

Name Me

Quiz 1

Solve for x and circle your answers. Show enough work so that I can follow your method. And please write in complete mathematical sentences... meaning that all of the mathematical statements should be complete statements. If you do scratch work, do it off to the side and make it obvious that it is not part of the flow to your solution.

1. Find all solutions for x : $x^5 - 3x^3 + 2x = 0$ let $y = x^2$ if you prefer

$$x(x^4 - 3x^2 + 2) = 0$$

$$x(x^2 - 2)(x^2 - 1) = 0$$

↓

$$x^2 = 2$$

$$x = \pm\sqrt{2}$$

$$x^2 = 1$$

$$x = \pm\sqrt{1} = \pm 1$$

$\frac{5}{5}$

$$x = 0$$

2. Find all solutions to this system of equations: $2x + y = 3$ and $x^2 + 3y = 0$

$$y = 3 - 2x$$

$$x^2 + 3(3 - 2x) = 0$$

$$x^2 - 6x + 9 = 0$$

$$(x - 3)^2 = 0$$

$$x = 3$$

$$y = 3 - 2(3)$$

$$y = 3 - 6 = -3$$

$$y = -3$$

$\frac{2}{2}$

3. Sketch the following functions on the provided graph (see next page for graph):

a. $f(x) = -|2x| + 4$ ✓

b. $f(x) = 2$ ✓ See graph

See graph

4. Given two points, determine, the slope and the equation of the line in $y = mx + b$ form. Then sketch it on the same graph as number 3 (see next page).

a. $(4, -4)$ and $(-4, 2)$ $\frac{-4 - 2}{4 - (-4)} = \frac{-6}{8} = -\frac{3}{4} = m$

$$y = -(3/4)x - 1$$

$$y - 2 = -\frac{3}{4}(x + 4) = -\frac{3}{4}x - 3$$

$$y = -\frac{3}{4}x - 1$$

$\frac{2}{2}$

b. $(-4, -4)$ and $(4, 2)$

$$y = (3/4)x - 1$$

$$m = \frac{2 - (-4)}{4 - (-4)} = \frac{6}{8} = \frac{3}{4} = m$$

$$y - 2 = \frac{3}{4}(x - 4) = \frac{3}{4}x - 3$$

$$y = \frac{3}{4}x - 1$$

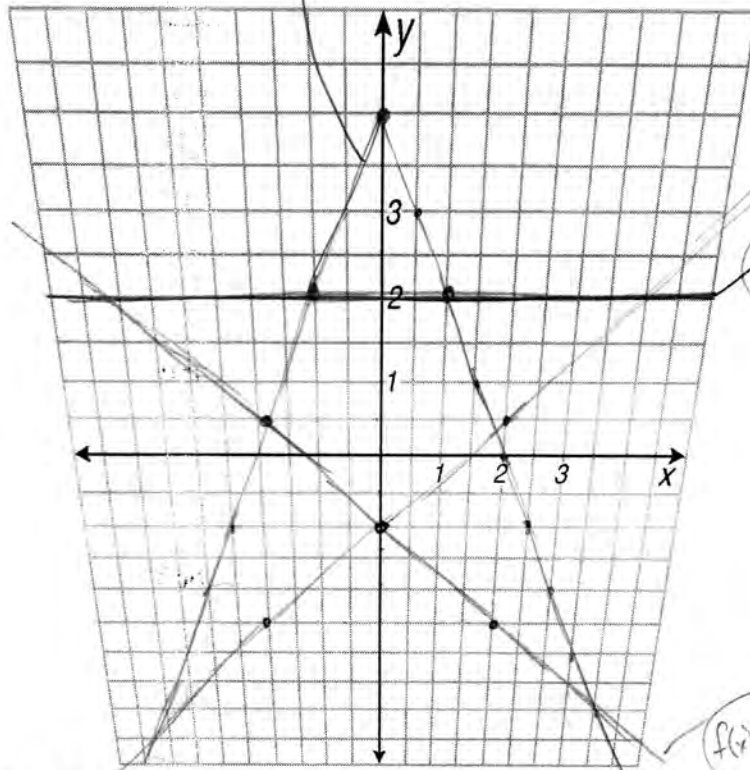
$\frac{2}{2}$

11

$$f(x) = -|2x| + 4$$

$$f(x) = 2$$

$$\frac{4}{4}$$



Use the above graph to sketch all the parts from numbers 3 and 4.

5. Given equation:

$$2x^2 - 5x - 3 = 0$$

$$a = 2$$

$$b = -5$$

$$c = -3$$

a. Using the quadratic formula, find all values for x .

