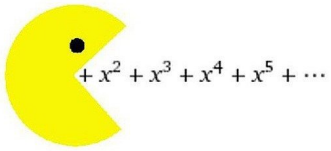
SWINBURNE
SENIOR SECONDARY COLLEGE

Maths Methods
HOLIDAY HOMEWORK
Year 12, 2019

Polynom-nom-nom-nomial



Teacher(s)/Subject Coordinator:	Paul.harris@sssc.vic.edu.au
Work required in preparation for start of 2019:	Please complete the following questions from Chapter 1 of the Essential Maths Text book 1A Q1, 4, 5, 7, 8 1B Q1, 2 LHS, 4, 5, 9 LHS, 11, 15 1C Q1, 2, 5, 6, 8, 10, 12, 14 Please complete the functions booklet attached to this sheet (Note: This content will be covered during transition. If you were unable to attend please use Chapter 1 of the textbook to complete fill in the blanks.)
Textbooks and other resources:	Cambridge Mathematical Methods Units 3 & 4 CAS Calculator (Ti-Nspire or Casio)
Key Links:	https://www.vcaa.vic.edu.au/Pages/vce/studies/mathematics/cas/casexams.aspx https://www.vcaa.vic.edu.au/Documents/vce/mathematics/MathematicsSD-2016.pdf
Due date:	Friday 1st of February 2019

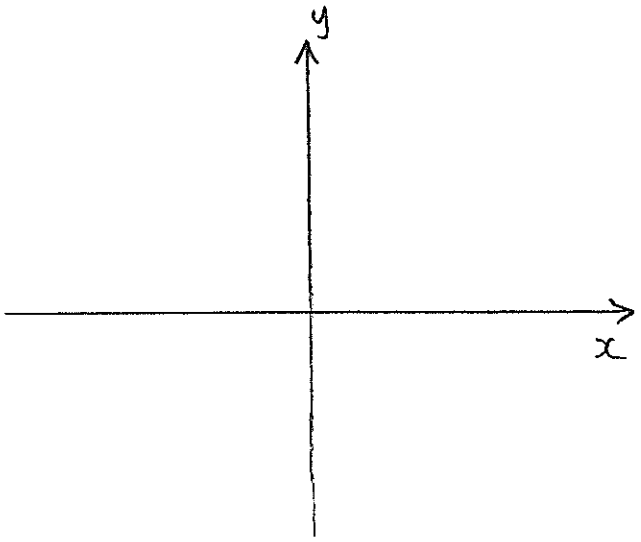
MATHEMATICAL METHODS UNITS 3 & 4

FUNCTIONS & TRANSFORMATIONS

TRANSITION WORKSHEETS

A SUMMARY OF FUNCTIONS

① LINEAR



general form:

$y =$

where $m =$

and $c =$

to find the y intercept, let $x =$

to find the x intercept, let $y =$

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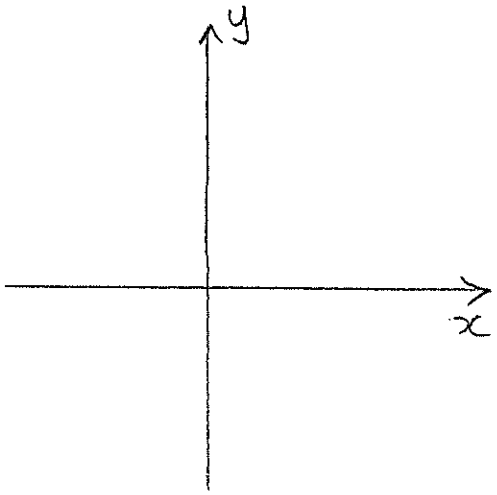
② QUADRATIC



