3. Find when it hits 360. Type it with a tilde:

$$P(t) \sim 360 \;\Rightarrow\; t = 0.8$$

4. That's 0.8 **hours**. The question wants minutes:

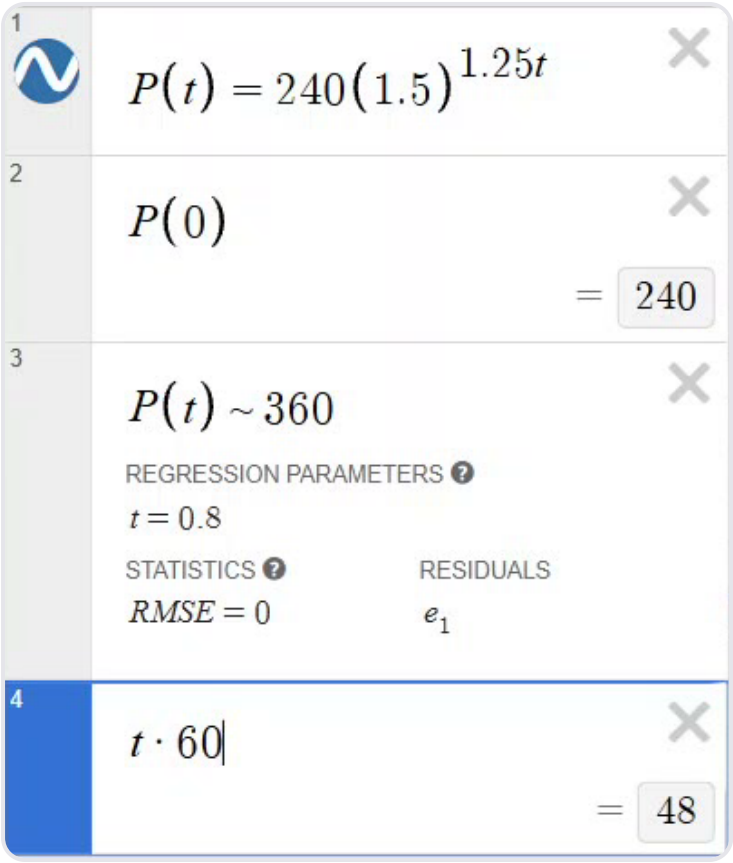
$$0.8 \times 60 = 48$$

My working continues on the next page ↓

08

MY WORKING · 2 OF 2

Exponential growth, in minutes



DESMOS The whole thing in four Desmos lines.

THE TRAP

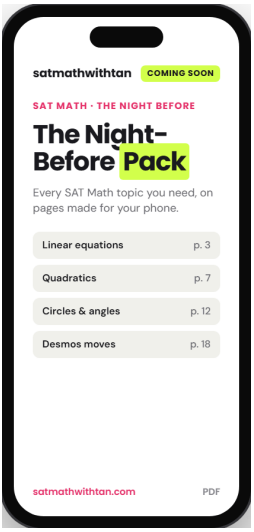
Stopping at 0.8. That's hours. The question asks for minutes.

ANSWER 48

Watch me solve this one on YouTube

COMING SOON

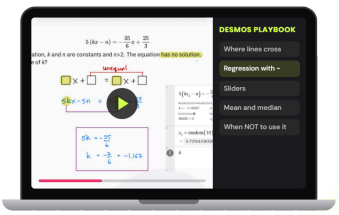
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Join the waitlist →

The waitlist hears first and pays less. No launch date yet.

09

QUESTION 9 · ADVANCED MATH

Exponential function

The exponential function f is defined by $f(x) = ab^x$, where a and b are positive constants. If $f(s) = t$ and $f(s + 1) = t - 0.87t$, where s and t are constants, what is the value of b?

A 0.13

B 0.87

C 1.13

D 1.87

Try it first. *My working is on the next page.*

09

MY WORKING · 1 OF 2

Exponential function

THE KEY IDEA

More unknowns than equations? **Make up values** until the counts match. The answer won't change.

1. Define the function in Desmos, then put both equations in one line as lists, with a tilde:

$$f(x) = ab^x$$

$$\left[f(s),\ f(s+1)\right] \sim \left[t,\ t-0.87t\right]$$

2. That's 2 equations but 4 unknowns: a, b, s, t. You can only solve when they match. So make up $a = 1$ (it has to be positive) and $t = 2$. Now it's 2 and 2, and Desmos solves it:

