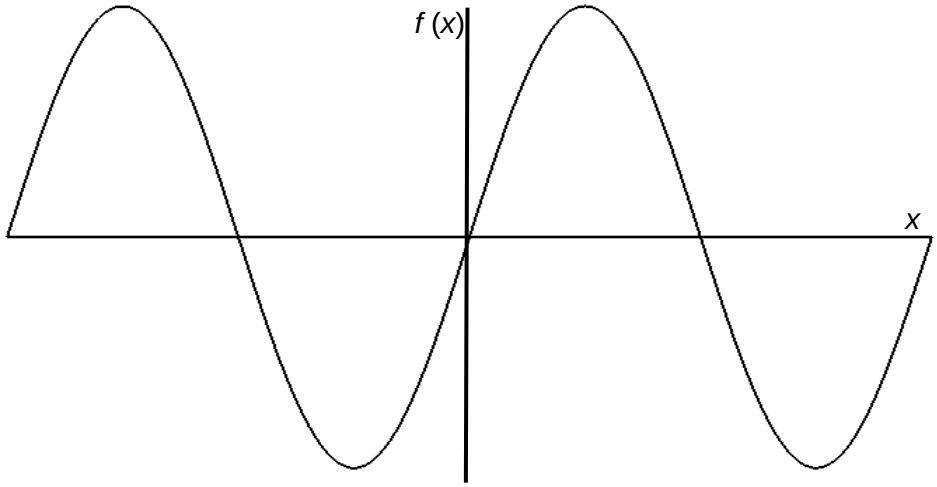
Learning Enhancement Team

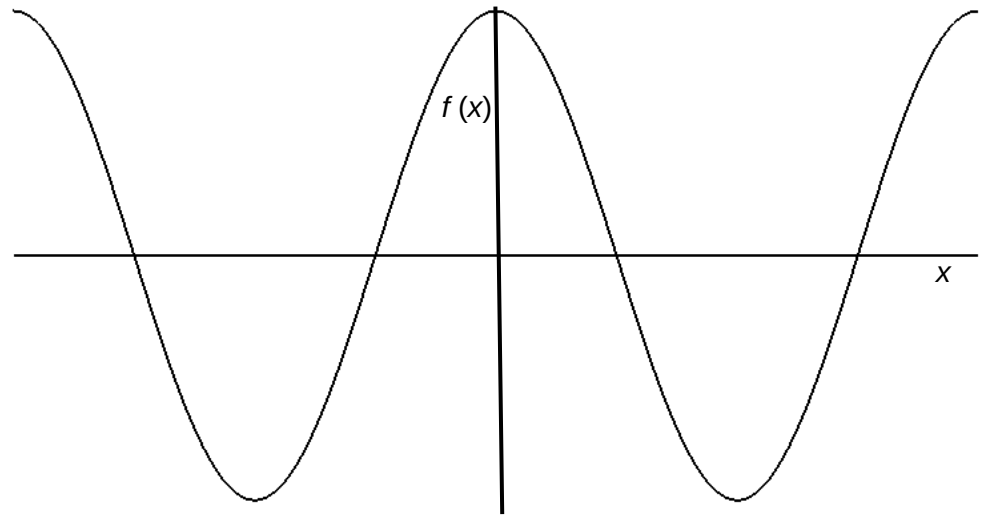
University of East Anglia
STUDENT SUPPORT SERVICE