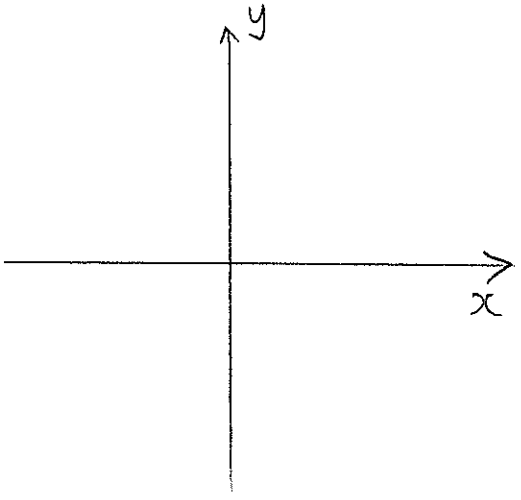
- general form : $y =$

  where $c =$

- factorised form : $y =$

  where the x intercepts are

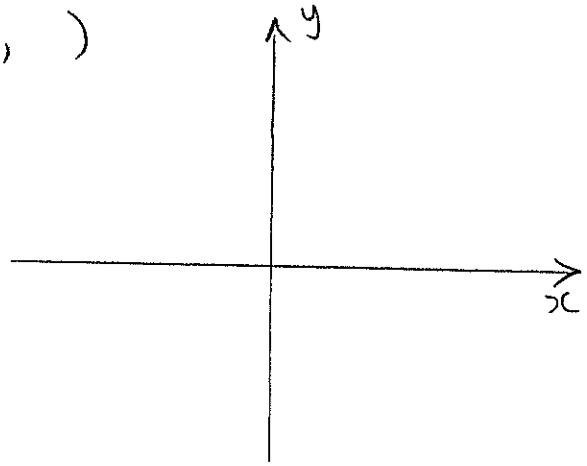
and due to symmetry the turning point will be



QUADRATIC continued

- turning point form : $y =$

where the turning point is (,)



Note : you may have to COMPLETE THE SQUARE to convert the general form into turning point form.

QUADRATIC FORMULA

given $y = ax^2 + bx + c$

we solve $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

to find the x intercepts

also helps find turning point by using $x = \dfrac{-b}{2a}$

to determine the x coordinate of the t.p.