$$b = 0.13$$

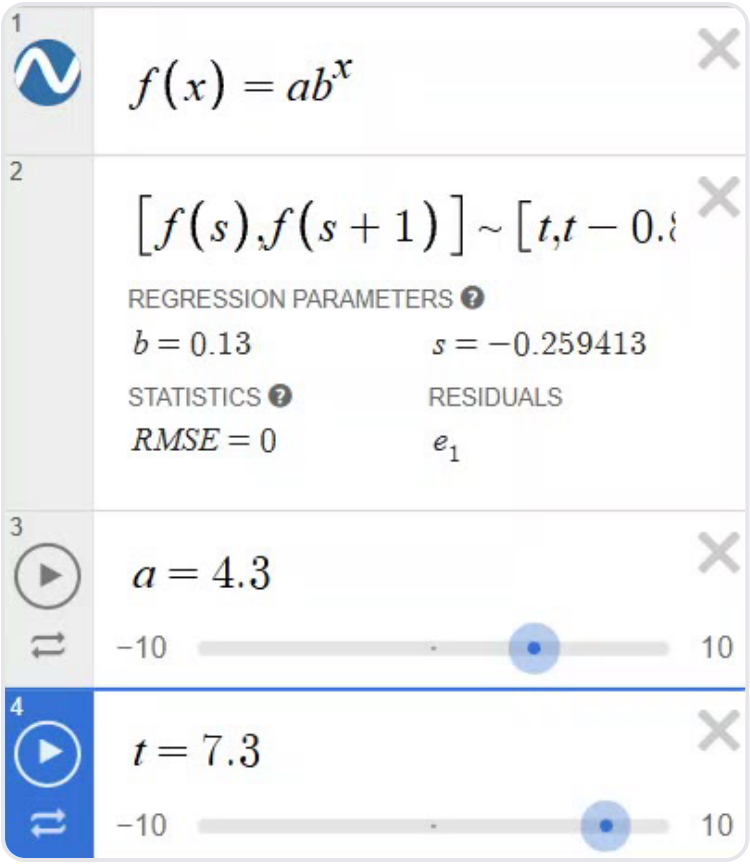
3. Drag the a and t sliders. b stays 0.13 every time.

My working continues on the next page ↓

09

MY WORKING · 2 OF 2

Exponential function



DESMOS a and t as sliders. Move them, b never changes.

THE TRAP

B, 0.87. The function doesn't keep 87%, it **loses** 87%. $t - 0.87t = 0.13t$.

ANSWER **A.** 0.13

Watch me solve this one on YouTube

10

QUESTION 10 · ADVANCED MATH

Square root inside a square root

The expression $\sqrt{486 + 44\sqrt{2}}$ is equivalent to the expression $r + p^{\frac{1}{2}}$, where r and p are positive integers. What is the value of $r + p$?

Grid-in: you type the answer, there are no choices.

Try it first. *My working is on the next page.*

10

MY WORKING · 1 OF 2

Square root inside a square root

THE KEY IDEA

Set the two expressions equal. Then slide r through whole numbers until p is a whole number too.

1. Just type it in with a tilde:

$$\sqrt{486 + 44\sqrt{2}} \sim r + p^{\frac{1}{2}}$$

2. One equation, two unknowns, so we can't solve both. But they're positive integers. Make up r, set the slider step to 1, range up to 100, and add a line $r + p$.

3. Slide: 1, 2, 3... not integers. Keep going. At $r = 22$, $p = 2$. Both integers.

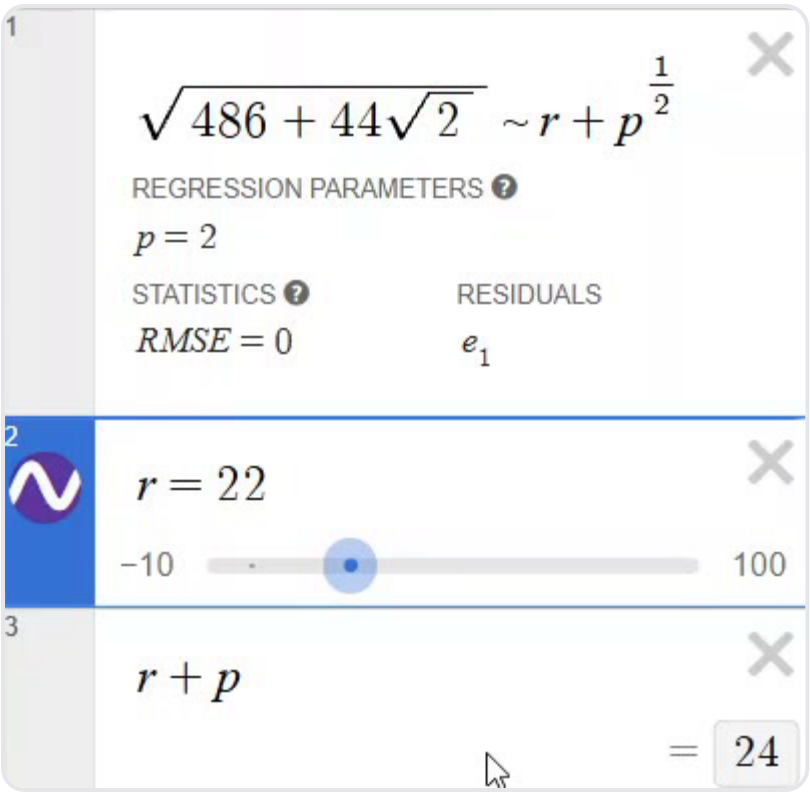
$$r + p = 22 + 2 = 24$$

My working continues on the next page ↓

10

MY WORKING · 2 OF 2

Square root inside a square root



DESMOS Slider at $r=22$: $p=2$, and $r+p=24$.

