Warm-up!

Open Desmos and type into the expression list:
$f(x) = x^3 - 11x^2 + 35x - 28$

Then try to find…

A) $f(5.2)$

B) $f(-1.7)$

C) $f(\pi)$

D) $f\left(\sqrt{2}\right)$

Unit 1 Day 12:
- More Desmos Skills
- Regression

Homework: Calculator Skills and Regression

Test Class after Next:
Wed Sept 17/Thur Sept 18

Let $f(x) = x^3 - 11x^2 + 35x - 28$

Use the graph of $y = f(x)$ to answer the following:

E) How many real zeros does $f(x)$ have?

F) How many negative zeros does this function have?

G) Find the zero with the greatest value.

H) Find the zero with the second greatest value.

Let $f(x) = x^3 - 11x^2 + 35x - 28$

Use the graph of $y = f(x)$ to answer the following:

I) Find the x-coordinate at which the relative maximum occurs.

J) Find the relative maximum.

K) For what input value is the output of f equal to 5?

Let $g(x) = x^3 - 2x^2 - 3x + 1$

DON'T GET RID OF $f(x)$. WE'LL USE IT LATER.

Find the only negative zero of $g(x)$.

Find the y-intercept of $g(x)$.

Over what interval does $g(x)$ decrease?

Approximate the point of inflection of $g(x)$.

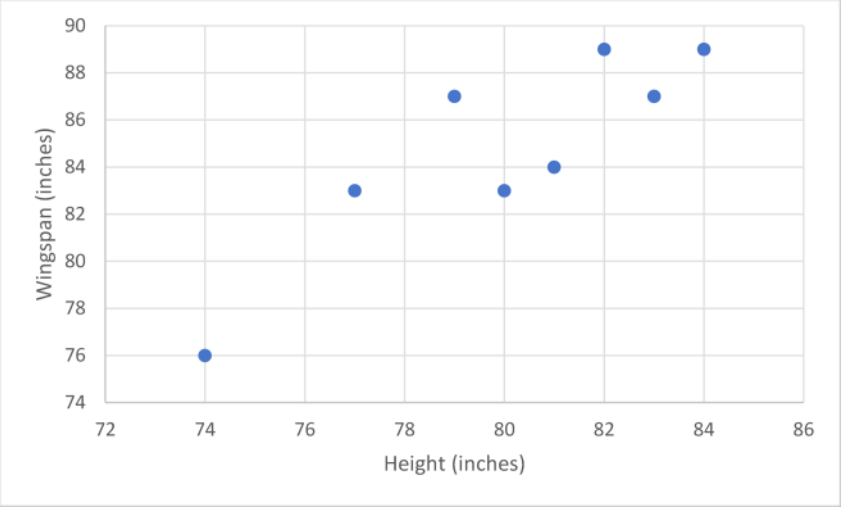
Let $f(x) = x^3 - 11x^2 + 35x - 28$ and let $g(x) = x^3 - 2x^2 - 3x + 1$

Solve:

$x^3 - 11x^2 + 35x - 28 = x^3 - 2x^2 - 3x + 1$

I Googled "Top NBA Players" and then looked up the height and wingspan of the top nine results

	Height (in.)	Wingspan (in.)
LeBron James	81	84
Stephen Curry	74	76
Kevin Durant	82	89
Nikola Jokić	83	87
Giannis Antetokounmpo	83	87
Kawhi Leonard	79	87
James Harden	77	83
Jayson Tatum	80	83
Joel Embiid	84	89



Let's construct a linear regression model to predict wingspan as a function of height

Yao Ming is 90 inches tall. Use the model to predict his wingspan.

Michael Jordan's wingspan is 83 inches. Predict his height.

What are some limitations to this model?

Sally is selling sandwiches at the beach. If she charges too low of a price, she doesn't make much profit. If she charges too high of a price, she doesn't make many sales, so she doesn't make much profit. In between is the perfect balance when she makes the most profit possible. Below are various prices she has tried charging for a day along with how much profit she made that day. Use a graphing calculator to determine a quadratic model of profit as a function of price.

Price	$3.00	$5.25	$8.00	$9.00	$12.00	$15.50	$16.25	$18.00
Profit	$274.39	$397.95	$497.82	$490.931	$488.86	$327.85	$270.04	$139.56

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At what price does the model predict a maximum profit?

Based on the model, two different prices correspond with a profit of $\$450$. Find the lesser of these prices.

Sleep deprivation affects the human brain. One study tested the reaction time of individuals who had been awake for various lengths of time. The table below gives the results. (source: Cain SW, Silva EJ, Chang AM, Ronda JM, Duffy JF)

Time Awake (hrs)	2	6	10	14	18	22	26	30
Reaction Time (msec)	792	780	778	821	908	975	1074	1022

Use a linear model to predict the reaction time of someone who has been awake for 24 hours.

Based on the model, how many hours awake corresponds with a reaction time of 800 milliseconds?

Let's Practice One of These

Tangier Island is an island in Virginia that was once home to over 1000 residents. Unfortunately, the island has been shrinking since approximately 1800. In 1850 ($t = 50$), the island had an area of 2163 acres. In 2013 ($t = 213$), the island had an area of 789 acreas.

The area of Tangier Island can be modelled by the function $S(t) = at^{1.6} + b$.

A(i) Use the given data to write a system of equations that can be used to find values for the constants a and b.

A(ii) Find values for a and b as decimal approximations.

Let's Practice One of These

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The area of Tangier Island can be modelled by the function $S(t) = at^{1.6} + b$.

B(i) Use the given data to find the average rate of change of the area of the island, in acres per year, from $t = 50$ to $t = 213$. Express your answer as a decimal approximation. Show the computations that lead to your answr.

B(ii) Use the average rate of change found in B(i) to estimate the area of the island for $t = 250$. Show the work that leads to your answer.

B(iii) Use concavity to explain why the approximation found in B(ii) is an overestimate of the value of $S(250)$.