Can also calculate $b^2 - 4ac$ to determine how many x intercepts there are

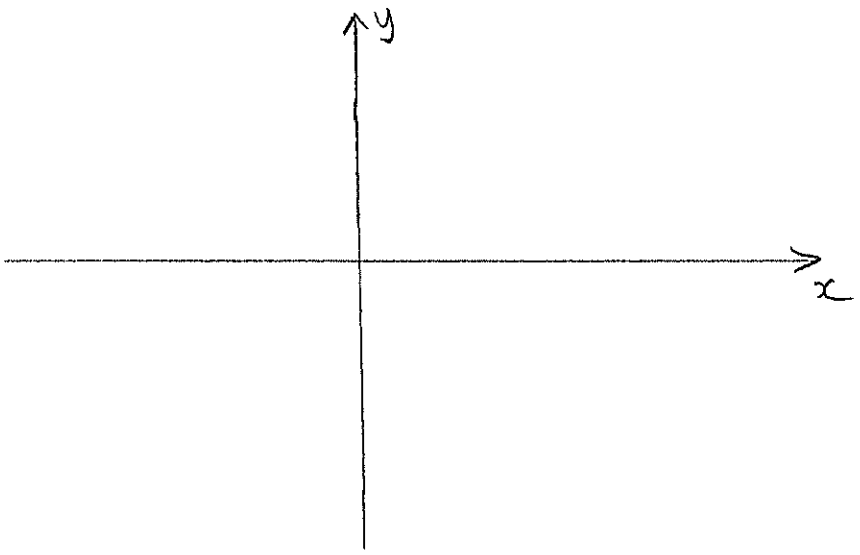
if $b^2 - 4ac > 0$ there are

if $b^2 - 4ac = 0$ there is

if $b^2 - 4ac < 0$ there are

