Luis Hernandez

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Thehomeworkxpress.com

In August 2019, I founded **The Homework Xpress** to offer private tutoring services to families in Santa Cruz County at different levels, from middle school to college, including adult education. It is my objective to expand the brand at the service of our community.

HM XP

HOMEWORK XPRESS

Experience

JULY 2023 • CROSSWALK EDUCATION. BAY AREA, CA.
SAT Math Test Prep Seminar at Hartnell College, Salinas, CA.

SEP 2020 – PRESENT • MOUNT MADONNA SCHOOL. WATSONVILLE, CA.
Math and Engineering Teacher, Middle School & High School.
Specialized in Engineering Principles, Calculus, Pre-Calculus, Geometry, Pre-Algebra and Algebra.

OCT 2020 – PRESENT • ENGAGING MATH CIRCLES. SAN JOSE, CA.
Math Teacher, 4th to 10th grade. Online teaching using Zoom Meetings and Google Classroom, group classes and 1-on-1 tutoring. Specialized in Pre-Algebra, Algebra and Math.

OCT 2020 – MAR 2021 • DIAMOND TUTORING. BAY AREA, CA.
Math teacher, 10th to 12th grade. Online teaching. Specialized in Calculus and high-level math, 1-on-1 tutoring.

OCT 2019 – MAY 2021 • SANTA CRUZ LEARNING CENTER. SANTA CRUZ, CA.
Math, Science, Spanish and SAT/ACT Teacher, 6th to 12th grade. Specialized in SAT Math Prep Test.

JAN 2013 – SEP 2018 • GRUPO CHACARILLA SUR. LIMA, PE.
Construction Manager. Specialized in apartment complex management.

Formation

Pontifical Catholic University of Peru, Lima, Peru.
- Bachelor's degree in Civil Engineering, 2009.

Peruvian University of Applied Sciences, Lima, Peru.
- Master's degree in Construction Management, 2017.

Resume

Civil Engineer since 2009 with experience in construction management, leading technology innovations to reduce production costs, including prefabricated slabs for multifamily buildings.

Since the year 2017 I started teaching engineering, math and science to high school and college students. I specialize in tutoring Math, Integrated Math, Algebra, Pre-Calculus, Calculus, Trigonometry, Geometry, Physics, Noetic Math competition test, and SAT/ACT preparation test, in English and Spanish, 1-on-1, and group sessions, online and in person.

Teaching Style

I believe in education as the key to open our minds and become better human beings for the benefit of our community. It is my principal goal to mentor my students from a holistic paradigm, using academic resources to help them develop independent critical thinking, find their true passion, and become their best version. I work on personalized programs for my students according to their abilities and interests, in constant communication with their parents and guardians, and improving the experience with their feedback for a better understanding of their needs.

Work Samples

Page 337

16)

$$J^2 = 6^2 + 8^2 \quad | \quad J^2 = 100$$
$$J^2 = 36 + 64 \quad | \quad J = 10$$

$$X + 10 = 30 \rightarrow X = 20$$

$$\triangle RTQ \cong \triangle RSP \text{ bc AAA}$$

$$\frac{6}{y} = \frac{10}{30} \rightarrow y = 18$$

$$\frac{10}{30} = \frac{8}{SR} \rightarrow SR = 24$$

$$Z + 8 = 24 \rightarrow Z = 16$$

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7) $r(x) = \dfrac{x^3 + x^2}{x^2 - 4} = \dfrac{x^2(x+1)}{(x+2)(x-2)}$

- **X-intercept:** Numerator = 0
  $$x^2(x+1) = 0$$
  Then $X_{int} = 0$, $X_{int} = -1$

- **y-intercept:** $y_{int} = r(0)$
  $$\frac{0^2(0+1)}{(0+2)(0-2)}, \text{ then } y_{int} = 0$$

- **Vert. Asymptote:** Denominator = 0
  $$(x+2)(x-2) = 0$$
  Then $X = 2$, $X = -2$