Quadratic formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$x = \frac{5 \pm \sqrt{25 - 4(2)(-3)}}{4} = \frac{5 \pm \sqrt{49}}{4} = \frac{12}{4} \text{ and } \frac{-2}{4}$$

$$\frac{4}{4}$$

$$x = 3, -\frac{1}{2}$$

Some of you ignored your results and just factored it another way.

b. Using the results from part "a", factor the given equation into the form $(x \pm e)(x \pm f) = 0$.

$$(x - 3)(x + 1/2) = 0$$

$$(x - 3)(x + \frac{1}{2}) = 0$$

When you input your x values into this form, you need to make the parts equal 0. Many of you put $(x+3)(x-1/2)=0$. Sub in your values. They won't work.

$$\frac{2}{2}$$

c. Multiply out (foil) the answer to part "b". Do what you need to do to make it exactly match the original given equation. Tell me in prose what you did to make it match the original equation.

$$x^2 - 3x + \frac{1}{2}x - \frac{3}{2} = x^2 - 2.5x - 1.5 = 0$$

There is a lot of prose in mathematics. Get used to writing about it. It's not that hard.

$$2x^2 - 5x - 3 = 0$$

multiply both sides by 2

$$\frac{2}{2}$$

$$\frac{12}{12}$$

6. The year 1 A.H. (Anno Hegirae-"in the year of the Hijra") corresponds to 622 A.D. (Anno Domini- "in the year of the Lord"). The Islamic New Year 1440 A.H. (الهجرية السنة رأس Ra's al-Sanah al-Hijriyah), was recently celebrated on September 12th, 2018 A.D. (plus or minus depending on tradition and/or location).

a. & b. Determine the slopes and the linear equations which will convert from A.H. to A.D. ... and from A.D to A.H. Because the data given does not account for months, your conversion results are only going to be accurate to ± 1 year. Put your final results (slopes and functions) into the table below. Round any decimals to the nearest 100th.

Hint: Set up your data like this: (AH, AD) for conversion from AH to AD. Input AH, output AD.
(AD, AH) for conversion from AD to AH. Input AD, output AH.

Then find the slopes and use the point slope formula to find the equations.

Check to see if your known data works in your formulas! If it doesn't, something went wrong.

Set up your problem neatly. It will play out better.

$y - 1 = 1.03(x - 622)$
 $y = 1.03x - 640.66 + 1$
 $y = 1.03x - 639.66$
 $AH = f(AD) = 1.03x - 639.66$
 check $f(622) = 1.03(622) - 639.66 = 1$ ✓

(x, y)
 (AD, AH)
 $(622, 1)$
 $(2018, 1440)$
 $m = \frac{1440 - 1}{2018 - 622}$
 $m \approx 1.03$

(x, y)
 (AH, AD)
 $(1, 622)$
 $(1440, 2018)$
 $m = \frac{2018 - 622}{1440 - 1}$
 $m \approx 0.97$

$y - 622 = 0.97(x - 1)$
 $= 0.97x - 0.97 + 622$
 $y = 0.97x + 621.03$
 $AD = f(AH) = 0.97(AH) + 621.03$
 check: $f(1440) = 0.97(1440) + 621.03 = 2017.83 \approx 2018$ ✓

Put your final results for parts a and b in the appropriate boxes. (Round all numbers to the nearest 100th.)

slope = $\frac{\Delta AH}{\Delta AD}$	Put your equation into the form shown. $y = f(x) = mx + b$	slope = $\frac{\Delta AD}{\Delta AH}$	Put your equation into the form shown. $y = f(x) = mx + b$
$m_{f(AD)} \approx 1.03$	$AH = f(AD) = m(AD) \pm b_a$ $AH = 1.03x - 639.66$	$m_{f(AH)} \approx 0.97$	$AD = f(AH) = m(AH) \pm b_a$ $AD = 0.97x + 621.03$

Check your formula with known dates. If you don't get the right results, something is wrong.

d. Using your conversion equations, fill in the following table.

Person or Event	A.D.	A.H.
Al-Khwarizmi, father of algebra	ca. 850	d. ca. 236
Jerusalem conquered by Christian forces in the First Crusade.	1099	493
Saladin, conquered Jerusalem (Al Quds)	1187	583
Ibn Rushd, Averroes. "The Commentator" (... on Aristotle)	d. 1198	595
Al-Tūsī, influenced Copernicus	d. 1274	d. 673
Muslims expelled from Spain	1492	898

Notice that these dates are in ascending chronological order. If your results didn't do this, something is wrong.

8/14

3/3

11/11

Extra Credit. Find all solutions to this system of equations: [This is not as simple as it looks.]

$$2x + y = 10$$

$$x^2 - 3y = -3$$

OP to
+3

2 for answers
1 for qualifications

Tricky: $(x,y) = (3, 4)$ or $(-9, 28)$

No mix'n' match

if $x=3$ then $y=4$

if $x=-9$ then $y=28$