Calculus Lifesaver PDF

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Q&A

Questions

Contents

Chapter 1 – Functions, Graphs, Lines

1.1

What is a function?

1.2

What is the domain / co-domain?

1.3

What is R?

1.4

If function ‘g’ is similar to function ‘f’ but it operates on a smaller set of inputs (e.g. only non-negative numbers), what is this called?

1.5

How many outputs can a function create for each valid input?

1.6

What is the range of a function?

1.7

A common codomain is?

1.8

What does this mean? - $[a, b]$

1.9

What does this mean? - (a, b)

1.10

What is open vs closed interval.

1.11

What are these?

$[a, b)$ and $(a, b]$

1.12

Interval notation for all numbers greater than or equal to a?

1.13

Interval notation for all numbers greater than a (but not equal to a) ?

1.14

What roots can you get for a negative number?

1.15

You can't get the logarithm of what?

1.16

What's problematic about tan(90degrees)?

1.17

If restrict the domain of a function, is it still the same function?

1.18

If change the domain, does the name of the function change?

1.19

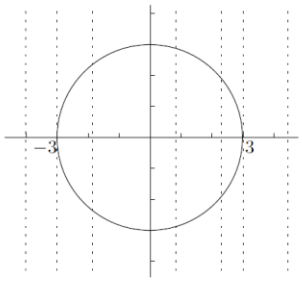
What does this mean? $(-8, 13] \setminus \{2\}$

1.20

How to check if a graph represents a function?

1.21

Does this represent a function?



1.22

If the equation for a circle is $x^2 + y^2 = 9$, how to convert this into a function?

1.23

How to know if an inverse function exists.

1.24

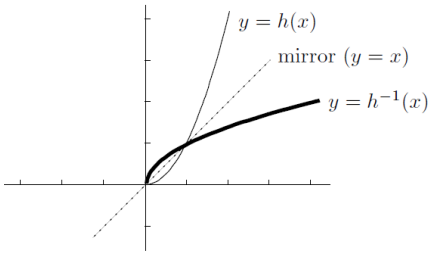
How to use a graph to check if an inverse function exists

1.25

What does the inverse function look like on a graph?

1.26

What does this graph show?



1.27

What's the connection between the vertical and horizontal line tests?

1.28

What does this mean?

$$h \circ g$$

1.29

Is composition of functions the same as multiplication?

1.30

What does this mean? $$f = m \circ k \circ n \circ g.$$

1.31

Is f(x) the composition of 2 functions?

$$f(x) = x^2 \sin(x)$$

1.32

How to sketch the function $f(x) = (x-1)^2$

1.33

What is an “even” function?

1.34

What is an “odd” function?

1.35

Are most functions odd or even?

1.36

What is the only function that is both odd and even.

1.37

Why is knowing a function is ‘odd’ or ‘even’ interesting for plotting the graph

1.38

What is the product of 2 odd functions? Or the product of 2 even functions? Or the product of 1 even and 1 odd function?

1.39

What’s the form of a linear function.

1.40

How many points do you need to know, to sketch the graph of a linear function.

1.41

What’s the “point-slope form of a linear function”

1.42

If a line goes through (x1,y1) and (x2,y2), what is the slope?

1.43

What is a polynomial

1.44

What is the degree of a polynomial?

1.45

Are these odd or even? What does the plots look like?

Y=1 … y=x … $y=x^2$ … $y=x^3$ … $y=x^4$ … $y=x^5$ … $y=x^6$ … $y=x^7$

1.46

What is the leading coefficient?

1.47

How does the leading coefficient and the degree of the polynomial impact the edges of the graph i.e. the direction of the extreme values.

1.48

What's a quadratic equation?

1.49

What is the discriminant and how is it written?

1.50

What are the 3 possibilities for the discriminant?

1.51

How to calculate the root of the discriminant?

1.52

What is a monic quadratic?

1.53

What is "completing the square" of a quadratic? And do it for the following quadratic:

$$2x^2 - 3x + 10$$

1.54

What is a rational function?

1.55

What are the simplest examples of rational functions?

1.56

For functions of the following form $1/x^n$

Where ‘n’ is 1, 2, 3, 4. What do the graphs look like?

