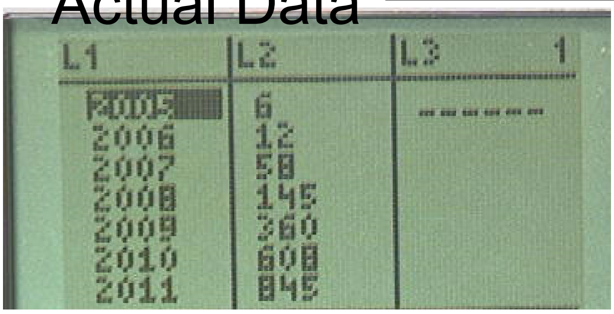
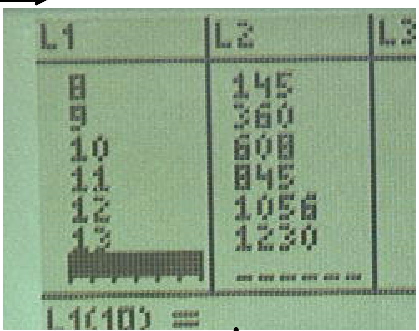
Transformation of Functions

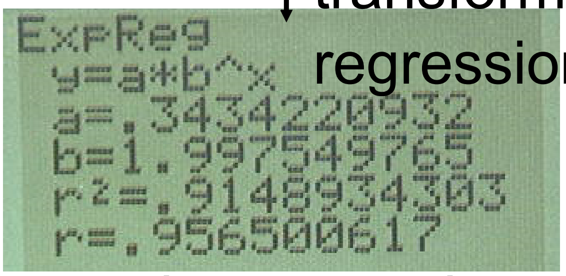
for Data Overflow

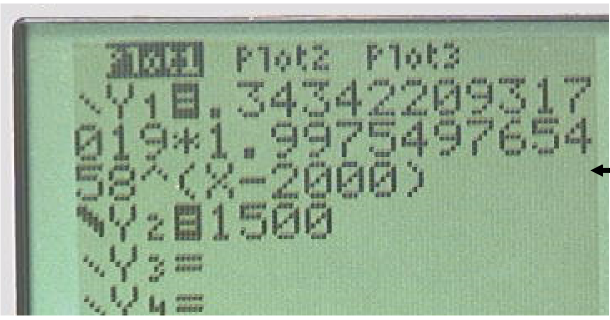
Actual Data → transformed data



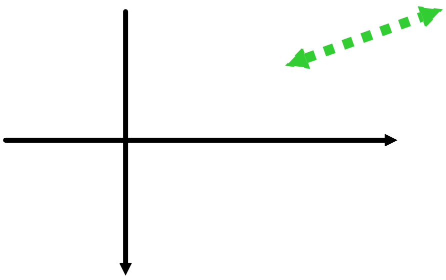


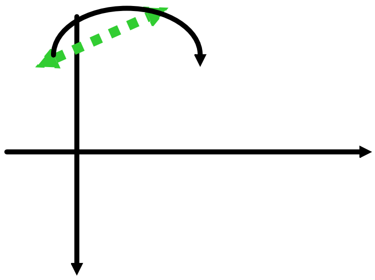
transformd regression





change the regression back



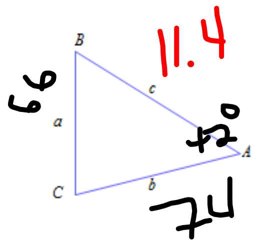


2. Solving a triangle with the law of sines: Problem type 2

Consider a triangle ABC like the one below. Suppose that $a = 66$, $b = 74$, and $A = 42°$. (The figure is not drawn to scale.) Solve the triangle.

Carry your intermediate computations to at least four decimal places, and round your answers to the nearest tenth.

If no such triangle exists, enter "No solution." If there is more than one solution, use the "or" button.



$a^2=b^2+c^2-2bc*\cos A$

$66^2=74^2+c^2-2*74*c*\cos(42^0)$

$c^2 - 109.98c+1120 = 0$

2 solution

You answered:

$B = 48.6°$, $C = 89.4°$, $c = 98.6$

The solution you provided was correct; however, you did not provide all the solutions.

The correct answer is:

$B = 48.6°$, $C = 89.4°$, $c = 98.6$,
or $B = 131.4°$, $C = 6.6°$, $c = 11.4$

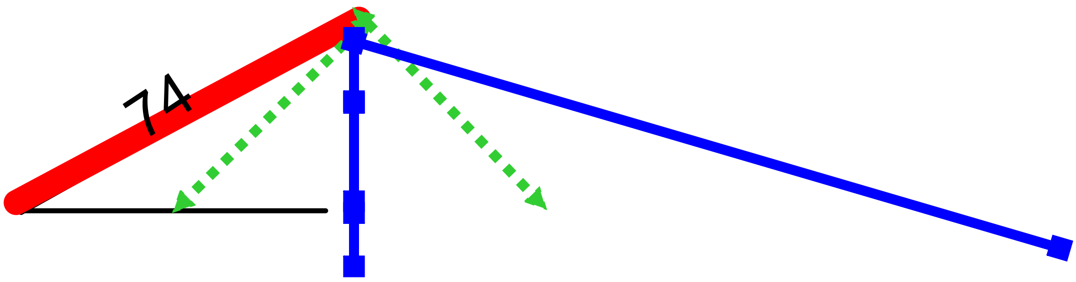
Solutions:

