Unit 6 : Finding the Rule of a Real Function (Equation)

↳ find the value of a / b / h / k

P 6.12.

Find equation of quadratic function with V (5, -1) (h, k) P (3, 3) (x, y)

(in the form $f(x) = a(x-h)^2 + k$)

$f(x) = a(x-5)^2 - 1$

$3 = a(3-5)^2 - 1$

$3 = a(-2)^2 - 1$

$3 + 1 = 4a - 1 + 1$

$\frac{4}{4} = \frac{4a}{4}$

$a = 1$

$f(x) = (x-5)^2 - 1$

Step i. Pick correct starting equation

$f(x) = a(b(x-h))^2 + k$

Step ii. label parameters, assume b=1 and sub in info.

Step iii find value of last parameter by temp. subbing in point

$f(x) = (-1(x-5))^2 - 1$

$(a+b)^2 \neq a^2+b^2$

$(abc)^2 = a^2b^2c^2$

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

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

$g(x) = 4(x-1)^2 + 1$

Find equation of parabola w/ vertex $(-1, -2)$ and $P(-2, -3)$

Find equation of parabola in form

$y = a(x - x_1)(x - x_2)$

where $(x_1, 0)$ $(x_2, 0)$ are x-ints.

Parabola has x-ints $(4, 0)$ $(6, 0)$ (x_1, x_2)

and point $(3, 3)$ (x, y)

$y = a(x - 4)(x - 6)$

$3 = a(3 - 4)(3 - 6)$

$3 = a \cdot (-1) \cdot (-3)$

$\frac{3}{3} = \frac{a \cdot 3}{3}$

$a = 1$

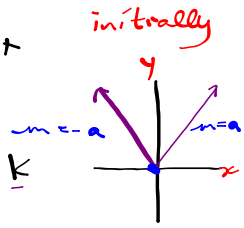
$y = (x - 4)(x - 6)$

substra

$-1 - 3$

$(-1)(-3)$ multiplic

Find the equation of an absolute value function given vertex and point



Ex Find equation of | | function
(in the form $y = a|x-h|+k$)
w V(1, 2)
h k
P(4, 5)
x y

$y = a|b(x-h)|+k$

assume $b = 1$

$y = a|x-1|+2$

$5 = a|4-1|+2$

$5 = a|3|+2$

$5 - 2 = a(3) + 2 - 2$

$\frac{3}{3} = \frac{3a}{3}$

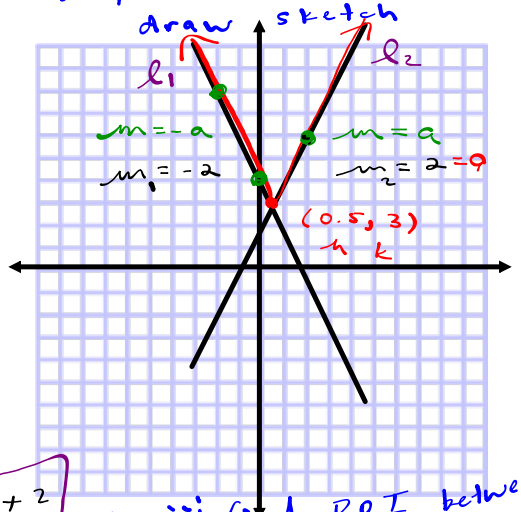
$a = 1$

$y = |x-1|+2$

Find the equation of the absolute value function given 3 points (not vertex)

ex. find equation in form $f(x) = a|x-h|+k$ w function passing through $P_1(-2, 8)$ and $P_2(0, 4)$ and $(2, 6)$

step i Plot points and sketch



step ii find $y = mx + b$ of l_1 and l_2.

for l_1:

$m_1 = \frac{y_2 - y_1}{x_2 - x_1}$

$m_1 = \frac{4-8}{0-(-2)}$

$m_1 = \frac{-4}{2}$

$m_1 = -2$

$l_1 : y = -2x + 4$

for l_2

$y = 2x + b$

$6 = 2(2) + b$

$6 = 4 + b$

$2 = b$

$l_2 : y = 2x + 2$

step iii find POI between l_1 and l_2 using comparison

1. Put right sides of equations equal to each other
2. Solve for x
3. sub x into ① or ②

① $y = -2x + 4$

② $y = 2x + 2$

$-2x + 4 = 2x + 2$ (−2x, +2x)

$-4x + 4 = 2$ (−4)