ANSWER 24

Watch me solve this one on YouTube

11

QUESTION 11 · GEOMETRY

Similar rectangles

Rectangles S and R are similar. The ratio of each side length of rectangle S to the corresponding side length of rectangle R is 23 to 47. The ratio of the area of rectangle S to the area of rectangle R is 529 to r. What is the value of r?

Grid-in: you type the answer, there are no choices.

Try it first. *My working is on the next page.*

11

MY WORKING · 1 OF 3

Similar rectangles

THE KEY IDEA

Similar shapes: sides scale by k, areas scale by k^2.

1 Turn the side ratio into a fraction and find the scale factor k:

$$\frac{\ell_S}{\ell_R} = \frac{23}{47} \Rightarrow \ell_R = \frac{47}{23}\ell_S$$

$$k = \frac{47}{23}$$

2 For area it's k^2: area of R is k^2 times area of S.

$$\frac{A_R}{A_S} = k^2$$

3 Look carefully. The question gives S over R, which is **flipped**. So it's $\frac{1}{k^2}$:

$$\frac{1}{k^2} = \frac{529}{r}$$

4 Type that in Desmos with $k = \frac{47}{23}$. Done.

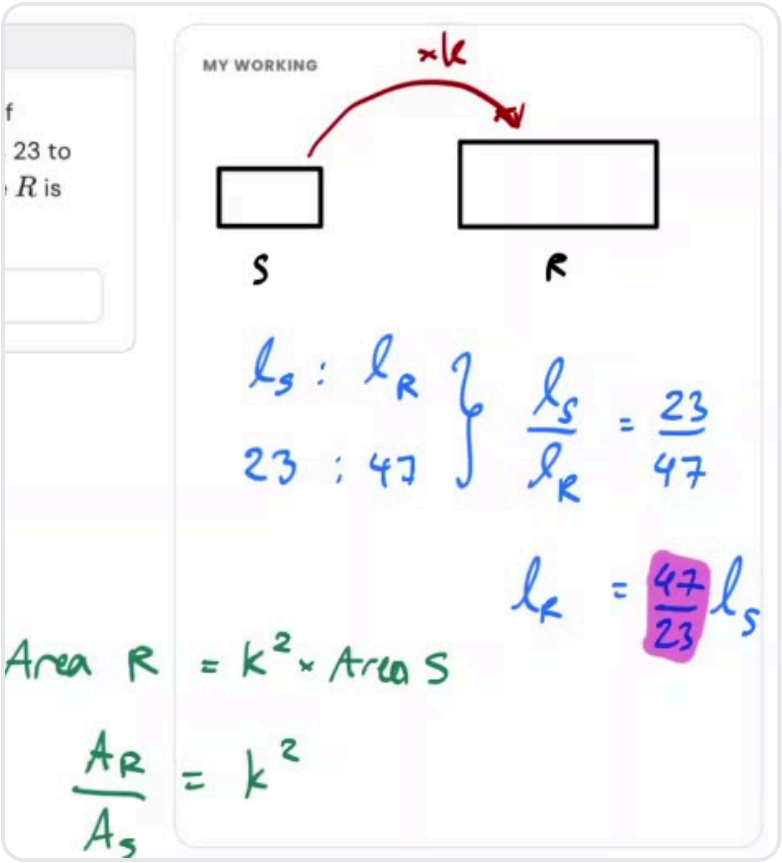
$$r = 2209$$

My working continues on the next page ↓

11

MY WORKING · 2 OF 3

Similar rectangles



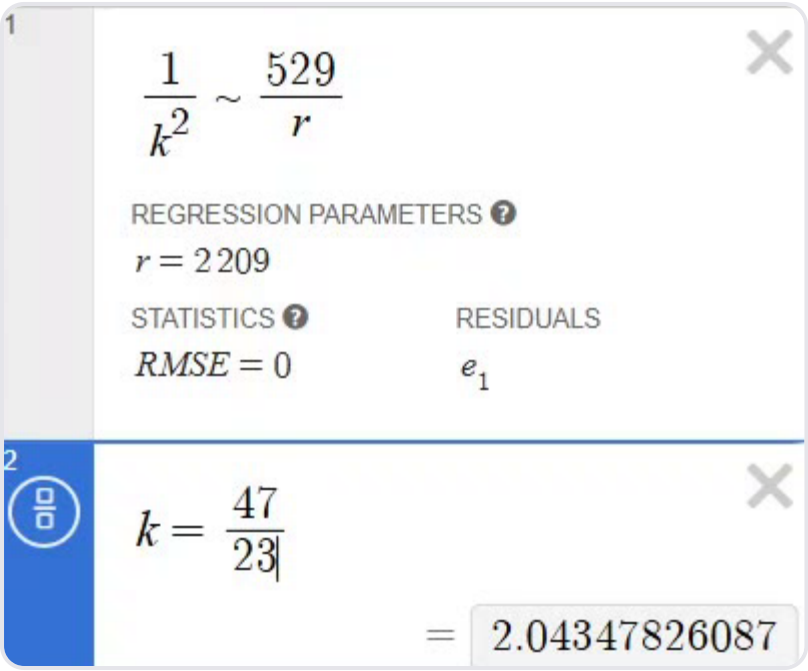
MY WORKING Scale factor from the sides, k^2 for the area.