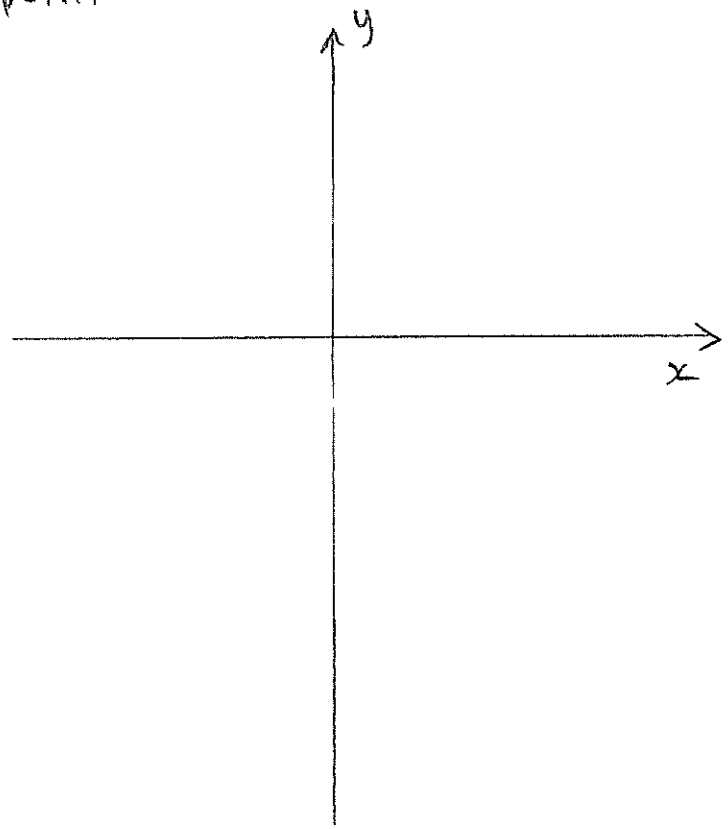
GRAPHING EXERCISES

① Sketch $y = -2x + 3$



② Sketch $y = (x-2)(x+4)$

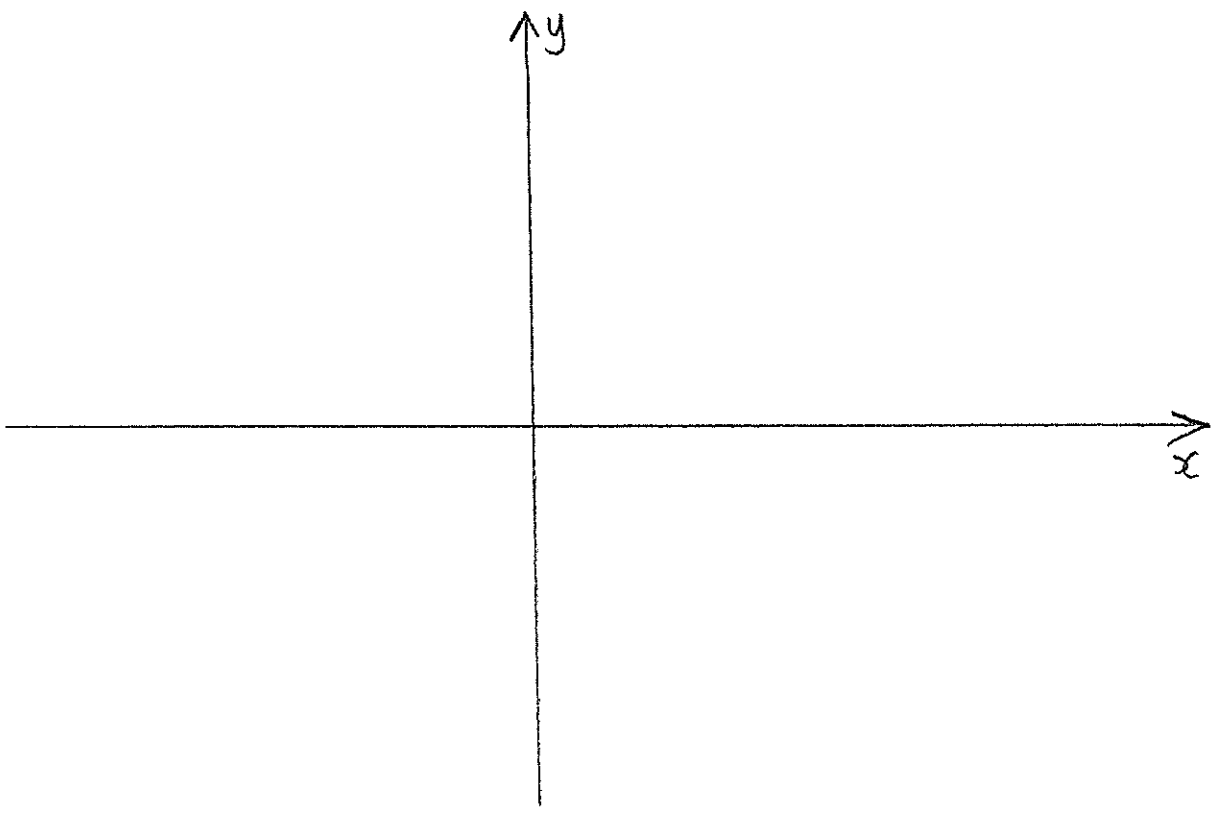
labelling all axes intercepts and the coordinates of the turning point