Factsheet: Five Basic Functions

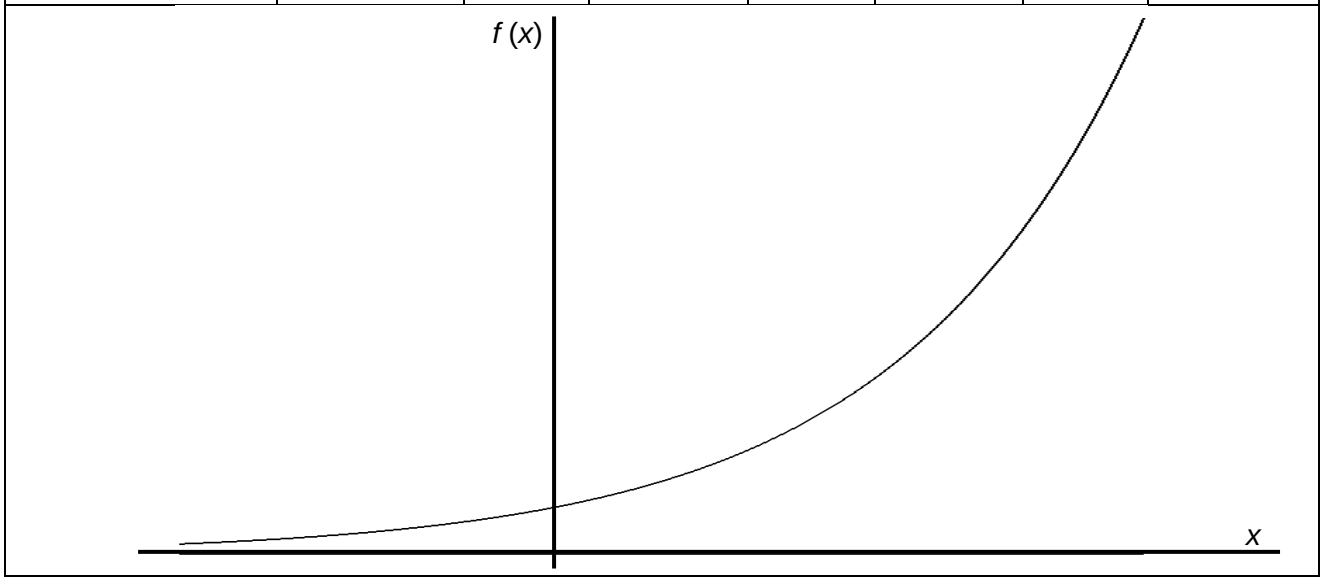
Sine	Periodic function of an angle x					
Written	Inverse	Derivative	Integral	Domain	Range	Comments
$\sin x$	$\sin^{-1} x$	$\cos x$	$-\cos x + c$	Real Numbers	$-1 \le \sin(x) \le 1$	Odd function $\sin(-x) = -\sin(x)$ Period is 2π $\sin(x + \pi/2) = \cos(x)$ $\sin(0) = 0$ $\sin(\pi/2) = 1$ $\sin(\pi) = 0$ $\sin(3\pi/2) = -1$ $\sin(2\pi) = 0$ $\sin(n\pi) = 0$



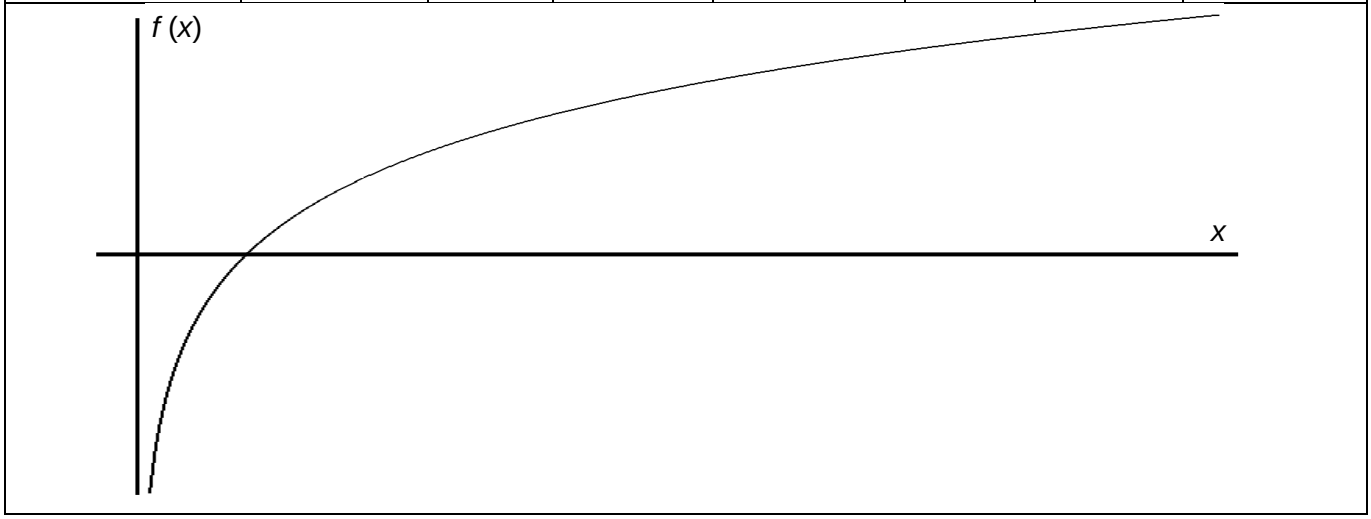
Cosine	Periodic function of an angle x					
Written	Inverse	Derivative	Integral	Domain	Range	Comments
$\cos x$	$\cos^{-1} x$	$-\sin x$	$\sin x + c$	Real Numbers	$-1 \le \cos(x) \le 1$	Even function $\cos(-x) = \cos(x)$ Period is 2π $\cos(x - \pi/2) = \sin(x)$ $\cos(0) = 1$ $\cos(\pi/2) = 0$ $\cos(\pi) = -1$ $\cos(3\pi/2) = 0$ $\cos(2\pi) = 1$ $\cos(\pi/2 + n\pi) = 0$