My working continues on the next page ↓

11

MY WORKING · 3 OF 3

Similar rectangles



DESMOS k defined, then $\frac{1}{k^2} \sim \frac{529}{r}$.

THE TRAP

1081. That's using k instead of k^2. Sides scale by k, areas by k^2.

ANSWER 2209

Watch me solve this one on YouTube

12

QUESTION 12 · GEOMETRY

Right-triangle trig

In right triangle XYZ, angles X and Z are acute angles. Point R lies on $\overline{XZ}$ such that $\overline{YR}$ is perpendicular to $\overline{XZ}$. The measure of $\angle ZXY$ is $a°$, the measure of $\angle XYR$ is $b°$, and the length of $\overline{XY}$ is 19. If $\sin a° = \frac{12}{13}$, what is the value of $\tan b°$?

Grid-in: you type the answer, there are no choices.

Try it first. *My working is on the next page.*

12

MY WORKING · 1 OF 2

Right-triangle trig

THE KEY IDEA

Draw it and label everything. Sine uses the **hypotenuse**. Tangent uses the **two legs**.

1. Right triangle XYZ: X and Z are acute, so the right angle is at Y. R is on XZ with $YR \perp XZ$. Angle a is at X, angle b is at Y next to XR. $XY = 19$.

2. In triangle XYR, $\sin a$ is opposite over hypotenuse. Opposite a is YR, hypotenuse is 19.

$$\frac{YR}{19} = \frac{12}{13} \Rightarrow YR = \frac{228}{13}$$

3. $\tan b$ is opposite over adjacent: $\frac{XR}{YR}$. Find XR with Pythagoras (hypotenuse squared = leg squared + leg squared):

$$19^2 = \left(\frac{228}{13}\right)^2 + XR^2 \Rightarrow XR = \frac{95}{13}$$

4. Divide. Desmos simplifies it for you.

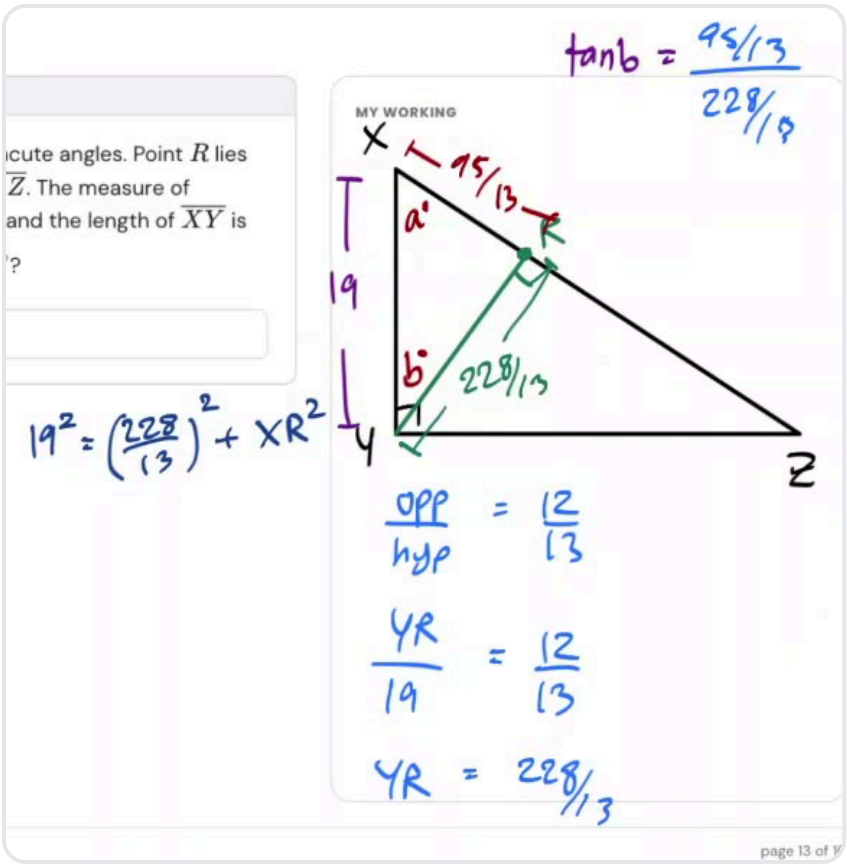
$$\tan b = \frac{95/13}{228/13} = \frac{5}{12}$$

My working continues on the next page ↓

12

MY WORKING · 2 OF 2

Right-triangle trig



MY WORKING The sketch with everything labeled, then sine, then Pythagoras.