GRAPHING EXERCISES

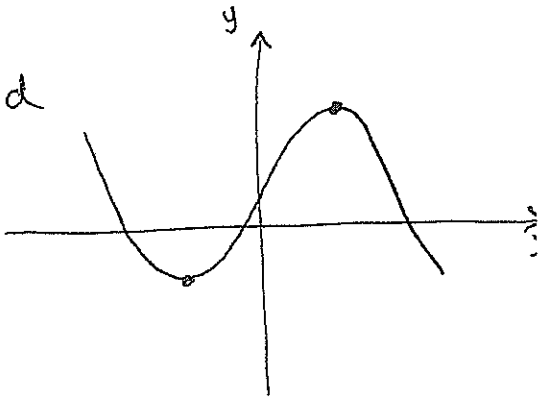
③ Sketch $y = x^2 - 2x + 3$

by first completing the square

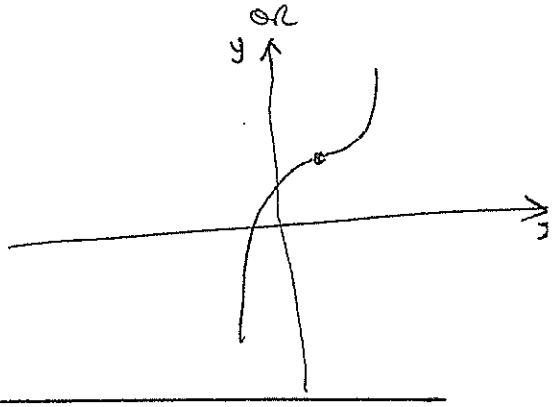


③ CUBIC

$y = ax^3 + bx^2 + cx + d$



use long division to factorise



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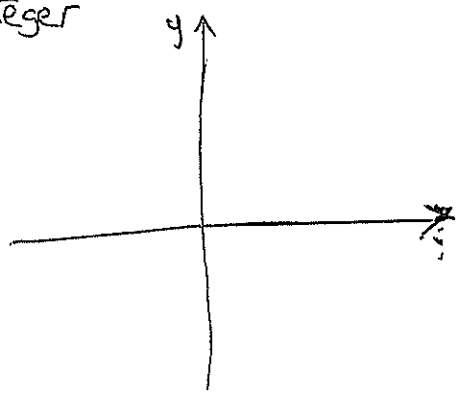
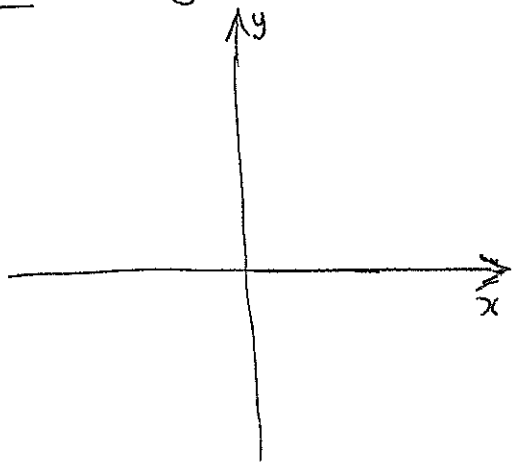
④ $f(x) = \frac{1}{x^n}$ n positive odd integer



e.g. $y = \frac{1}{x}$

(rectangular hyperbola)