Exponential	The exponential function of x						
Written	Pronounced	Inverse	Derivative	Integral	Domain	Range	Comments
e^x or $\exp(x)$	"e to the x"	$\ln x$	e^x	$e^x + c$	Real Numbers	$e^x > 0$	$e^0 = 1$ $e^1 = e$

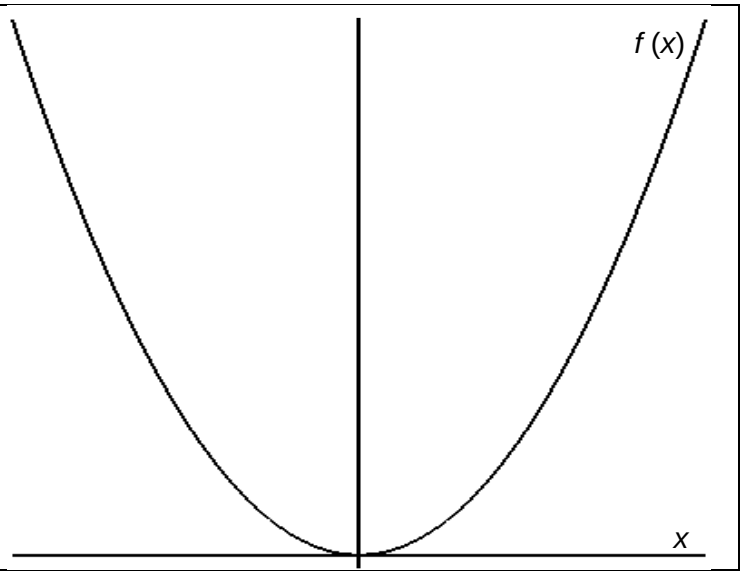


Logarithm	The natural logarithm of x						
Written	Pronounced	Inverse	Derivative	Integral	Domain	Range	Comments
$\ln x$	"el en of x" or "lun x"	e^x	$\frac{1}{x}$	$x \ln x - x + c$	$x > 0$	Real Numbers	$\ln 1 = 0$ $\ln e = 1$ $\ln x \equiv \log_e x$