THE TRAP

12/5. Flipping the legs. From b (at Y), the opposite side is XR, the adjacent side is YR.

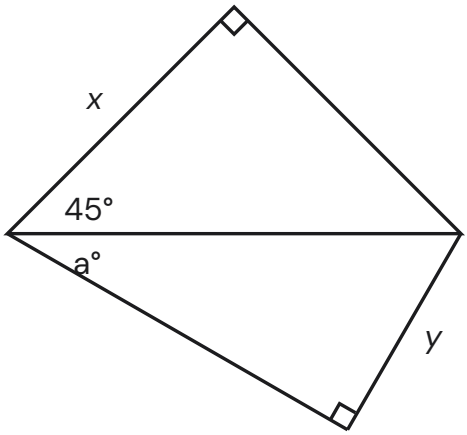
ANSWER $\dfrac{5}{12}$

Watch me solve this one on YouTube

13

QUESTION 13 · GEOMETRY

Two right triangles, one hypotenuse



In the figure, $x = \dfrac{150}{\sqrt{2}}$ and $\sin a^\circ = \dfrac{1}{2}$. What is the value of y?

Note: Figure not drawn to scale.

Grid-in: you type the answer, there are no choices.

Try it first. *My working is on the next page.*

13

MY WORKING · 1 OF 2

Two right triangles, one hypotenuse

THE KEY IDEA

45-45-90 triangle: hypotenuse $=$ leg $\times\sqrt{2}$. It's on the reference sheet, you don't have to memorize it.

1 The top triangle has 45s, so the hypotenuse is $x\sqrt{2}$. The $\sqrt{2}$ cancels:

$$\frac{150}{\sqrt{2}} \times \sqrt{2} = 150$$

2 Now the bottom triangle. $\sin a$ is opposite over hypotenuse. Opposite a is y, and the hypotenuse is the same 150:

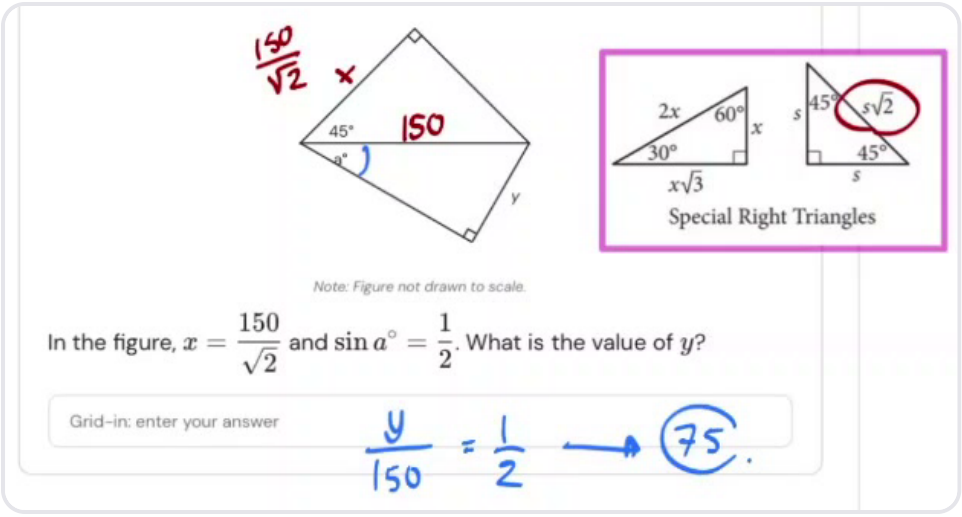
$$\frac{y}{150} = \frac{1}{2} \Rightarrow y = 75$$

My working continues on the next page ↓

13

MY WORKING · 2 OF 2

Two right triangles, one hypotenuse



MY WORKING Special right triangles from the reference sheet, then one line of sine.

THE TRAP

Using $\frac{150}{\sqrt{2}}$ as the hypotenuse. That's a leg. The shared hypotenuse is 150.