⑤ $f(x) = \frac{1}{x^n}$ n positive even integer



e.g. $f(x) = \frac{1}{x^2}$

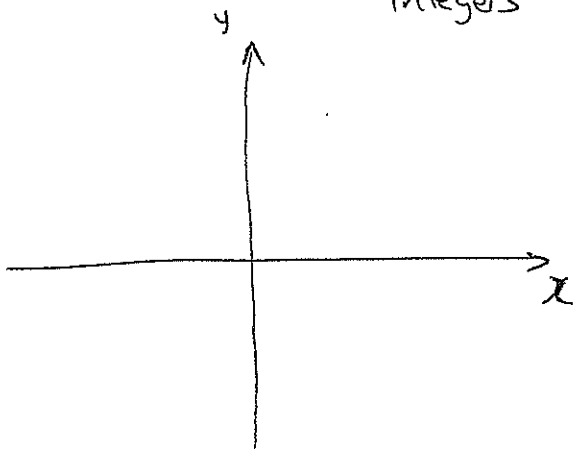
(truncus)

(6) $f(x) = x^{\frac{p}{q}}$ p and q both positive odd integers

e.g. $f(x) = x^{1/3}$

$f(x) = x^{3/7}$

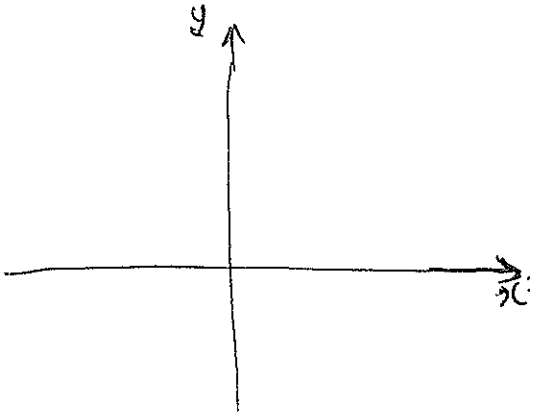
etc



(7) Exponential & Logarithmic

a) $y = a^x$, $a > 1$

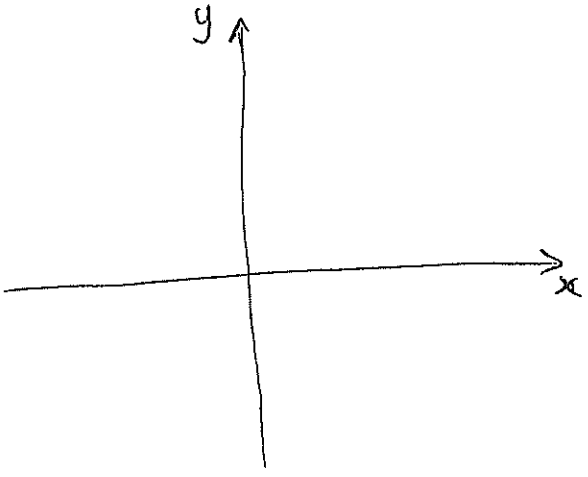
e.g. $y = 2^x$



b) $y = a^x$, $0 < a < 1$

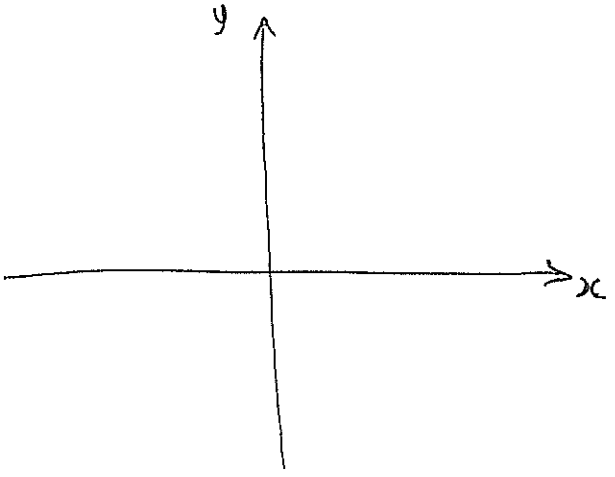
e.g. $y = \left(\frac{1}{2}\right)^x$

or $y = 2^{-x}$



c) $y = \log_a x$, $a > 1$

e.g. $y = \log_{10} x$



TRANSFORMATIONS

① $y = c\,f(x)$ is a

e.g. $y = \frac{2}{x}$ if $c > 1$

if $c < 1$

② $y = f(cx)$ is a

e.g. $y = \frac{1}{(2x)^2}$ if $c > 1$

$= \frac{1}{4x^2}$ if $c < 1$

③ $y = -f(x)$ is a

④ $y = f(-x)$ is a

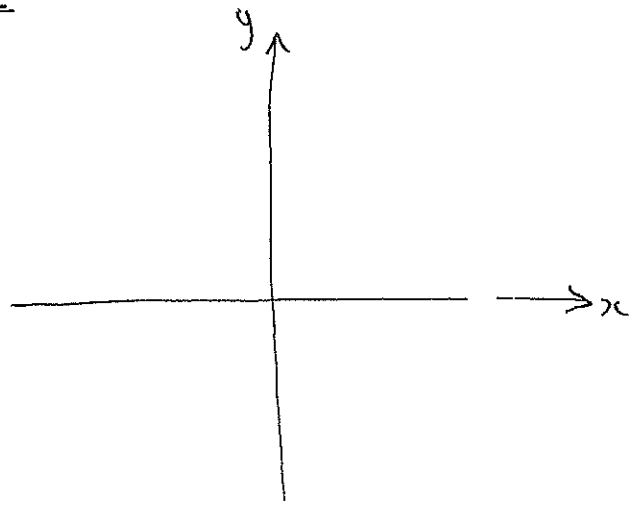
⑤ $y = f(x) + c$ is a

⑥ a) $y = f(x+c)$ is a translation

b) $y = f(x-c)$ is a translation

TRANSFORMATION EXAMPLES

① $y = \frac{1}{x}$



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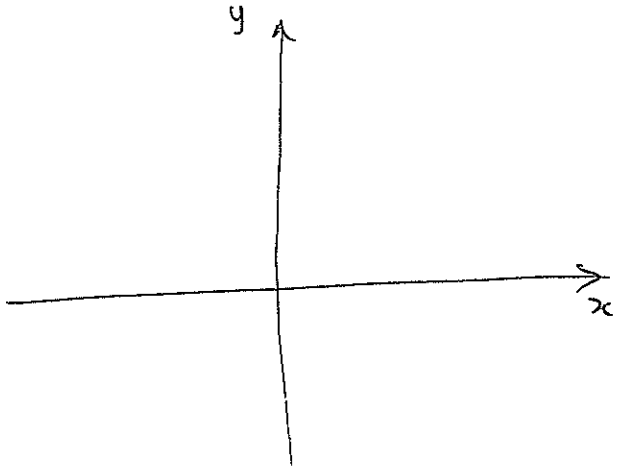
② $y = \frac{2}{x}$