$c \approx 11.354$

$c \approx 98.646$

Number line:

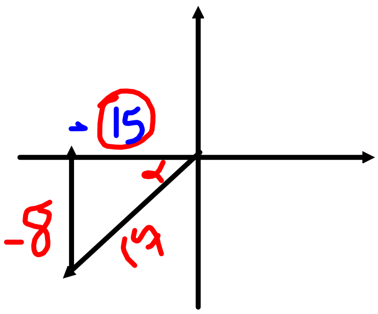
then use the law of sines!



Half-angle identities: Problem type 2 Q3

Suppose that Q4 $\sin\alpha = -\frac{8}{17}$ and $180° < \alpha < 270°$.

Find the exact values of $\sin\frac{\alpha}{2}$ and $\tan\frac{\alpha}{2}$.



Here are the half-angle formulas for sine, cosine, and tangent.

$$\sin\frac{u}{2} = \pm\sqrt{\frac{1-\cos u}{2}} = \pm\sqrt{\frac{1+\frac{15}{17}}{2}}$$

$$\cos\frac{u}{2} = \pm\sqrt{\frac{1+\cos u}{2}}$$

$$\tan\frac{u}{2} = \pm\sqrt{\frac{1-\cos u}{1+\cos u}} = \frac{\sin u}{1+\cos u} = \frac{1-\cos u}{\sin u}$$

$O = \sqrt{17^2 - 8^2}$

$= \sqrt{225}$

$= 15$

$\cos\alpha = \frac{-15}{17}$

$\frac{\alpha}{2}$ in Q2

$\pm\sqrt{32/34}$

Half-angle identities: Problem type 2

Suppose that $\boxed{\sin \cancel{\alpha} = -\frac{8}{17}}$ and $180° < \cancel{\alpha} < 270°$.

Find the exact values of $\sin \frac{\alpha}{2}$ and $\tan \frac{\alpha}{2}$.

Xmin = 180

Here are the half-angle formulas for sine, cosine, and tangent.

$$\sin \frac{u}{2} = \pm \sqrt{\frac{1-\cos u}{2}}$$

$$\cos \frac{u}{2} = \pm \sqrt{\frac{1+\cos u}{2}}$$

$$\tan \frac{u}{2} = \pm \sqrt{\frac{1-\cos u}{1+\cos u}} = \frac{\sin u}{1+\cos u} = \frac{1-\cos u}{\sin u}$$

$\alpha = 208$

$\tan\left(\frac{\alpha}{2}\right) = -4$

1. Half-angle identities: Problem type 1

Use a half-angle formula to find the exact value of $\sin\frac{5\pi}{8}$.

5pi/8 5pi/4

$\alpha = \frac{5\pi}{4}$

You answered:

Half

$\sin\frac{5\pi}{8} = \square$ $\pm\sqrt{\frac{1-\cos\alpha}{2}}$

$\cos\left(\frac{5\pi}{4}\right) = -\frac{\sqrt{2}}{2}$

Please fill in all the empty boxes before clicking on "Next"...

The correct answer is:

$\sin\frac{5\pi}{8} = \frac{\sqrt{2+\sqrt{2}}}{2}$

$\pm\sqrt{\frac{1+\sqrt{2}/2}{2}} = \pm\sqrt{\frac{2+\sqrt{2}}{4}}$

Q2

$\pm \frac{\sqrt{2+\sqrt{2}}}{2}$

$+$

$-$

$$\sin 112.5^\circ = \sin\left(\frac{225}{2}\right)$$

$$= \pm\sqrt{\frac{1-\cos 225}{2}}$$

$$= \pm\sqrt{\frac{1 + 1-\sqrt{2}/2}{2}}$$

$$\frac{\sqrt{2+\sqrt{2}}}{2}$$

$$\sqrt{\frac{1+\frac{\sqrt{2}}{2}}{2}} = \sqrt{\frac{\frac{2}{2}+\frac{\sqrt{2}}{2}}{\frac{2}{1}}}$$

$$= \sqrt{\frac{\frac{2+\sqrt{2}}{2}}{\frac{2}{1}}}$$

$$= \sqrt{\frac{2+\sqrt{2}}{2}\cdot\frac{1}{2}}$$

$$= \sqrt{\frac{2+\sqrt{2}}{4}}$$

$$= \frac{\sqrt{2+\sqrt{2}}}{\sqrt{4}}$$