$\frac{-4x}{-4} = \frac{-2}{-4}$

$x = 0.5$

sub $x = 0.5$ into ②

$y = 2(0.5) + 2$

$y = 1 + 2$

$y = 3$

POI (0.5, 3)

h k

$a = 2$

$y = 2|x - 0.5| + 3$

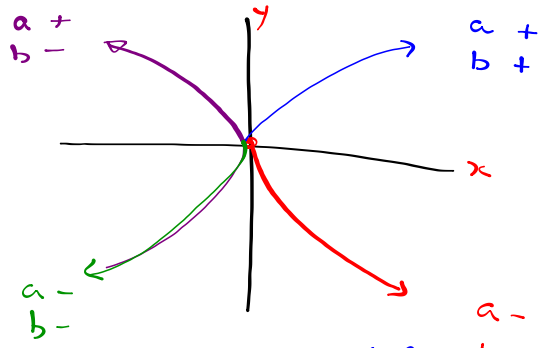
find equation in form $y = a|x-h|+k$

(0, −5) (6, −5)

(2, −2)

Determining the Equation of a Square Root Function

$y = a\sqrt{b(x-h)} + k$ ✓

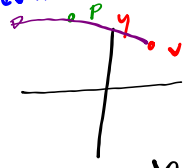


ex. find equation of $\sqrt{\ }$ function

$V(2, 4)$ (h, k)

$P(-2, 8)$ (x, y)

step i Plot points and determine if b = 1 or b = −1



$y = a\sqrt{-1(x-2)} + 4$

$y = 2\sqrt{-1(x-2)} + 4$

step ii find the value of last parameter by subbing in (x, y) temp.

$8 = a\sqrt{-1(-2-2)} + 4$

$8 = a\sqrt{4} + 4$

$8 - 4 = 2 \cdot a + 4 - 4$

$\frac{4}{2} = \frac{2a}{2}$

$a = 2$

BEDMAS

Find the equation of $\sqrt{\ }$ function $\bar{w}$ vertex $(-2, 3)$ and point $(-10, 1)$

Find the equation of the $\sqrt{\ }$ functron $\bar{w}$ a max value of -2, and a domain of $-\infty, 3]$ It passes through point $(-4, -4)$

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p 6.55 b)
p 6.58 b)
p 6.70 #1
p 6.71 #2
p 6.74 #4
p 6.76 #5
p 6.77 #6

Unit 7: Solving Problems Involving Functions

find (x, y)

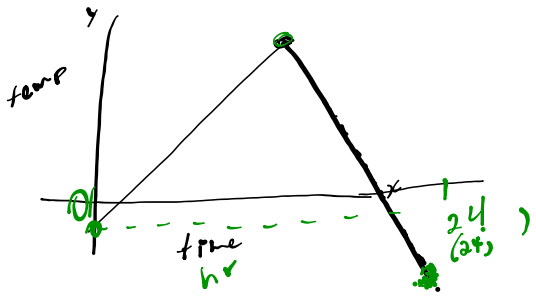
find characteristic → first construct equation

- Confidence
- Read / Sketch / Label
  - place / label x / y axis
  - Translate sentences into points
  - Construct equation (unit 6) (case scenario - optimization)

y is a function of x
is dependant on
is determined by

temperature is a function of time
y x

?



? → (x, y)

- max / min / vertex
- (x, y) w/ x or y given
- "initially" → y-int $(0, c)$
- x-ints $(x, 0)$
- POI → comparison / sub / elim

p 7.5 Situation

Q

d)

selling fridges

#1

North Shore

- 10%

- $ 200

South Shore

- 20%

If the discount price (y) is a function of the original price (x), which store offers the better deal initially?

• case scenario to construct 2 equations

$y = \$1000 - 0.10 \times \$1000 - \$200$

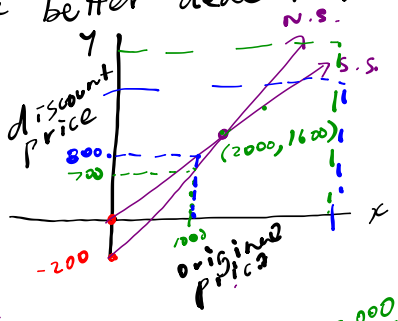
$y = 1x - 0.10x - 200$

$y = 0.90x - 200$ N.S.

$y = 1x - 0.20x$

$y = 0.8x$ S.S.

$y = mx + b$



POI

For fridges $2000 or more, go to SS for discount deal.

d) When does the south shore become the better deal? How expensive does the fridge have to originally cost?

p 7.50

- transportation $400 total (split)
- max 54 people
- $13 for each meal x

$C(x)$ cost per person is a function of the # of people attending.

a) find equation

c) - e) keeping context in mind

Domain $\{1, 2, 3, \ldots, 54\}$

$\{x \in \mathbb{N} \mid 1 \leq x \leq 54\}$

HMWK

p 7.43 #4
p 7.15 #6
p 7.22 #8 not d) not e)
p 7.31 #11

p 7.39 #15
p 7.57 #3 not e)