is a



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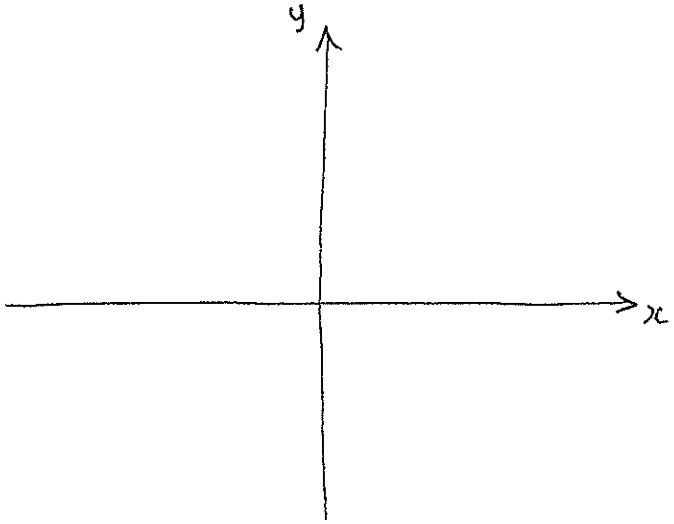
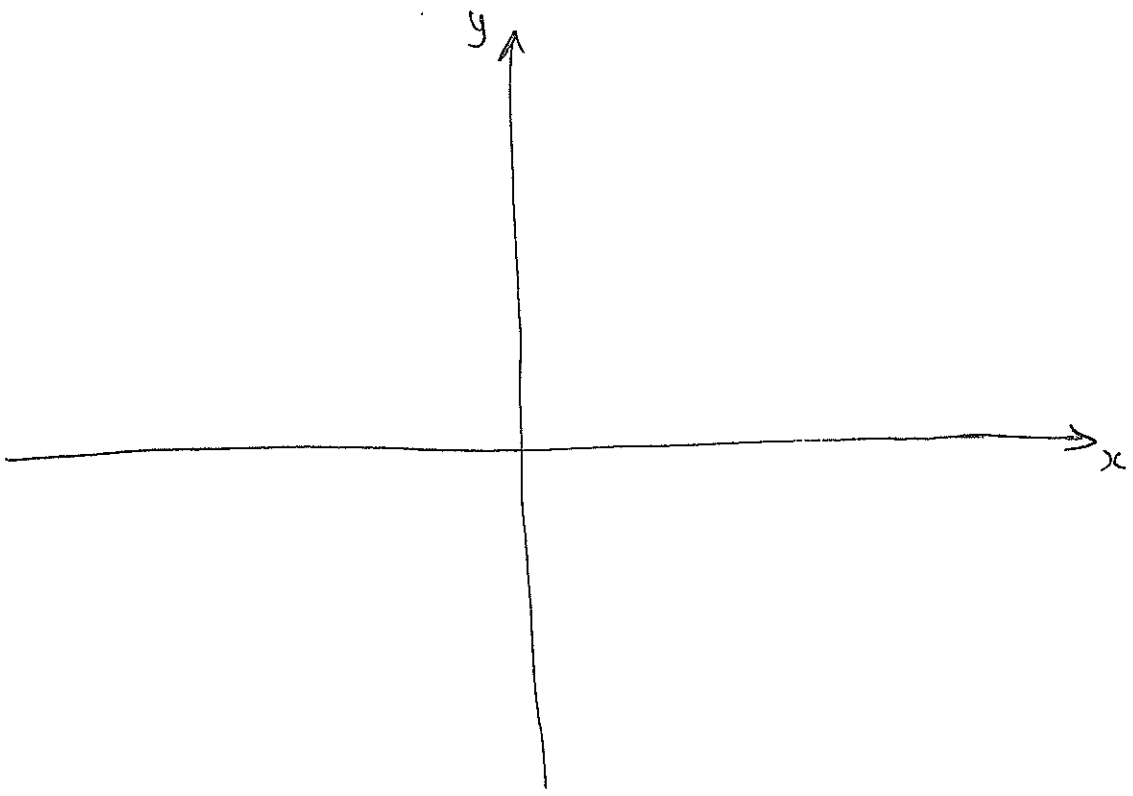
③ $y = \frac{2}{x-1}$

is a



(4) $y = \dfrac{2}{x-1} + 3$

is a:



finding x intercept

let $y =$

$0 = \dfrac{2}{x-1} + 3$

$-3 =$

$-3(x-1) =$

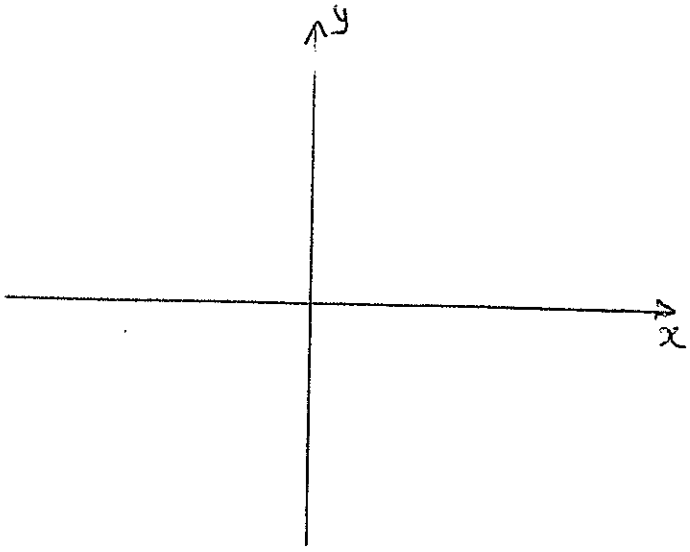
$-3x + 3 =$

$-3x =$

$x =$

TRANSFORMATIONS – QUESTIONS

① Sketch $y = \frac{3}{x-2} + 1$



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② Sketch $y = \frac{-2}{x+1}$