- **Hor. Asymptote:** $r(x) = \dfrac{a_n x^n + \ldots}{a_m x^m + \ldots}$
  If $n < m$, then $y = 0$
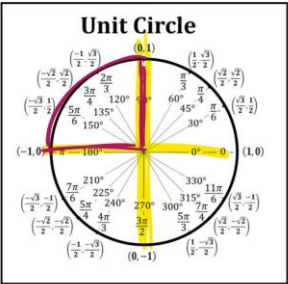 $n = m$, then $y = a_n/a_m$
  $n > m$, no asymptote

- **Slant:** Long division
  $$x^2 - 4 \overline{)\, x^3 + x^2\,}$$
  $$\frac{x+1}{}$$
  $-(x^3 + 0x^2 - 4x)$
  $x^2 + 4x$
  $-(x^2 + 0x - 4)$
  $4x - 4$

  Then $r(x) = x+1 + \dfrac{4x-4}{x^2-4}$
  Slant: $y = x+1$

- **Behavior:** As x tends to

	$x=2^-$	$x=2^+$	$x=-2^-$	$x=-2^+$
	$\frac{(+)(+)}{(+)(-)}$	$\frac{(+)(+)}{(+)(+)}$	$\frac{(+)(-)}{(-)(-)}$	$\frac{(+)(-)}{(+)(-)}$
	$y \to -\infty$	$y \to +\infty$	$y \to -\infty$	$y \to +\infty$

Note: To refine the graph you can make a table to find additional points.

Sine = $\dfrac{\text{Opposite}}{\text{Hypotenuse}}$

Unit Circle

If $\sin\theta = \dfrac{5}{13}$, $\tan\theta = -\dfrac{5}{12}$

Find $\sec\theta$.

Hyp 13, 5
$$x^2 + 5^2 = 13^2$$
$$x^2 + 25 = 169$$
$$x^2 = 144 \rightarrow X = 12$$
$X = 12$ adj

$\ast$ $\tan\theta = \dfrac{\sin\theta}{\cos\theta}$, If $\tan\theta$ is negative and $\sin\theta$ is positive, then $\cos$ is neg.

$\ast$ Now I know: $(-\cos, +\sin)$ QII

$\ast$ $\cos\theta = -\dfrac{12}{13} \rightarrow \sec\theta = -\dfrac{13}{12}$

Rational inequality guide:

Exercise: $\dfrac{2x-5}{x^2-16} < 0$

1st step: Find the restrictions of the denominator: $x^2 - 16 \neq 0$
Then if $x^2 - 16 = 0 \rightarrow X=4,\ X=-4$

2nd step: Analyze the numerator
$2x - 5 = 0$, then $X = 5/2$

3rd step: Plot these points on a number line: $x=4, x=-4, x=5/2$
$$-\infty \longleftrightarrow +\infty$$

4th step: Test points in between the values you found for x

Test $x=-5$: $\dfrac{2(-5)-5}{(-5)^2-16} = \dfrac{-15}{25-16} = -\dfrac{15}{9} < 0$ (True)

Test $x=0$: $\dfrac{2(0)-5}{(0)^2-16} = \dfrac{-5}{-16} = \dfrac{5}{16} < 0$ False

Test $x=2$: $\dfrac{2(3)-5}{(3)^2-16} = \dfrac{+1}{9-16} = \dfrac{+1}{-7} < 0$ (True)

Test $x=5$: $\dfrac{2(5)-5}{(5)^2-16} = \dfrac{+5}{25-16} = \dfrac{5}{9} < 0$ False

5th step: Write the intervals that satisfied the inequality

Solution: $(-\infty, -4) \cup (+5/2, +4)$

Page 479:

12)

Dimensions: 12, 12, 10, 10, 20 cm, 20 cm, 40 cm

Volume: $40 \times 20 \times 20 - 12 \times 10 \times 20 \times 2$

$$Vol = 16000 - 4{,}800$$
$$Vol = 11{,}200 \text{ cm}^3$$

Cement weight = 1,700 kg

$$1{,}700 \frac{kg}{m^3} \times \left(\frac{1m}{100cm}\right)^3 = 0.0017 \frac{kg}{cm^3}$$

Weight $= 11{,}200 \text{ cm}^3 \times 0.0017 \frac{kg}{cm^3} = 19.04 \text{ kg}$

