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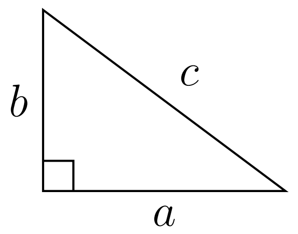
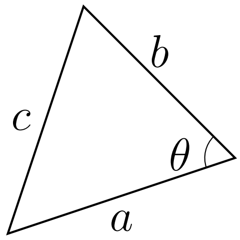
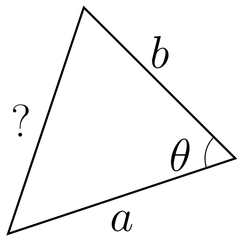
$a + ar + ar^2 + \cdots + ar^{n-1}$	Pythagoras $a^2 + b^2 = c^2$
$a + ar + ar^2 + ar^3 + \dots$	$\cos x$
$a + (a + d) + (a + 2d) + \cdots + (a + (n-1)\,d)$	$\sin x$
$\cos^2(x)$	$-\sin x$
$\sin^2 x$	$\cos x$

	Geometric series $\dfrac{a\,(1-r^n)}{1-r}$ if $r \neq 1.$
$\sin(90^\circ - x)$	Sum to infinity of a geometric sequence, equals $\dfrac{a}{1-r}$ if $\lvert r\rvert < 1,$ diverges otherwise.
$\cos(90^\circ - x)$	Arithmetic series $\dfrac{n}{2}\,(2a + (n-1)d)$
$\sin(-x)$	$1 - \sin^2 x$
$\cos(-x)$	$1 - \cos^2 x$

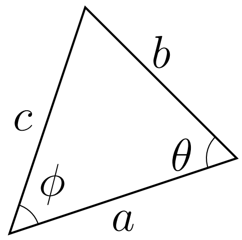
Area?



Circle with centre (a, b) and radius r



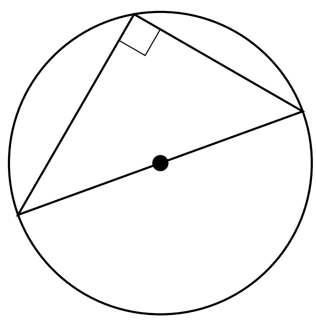
$$m_1 m_2 = -1$$



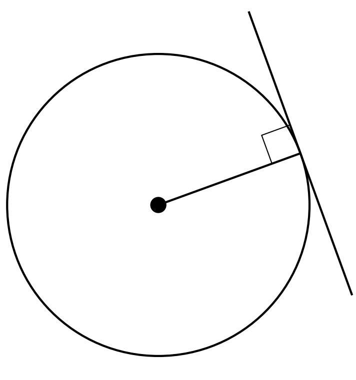
Same gradient

$$m_1 = m_2$$

The line through (x_1, y_1) with gradient m



The distance between (x_1, y_1) and (x_2, y_2)



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$$(x-a)^2+(y-b)^2 = r^2$$

$$\frac{1}{2}ab\sin\theta$$

The lines

$$y = m_1 x + c_1$$

and

$$y = m_2 x + c_2$$

are perpendicular

Cosine rule

$$c^2 = a^2 + b^2 - 2ab\cos\theta$$

and we want c

The lines

$$y = m_1 x + c_1$$

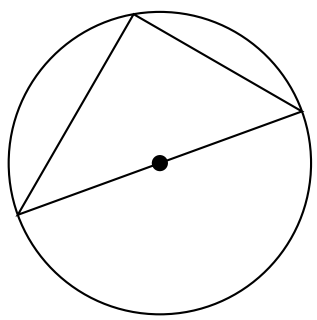
and

$$y = m_2 x + c_2$$

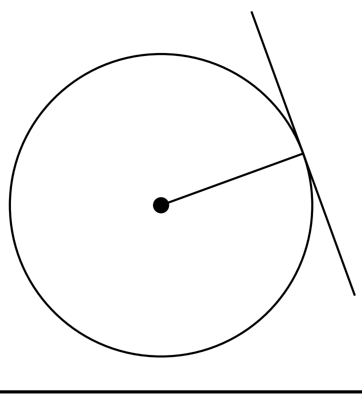
are parallel

Sine rule

$$\frac{\sin\theta}{c} = \frac{\sin\phi}{b}$$



$$y = m(x - x_1) + y_1$$



$$\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$$

Graph of $y = f(x+a)$	$b = a^c$
Graph of $y = f(ax)$	ax^{a-1}
Graph of $y = f(ax+b)$	Split the domain into equal-width sections. Represent the area with trapeziums. Add their areas.
$(a^m)^n$	The line with gradient $f'(a)$ and value $f(a)$ at $x = a$; $y = f'(a)(x-a) + f(a)$
$(a^m)(a^n)$	The line with gradient $\frac{-1}{f'(a)}$ and value $f(a)$ at $x = a$; $y = -\frac{(x-a)}{f'(a)} + f(a)$