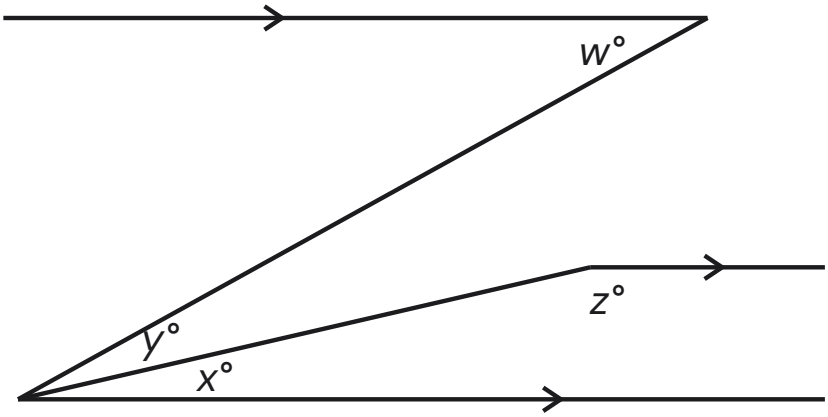
ANSWER 75

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14

QUESTION 14 · GEOMETRY

Three parallel lines



In the figure, the three lines marked with arrows are parallel. If $206 < x + y + z < 211$, which of the following could be the value of $w - x$?

I. 28

II. 30

A I only

B II only

C I and II

D Not enough information

Try it first. *My working is on the next page.*

14

MY WORKING · 1 OF 3

Three parallel lines

THE KEY IDEA

Hard question? **Don't freeze.** If you freeze, you freeze forever. Write down every angle fact you know, then build the thing they gave you.

1. Parallel lines with a line cutting through: **alternate angles** are equal.

$$w = x + y$$

2. Angles on the inside between two parallel lines add up to 180:

$$x + z = 180$$

3. We want $x + y + z$. Add the two equations, then move the extra x over:

$$x + x + y + z = w + 180$$

$$x + y + z = w - x + 180$$

4. Swap that into their inequality, then subtract 180 everywhere:

$$206 < w - x + 180 < 211$$

$$26 < w - x < 31$$

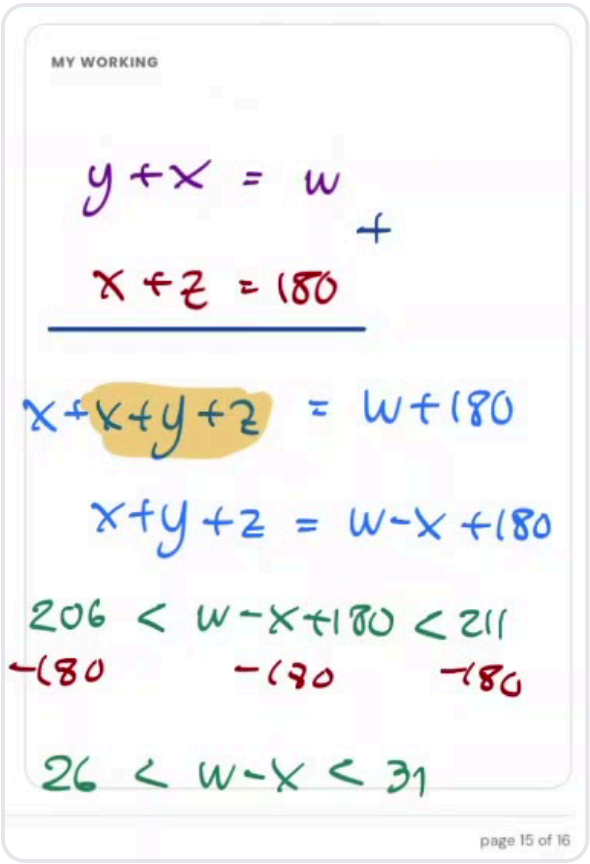
My working continues on the next page ↓

14

MY WORKING · 2 OF 3

Three parallel lines

5 28 fits. 30 fits. Both.



MY WORKING Two angle facts, add them, swap into the inequality.

My working continues on the next page ↓

14

MY WORKING · 3 OF 3

Three parallel lines

THE TRAP

D, not enough information. It feels that way because you can't find each angle. You don't need them. You only need $w - x$.

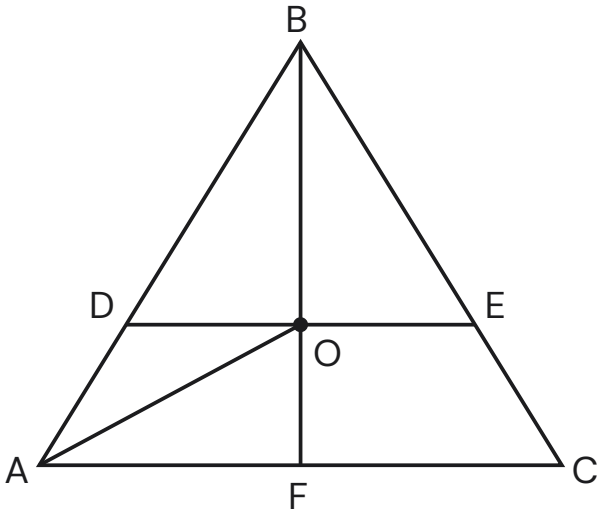
ANSWER **C. I and II**

Watch me solve this one on YouTube

15

QUESTION 15 · GEOMETRY

Isosceles triangle, parallel lines



In triangle ABC, $AB = BC$. Points D and E lie on line segments AB and BC, respectively, such that line segments DE and AC are parallel. Point O is the midpoint of line segment DE, and the measure of $\angle OAC$ is $30°$. Point F lies on line segment AC, and line segment BF passes through point O. If $AB = 81$ and $AO = BO$, what is the length of line segment BE?