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11)

i) $\log x^2 = \log(-4x-3)$
$$x^2 = -4x - 3$$
$$x^2 + 4x + 3 = 0$$
$$(x+1)(x+3) = 0$$
$$X = -1 \text{ or } X = -3$$

ii) $\log_{15}(17+x) + \log_{15}(17-x) = 2$

$\log_{15}[(17+x)\cdot(17-x)] = 2$

Keep base
$$15^2 = (17+x)(17-x)$$
$$225 = 17^2 - x^2$$
$$225 = 289 - x^2$$
$$x^2 = 289 - 225$$
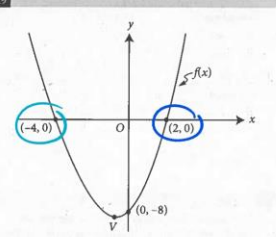$$x^2 = 64 \rightarrow X = +8, \ X = -8$$

28

When polynomial $g(x)$ is divided by $x - 4$, the remainder is 3. Which of the following statements about $g(x)$ must be true?

A) $g(-4) = 3$
B) $g(4) = 3$
C) $x - 4$ is a factor of $g(x)$.
D) $x + 3$ is a factor of $g(x)$.

Handwritten:
$x - 4 = 0$
$x = 4$
* Remainder theorem
$g(4) = $ Remainder $= 3$

29

The figure above shows the graph in the xy-plane of the function $f(x) = x^2 + 2x - 8$. Which of the following is an equivalent form of the function f that includes the coordinates of vertex V as constants in the function?

A) $f(x) = (x + 1)^2 - 9$
B) $f(x) = x(x + 2) - 8$
C) $f(x) = (x - 2)(x + 4)$
D) $f(x) = (x + 2)(x - 4)$

Handwritten:
$x = -4 \rightarrow (x+4)$
$x = +2 \rightarrow (x-2)$
$f(x) = (x+4)(x-2)$
$f(x) = x^2 - 2x + 4x - 8$
$f(x) = (x^2 + 2x + 1) - 8 - 1$
$\div 2 \rightarrow +1 \quad$ product
$f(x) = (x+1)^2 - 9$ ✓

$\rightarrow$ Vertex form
$y = a(x-h)^2 + k$
where (h, k) is the location of the vertex
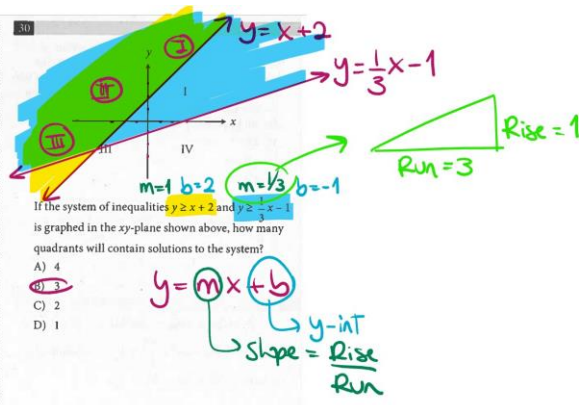
30

If the system of inequalities $y \geq x + 2$ and $y \geq -\frac{1}{3}x - 1$ is graphed in the xy-plane shown above, how many quadrants will contain solutions to the system?

A) 4
B) 3
C) 2
D) 1

Handwritten:
$y = x + 2$
$y = \frac{1}{3}x - 1$
Rise $= 1$
Run $= 3$
m=1 b=2   m=⅓ b=-1
$y = mx + b$
$\rightarrow$ y-int
slope $= \frac{Rise}{Run}$
Solutions: QI, QII, QIII

9

$$c = \frac{\dfrac{r}{1,200}}{1 - \left(1 + \dfrac{r}{1,200}\right)^{-N}} \cdot M$$

In order to buy a house, a couple takes on a mortgage of M dollars at an annual rate of r percent to be paid off over N months. If the equation above is used to determine the monthly payment, c, that the couple needs to make to pay off the loan, which of the following expressions gives the value of M, in terms of c, r, and N?