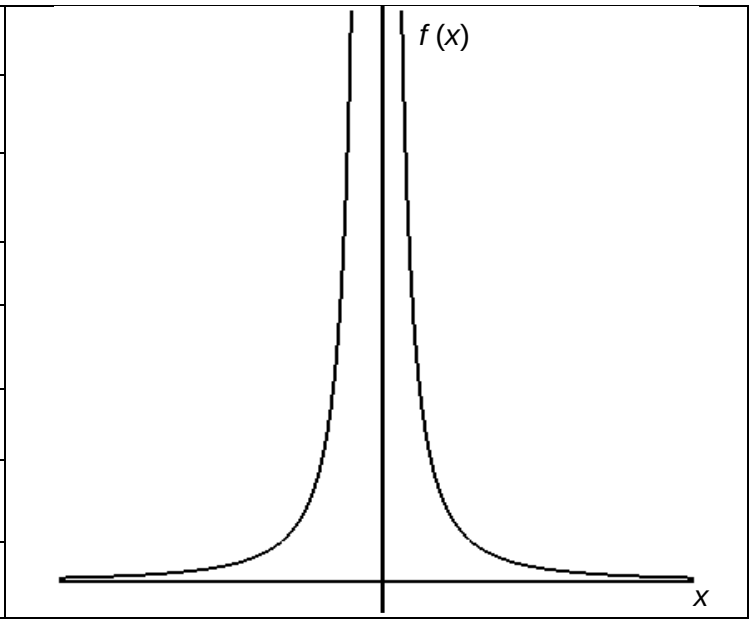


Power functions x^n

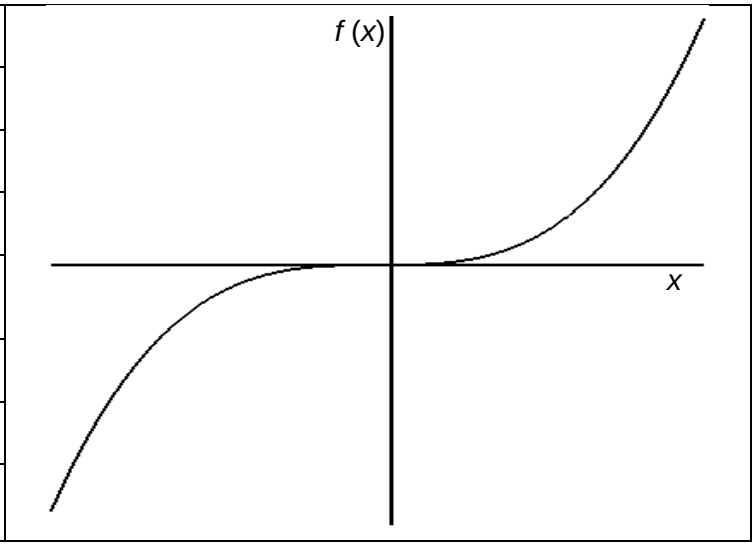
$n = 2$	Quadratic function
Written	x^2
Inverse	$\sqrt{x}$
Derivative	$2x$
Integral	$\frac{x^3}{3} + c$
Domain	Real Numbers
Range	$x^2 \geq 0$
Comments	Turning point at $(0,0)$



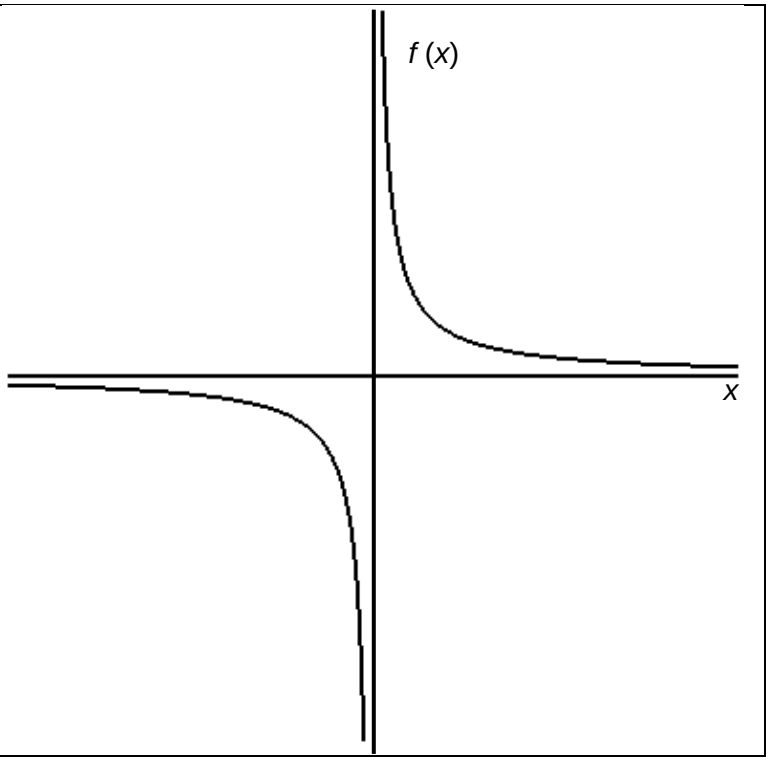
$n = -2$	Inverse square function
Written	$\frac{1}{x^2}$
Inverse	$\frac{1}{\sqrt{x}}$
Derivative	$-2x^{-3}$
Integral	$-\frac{1}{x} + c$
Domain	Real Numbers, $x \neq 0$
Range	$\frac{1}{x^2} > 0$
Comments	Asymptotes at $x = 0$ and $y = 0$



$n = 3$	Cubic function
Written	x^3
Inverse	$\sqrt[3]{x}$
Derivative	$3x^2$
Integral	$\frac{x^4}{4} + c$
Domain	Real Numbers
Range	Real Numbers
Comments	Point of Inflection at $(0,0)$



$n = -1$	Reciprocal Function
Written	$\frac{1}{x}$
Inverse	$\frac{1}{x}$
Derivative	$-x^{-2}$
Integral	$\ln x + c$
Domain	Real Numbers, $x \neq 0$
Range	Real Numbers, $x \neq 0$
Comments	Asymptotes at $x = 0$ and $y = 0$ Self-inverse



Want to know more?

If you have any further questions about this topic you can make an appointment to see a **Learning Enhancement Tutor** in the **Student Support Service**, as well as speaking to your lecturer or adviser.

Call: 01603 592761
Ask: ask.let@uea.ac.uk
Click: https://portal.uea.ac.uk/student-support-service/learning-enhancement

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For this topic, there is a webcast.

Your comments or suggestions about our resources are very welcome.

	Scan the QR-code with a smartphone app for a webcast of this factsheet.	