Note: Figure not drawn to scale.

Grid-in: you type the answer, there are no choices.

Try it first. *My working is on the next page.*

15

MY WORKING · 1 OF 4

Isosceles triangle, parallel lines

THE KEY IDEA

Mark every given on the figure as you read. Isosceles + midpoint gives you a right angle, and that gives you 30s and 60s everywhere.

1 $AB = BC = 81$, so ABC is isosceles. $DE \parallel AC$, and O is the midpoint of DE. A line from the top through the midpoint of the base is **perpendicular**. So $BO \perp DE$, and since $DE \parallel AC$, $BF \perp AC$ too.

2 Alternate angles: $\angle AOD = 30°$, so $\angle AOB = 30 + 90 = 120°$. $AO = BO$, so triangle AOB is isosceles too: its other two angles are $30°$ each.

$$\angle BAC = 30° + 30° = 60°$$

3 Base angles are equal, so $\angle C = 60°$, which makes $\angle B = 60°$. Every angle is 60: **equilateral**. So $AC = 81$, and F cuts it in half.

$$AF = \frac{81}{2} = 40.5$$

My working continues on the next page ↓

15

MY WORKING · 2 OF 4

Isosceles triangle, parallel lines

4 Triangle AFO has $30°$ at A. We have the adjacent side, we want the hypotenuse, so cosine. (Switch Desmos to **degrees** first.)

$$\cos 30° = \frac{40.5}{AO} \Rightarrow AO \approx 46.77$$

5 $BO = AO \approx 46.77$. In triangle BOE, the angle at E is $60°$ (corresponding to C). BO is opposite it, BE is the hypotenuse:

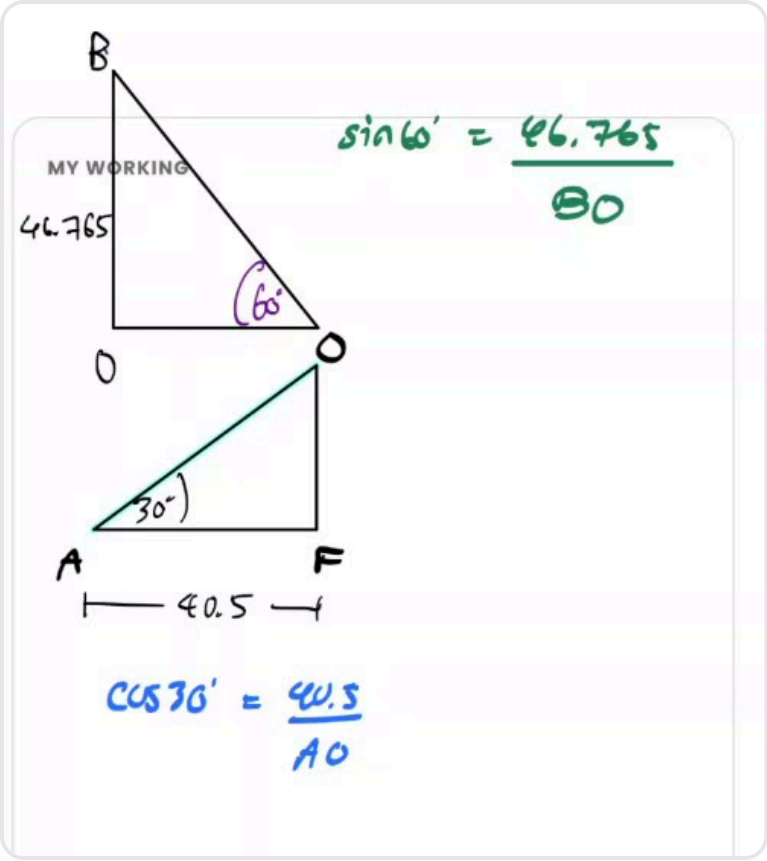
$$\sin 60° = \frac{46.77}{BE} \Rightarrow BE = 54$$