Handwritten: $M = c \cdot$ ▭

A) $M = \left(\dfrac{r}{1,200}\right)c$ ✗

B) $M = \left(\dfrac{1,200}{r}\right)c$ ✗

C) $M = \dfrac{1 - \left(1 + \dfrac{r}{1,200}\right)^{-N}}{\dfrac{r}{1,200}} c$?

D) $M = \dfrac{\dfrac{r}{1,200}}{1 - \left(1 + \dfrac{r}{1,200}\right)^{-N}} c$?

10

A line in the xy-plane has a slope of $\frac{2}{3}$ and passes through the origin. Which of the following points lies on the line?
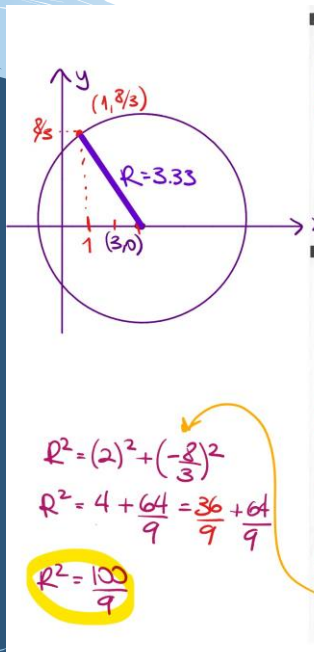
A) $\left(0, \dfrac{2}{3}\right)$
B) $(2, 3)$
C) $(6, 4)$
D) $(9, 4)$

Handwritten:
$m = \frac{2}{3} = \frac{Rise}{Run}$
$(x, y) = (0, 0)$
$(2, 3)$
3 ↑ 2 →

11

$$f(x) = cx^2 + 30$$

For the function f defined above, c is a constant and $f(3) = 12$. What is the value of $f(-3)$?

A) -12
B) -2
C) 0
D) 12

Handwritten:
$f(3) = c(3)^2 + 30 = 12$
$f(-3) = c(-3)^2 + 30 = 12$
Note: $c(3)^2 = c(-3)^2$
$9c = 9c$

Top-left handwritten graph:

$(1, 8/3)$
$8/3$
$R = 3.33$
$(3,0)$
1

$R^2 = (2)^2 + \left(-\frac{8}{3}\right)^2$

$R^2 = 4 + \frac{64}{9} = \frac{36}{9} + \frac{64}{9}$

$R^2 = \frac{100}{9}$

Question 1

A fish leaps vertically upward from the surface of a lake at an initial speed of 9 meters per second. The height h, in meters, of the fish above the surface of the water s seconds after it leaps is given by the equation $h = 9s - 4.9s^2$. Approximately how many seconds after the fish leaps will it hit the surface of the lake? $h = 0$

A) 2.0
B) 2.5
C) 3.0
D) 3.5

$9s - 4.9s^2 = 0$

$S(9 - 4.9s) = 0$

$s = 0 \qquad 4.9s = 9$

$s = \frac{9}{4.9} = 1.84$

Question (circle)

A circle in the xy-plane is centered at $(3, 0)$ and has a radius with endpoint $\left(1, \frac{8}{3}\right)$. Which of the following is an equation of the circle?

A) $(x-3)^2 + y^2 = \frac{10}{3}$
B) $(x+3)^2 + y^2 = \frac{10}{3}$
C) $(x-3)^2 + y^2 = \frac{100}{9}$
D) $(x+3)^2 + y^2 = \frac{100}{9}$

$(x_1, y_1) = (3, 0)$
$(x_2, y_2) = (1, \frac{8}{3})$

(h, k) : Center
$h = 3$
$k = 0$

Eq. Circle: $(x-h)^2 + (y-k)^2 = R^2$
$(x-3)^2 + (y-0)^2 = R^2$

D.F. : $(R) = \left(\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}\right)$

$R^2 = (3-1)^2 + \left(0 - \frac{8}{3}\right)^2$

Question 36

A square lawn has a length of 8 feet and a width of 8 feet. Eight researchers each examine a randomly chosen region of the field; all regions are square with length and width of one foot. The researchers count the number of seedlings in each region that have reached a height of at least 2 inches. The table below shows the resulting data.

