

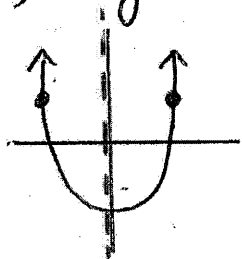
Ch. P Day 1 Notes Calculus AB

1. Finding Intercepts:

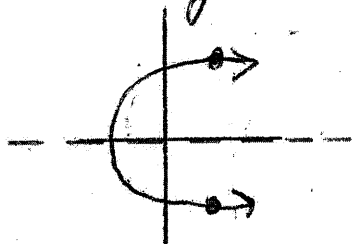
- x-intercepts: set $y=0$, solve for x (in numerator)
- y-intercepts: set $x=0$, solve for y .

2. Determining Symmetry algebraically

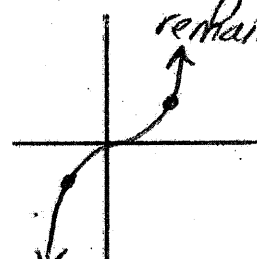
- y-axis: replace x with " $-x$ " and see if equation remains unchanged
- x-axis: replace y with " $-y$ " and see if equation remain unchanged
- origin: replace x and y with " $-x$ ", " $-y$ " and see if equation remain unchanged



y-axis symmetry



x-axis symmetry



origin symmetry

* Can graphs with x-axis symmetry be functions?

Ex. 1 Describe the symmetry of the following:

a) $y = x^2$ _____

b) $y = x^3$ _____

c) $y = x^2 - x$ _____

d) $x^2 + y^2 = 25$ _____

3. Points of Intersection

To find this, solve an equation for one variable and substitute it into the other equation.

Ex. 2 Find points of intersection for the following:
 $x^2 + y^2 = 25$ and $2x + y = 10$

Ex. 3 Find x and y -intercepts and discuss symmetry (determined algebraically)

$$x = y^2 + 1$$

* x -ints: set $y = 0$

* y -ints: set $x = 0$

Ch.P Day 2 Notes

1. Review formulas

a) slope: $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x}$

b) linear equation

* point-slope: $y - y_1 = m(x - x_1)$

* slope-intercept: $y = mx + b$

parallel lines: slopes of lines are equal ($m_1 = m_2$)

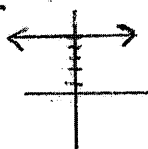
perpendicular lines: slopes of lines are opposite reciprocal of each other

vertical lines: example: $x = 3$



$(m_1 = -\frac{1}{m_2})$

horizontal lines: example: $y = 5$



2. Solving Inequalities

Steps:

- Rewrite as equation
- Find critical values by setting both numerator and denominator equal to 0.
- Make sign line using critical values
- Test values on sign line using the inequality.

Ex. 1

Solve: $\frac{x+5}{x+3} < \frac{x+1}{x-1}$

Ch. P Day 3 Notes

Domain: set of all values of x where function is defined.

* Restrictions vary depending on function type: rational, radical, trig functions.

Range: set of all values of y that have been mapped to value of x in domain of function

* Usually we'll have to look at graph to determine range or know information about parent graph and corresponding transformation.

Transformations: $y = Af(Bx+C) + D$

reflection over x -axis (points to A)
vertical stretch/compress (points to B)
shift left/right (points to C)
shift up/down (points to D)

1. Composition of functions

* Determine domain before simplifying

Ex. 1 $f(x) = 3x^2 \rightarrow$ Domain: _____

$g(x) = \sqrt{x-2} \rightarrow$ Domain: _____

Determine $f(g(x))$ and domain:

$f(g(x)) =$

Domain: _____

Ex. 2 Find $g(f(x))$ and domain:

$g(f(x)) =$

2) Test for symmetry

Even functions: $f(-x) = f(x)$ (symmetry about y-axis)

Odd functions: $f(-x) = -f(x)$ (symmetry about origin)

Ex.3 Test symmetry for

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

b) $f(x) = x - 2x^3$

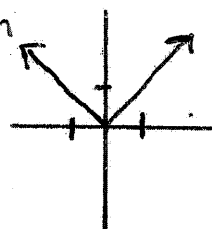
3) Piecewise Functions

Ex.4 Graph $f(x) = \begin{cases} 1-x, & x < 1 \\ \sqrt{x-1}, & x \geq 1 \end{cases}$, discuss domain and range

Absolute Value Functions

* Can be rewritten as piecewise function

$$y = |x| \rightarrow y = \begin{cases} x, & x > 0 \\ -x, & x \leq 0 \end{cases}$$



Ex.5 $y = |2x + 6|$