My working continues on the next page ↓

15

MY WORKING · 3 OF 4

Isosceles triangle, parallel lines



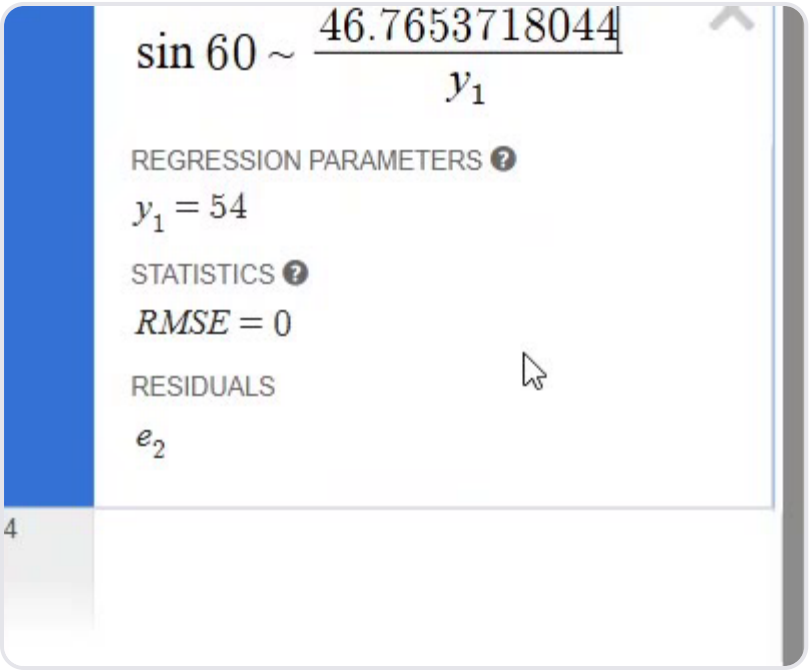
MY WORKING The two small triangles: cosine for AO, sine for BE.

My working continues on the next page ↓

15

MY WORKING · 4 OF 4

Isosceles triangle, parallel lines



DESMOS Degrees mode, then $\sin 60 \sim \frac{46.765\ldots}{y_1}$ gives 54.

THE TRAP

Stopping at $AO = BO \approx 46.8$. The question asks for BE.

ANSWER 54

Watch me solve this one on YouTube

ANSWER KEY

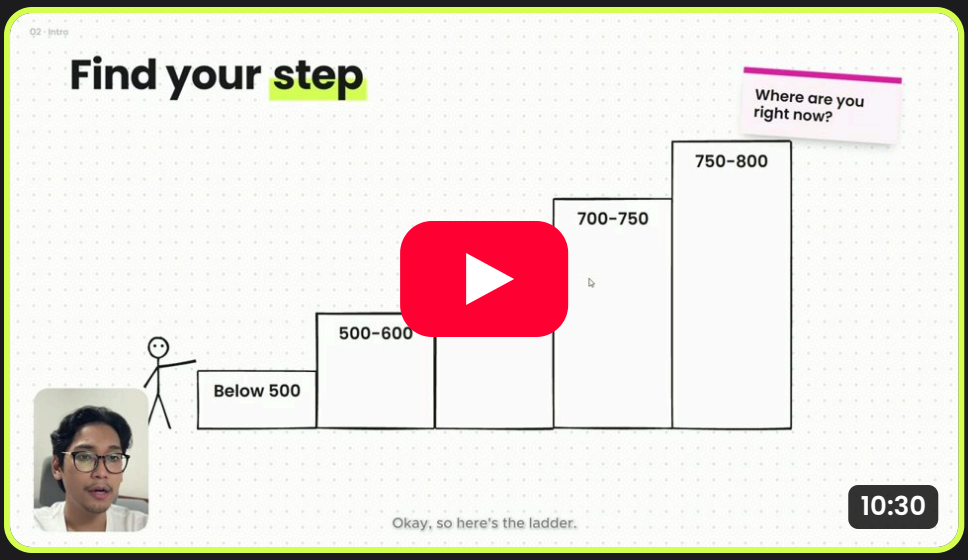
01	Triangle side lengths	**A.** 2
02	A ratio and a total	**A.** $2s = 5c$ **and** $s + c = 5{,}250$
03	Perpendicular lines	**A.** $\left(3,\ 5 - \frac{1}{m}\right)$
04	x-intercept with a constant k	**D.** 3
05	A linear model with two rates	**B.** $h = 2x + 124$
06	Percent change over two years	**A.** 0.712
07	Adding one value to a histogram	**B. II only**
08	Exponential growth, in minutes	48
09	Exponential function	**A.** 0.13
10	Square root inside a square root	24
11	Similar rectangles	2209
12	Right-triangle trig	$\frac{5}{12}$
13	Two right triangles, one hypotenuse	75
14	Three parallel lines	**C. I and II**
15	Isosceles triangle, parallel lines	54

Got one wrong? Watch me solve it, start to finish

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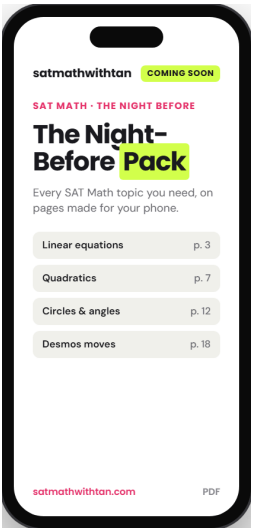


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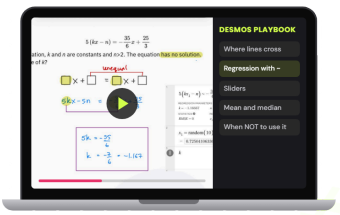
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