Region	1	2	3	4
Number of seedlings	82	87	95	99
Region	5	6	7	8
Number of seedlings	102	106	111	115

Which of the following best approximates the number of seedlings that are at least 2 inches high on the entire lawn?

A) 80
B) 640
C) 800
D) 6,400

Sample $= 8$, $\frac{8}{64} = \frac{1}{8}$
Total $= 64$

Sum $= 82 + 87 + 95 + 99 + 102 + 106 + 111 + 115 = 797$

$8 \cdot \frac{1}{8} \cdot \text{Total} = 797 \cdot 8$
Total $= 6,376$

Question (zoologist)

A zoologist is studying the reproduction rates of two different breeds of chinchillas in country Y. He discovered that the Eastern chinchillas in his study produced 30 percent more offspring than the Western chinchillas did. Based on the zoologist's observation, if the Eastern chinchillas in his study produced 143 offspring, how many offspring did the Western chinchillas produce?
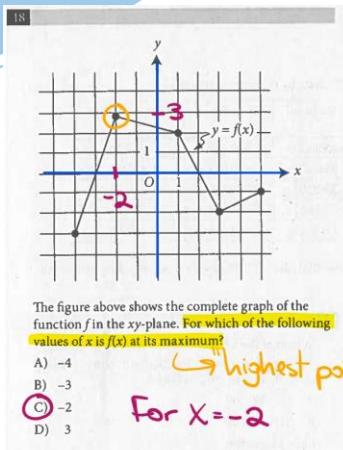
A) 100
B) 103
C) 110
D) 186

Western : Eastern
1 : 1.3
110 143
$\div 1.3$

Question 18

The figure above shows the complete graph of the function f in the xy-plane. For which of the following values of x is $f(x)$ at its maximum?

A) -4
B) -3
C) -2
D) 3

$\rightarrow$ "highest point"

For $X = -2$

$85\% = 0.85$

Question 19

The price of a train ticket purchased in the train station or from a conductor is 15 percent less during off-peak hours than it is during peak hours. If a ticket is purchased from the conductor, an 11 percent surcharge is added to the price. Alec purchased a ticket from the conductor during off-peak hours and paid a total of t dollars. Which of the following, in terms of t, represents the price he would have paid if he had purchased the ticket in the train station during peak hours?

A) $\frac{t}{0.96}$
B) $0.96t$
C) $\frac{t}{(0.85)(1.11)}$
D) $(0.85)(1.11)t$

$t = P (0.85)(1.11)$

$P = \frac{t}{(0.85)(1.11)}$

Question 20

Number of Exercise Sessions per Week

	0–2	3–5	More than 5	Total
Group 1	13	22	15	50
Group 2	11	18	21	50
Total	24	40	36	100

The table above was compiled by a nutrition researcher studying how often people exercise when asked to keep a log of their exercise sessions. Group 1 was comprised of people who regularly eat snacks, and Group 2 was comprised of people who rarely eat snacks. If one person is randomly chosen from among those who exercise fewer than six times per week, what is the probability that this person belonged to Group 1?

A) $\frac{35}{64}$
B) $\frac{50}{64}$
C) $\frac{29}{100}$
D) $\frac{35}{100}$

Group 1

$P = \frac{\text{Fav. outcomes}}{\text{Total outcomes}}$

$P = \frac{13 + 22}{24 + 40} = \frac{35}{64}$

$111\% = 1.11$

Question 21

A service station sells gasoline for $3.25 per gallon and diesel fuel for $3.00 per gallon. On Monday, the service station's revenue from selling a total of 131 gallons of gasoline and diesel fuel was $404.25. How many gallons of diesel fuel did the service station sell on Monday?

A) 35
B) 55
C) 76
D) 86

$(3.25)(G + D) = (131)(3.25) \longrightarrow 3.25G + 3.25D = 425.75$

$3.25G + 3D = 404.25 \longrightarrow 3.25G + 3.00D = 404.25$

Then $D = \frac{21.50}{0.25} = 86$

$\frac{0.25D}{0.25} = \frac{21.50}{0.25}$

Focus
Motivation
Dedication