1.57

What does the graph of an exponential look like?

1.58

What does the graph of this look like:

$y = b^x \text{ for any other base } b > 1$

1.59

What does the graph of this look like: $y = 2^{-x}$

1.60

What is the graph when the base is less than 1, e.g. $y = (\frac{1}{2})^x$.

1.62

What is the inverse function of $y = 2^x$

1.63

What does the graph of $y = \log_2(x)$. look like?

1.64

How to write the absolute value ?

1.65

What is $|x - y|$

1.66

Based on the foregoing, what is the region: $|x - 1| \leq 3$

1.67

How to get the graph of the absolute value of a function?

1.68

Draw the graph of $y = |x|$

1.69

Draw the graph of $y = |\log_2(x)|$

Chapter 2 – Review of Trigonometry

2.1

The 2 ways to measure angles?

2.2

For a right-angled triangle, what are the formulae for sin / cos / tan?

2.3

What are the reciprocal functions of sin / cos / tan ?

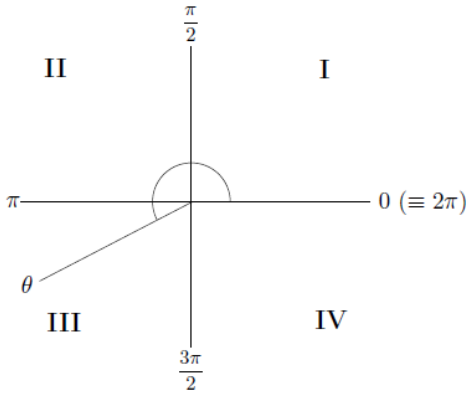
2.4

What are the sin / cos / tan values for:

0 … pi/6 … pi/4 … pi/3 … pi/2

2.5

What's the term for the line representing the angle in the graph here.

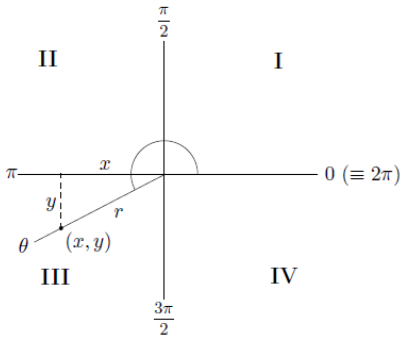


2.6

How to work out the angle based on the ray.

2.7

Define sin / cos / tan for this angle here:



2.8

How do we determine the sign of sin/ cos / tan in the 4 quandrants?

2.9

What's the reference angle?

2.10

How to get sin(-5*pi / 6) i.e. negative value.

2.11

Plot y=sin(x) for 0 to 2*pi

2.12

What is the period for cos(x) ?

2.13

Is cos(x) an even or odd function of x? what about sin(x)

2.14

What is the period of tan(x)

2.15

Draw the graph of tan(x)

2.16

Draw the three graphs of y=sec(x) ; y=csc(x) ; y = cot(x)

2.17

Which are even functions of x. And which are odd functions of x?

i.e. from cos … sin … tan … sec … csc … cot

Write out the implications for sin(-x) … tan(-x) … cos(-x) …

2.18

Express tan and cot in terms of sin and cos.

2.19

Pythagoras theorem (written in terms of cos and sin)

2.20

Express tan in terms of sec.

2.21

Express cot in terms of csc

2.22

What is “co” short for i.e. why do some trig functions start with “co”

2.23

Show the “co” functions of sin … cos … tan …

2.24

What are the “sum of angles formulae” for cos and sin?

2.25

The “difference of angles formulae” for cos and sin?

2.26

Hence what is sin(2x) … and cos(2x)

2.27

How to write sin(4x) in terms of sin(x) and cos(x)

[DON’T MEMORISE JUST KNOW HOW TO WORK OUT]

2.28

How to write cos(4x) in terms of cos(x)

[DON’T MEMORISE JUST KNOW HOW TO WORK OUT]

Chapter 10 – Inverse Functions and Inverse Trig Functions

Chapter 11 – The Derivative and Graphs

Chapter 12 – Sketching Graphs

Chapter 13 – Optimisation and Linearisation

Chapter 14 – L'Hopital's Rule and Overview of Limits