$\log_a b = c$	Translation by a units in the negative direction parallel to the x-axis
$y = x^a$ $\dfrac{\mathrm{d}y}{\mathrm{d}x} = \ ?$	Stretch by a factor of $\frac{1}{a}$ parallel to the x-axis
Trapezium Rule	Translation by b units in the negative direction parallel to the x-axis and then a stretch by a factor of $\frac{1}{a}$ parallel to the x-axis
Tangent to $y = f(x)$ at $x = a$	a^{mn}
Normal to $y = f(x)$ at $x = a$	a^{m+n}

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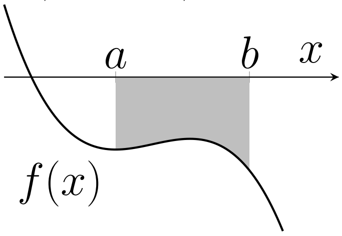
Area between $y = f(x)$, the x-axis, $x = a$, and $x = b$? 	The second difference $(x_{n+1} - x_n) - (x_n - x_{n-1})$ is constant
$\int f'(x)\,\mathrm{d}x$	If and only if $b^2 - 4ac > 0$
$(x+y)^n$	Factor Theorem $p(x) = (x-a)q(x)$ for some polynomial $q(x)$
$\|x\|$	$p(x) = (x-a)^2 q(x)$ for some polynomial $q(x)$
Prime number, p	Remainder Theorem $p(x) = (x-a)q(x) + r$ for some polynomial $q(x)$

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x_n is a quadratic sequence	$-\int_a^b f(x)\,\mathrm{d}x$
When does $ax^2+bx+c=0$ have exactly two real solutions?	$f(x)+c$ for some constant c
The polynomial $p(x)$ has a root at $x = a$	$x^n + \binom{n}{1}x^{n-1}y + \binom{n}{2}x^{n-2}y^2 + \dots$ $\dots + \binom{n}{n-2}x^2y^{n-2} + \binom{n}{n-1}xy^{n-1} + y^n$
The polynomial $p(x)$ has a repeated root at $x = a$	If $x \geq 0$, then $\lvert x\rvert = x$. If $x < 0$, then $\lvert x\rvert = -x$.
The polynomial $p(x)$ has value r when $x = a$	The only factors of p are 1 and p.

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$\log_a (x^n)$

Complete the square

$$a\left(x+\frac{b}{2a}\right)^2+c-\frac{b^2}{4a}$$

$\log_a(xy)$

Difference of two squares

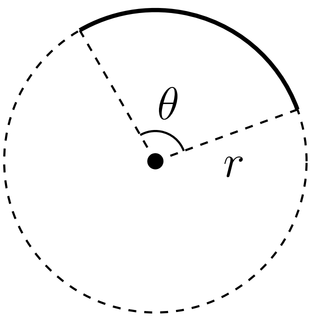
$$(a-b)(a+b)$$

$\log_a \frac{1}{f(x)}$

$$(f(x))^2 \geq 0$$

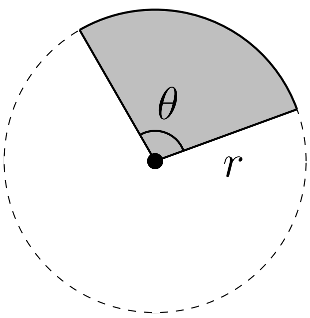
for all x.

Length?



First solve $f'(x) = 0$

Area?



Look for turning points and check $f''(x)$, or try to complete the square. Also, check the ends of the range.

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Another way to write $ax^2 + bx + c$	$n \log_a x$
$a^2 - b^2$	$\log_a x + \log_a y$
Inequality for $(f(x))^2$	$-\log_a f(x)$
Turning point of $f(x)$	$r\theta$ (using radians)
Maximum of a function	$\frac{1}{2}r^2\theta$ (using radians)

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$x^2 + y^2 + cx + dy + e = 0$	$-\cos\theta$
Solve $f(x) = g(x)$.	$\sin\theta$
$\cos(\theta + 360°)$	$\dfrac{1}{\tan\theta}$
$\sin(\theta + 360°)$	$\dfrac{n!}{r!(n-r)!}$ where $n! = n \times \cdots \times 2 \times 1$
$\tan(\theta + 180°)$	$\mathbf{a} = k\mathbf{b}$ for some real number k

$\cos(180^\circ - \theta)$	The equation of a circle... $\left(x+\frac{c}{2}\right)^2+\left(y+\frac{d}{2}\right)^2=\frac{c^2}{4}+\frac{d^2}{4}-e$ ... provided $\frac{c^2}{4}+\frac{d^2}{4}-e>0$
$\sin(180^\circ - \theta)$	Consider sketching $y = f(x)$ and $y = g(x)$.
$\tan(90^\circ - \theta)$	$\cos\theta$
$\binom{n}{r}$	$\sin\theta$
Non-zero vectors $\mathbf{a}$ and $\mathbf{b}$ are parallel	$\tan\theta$

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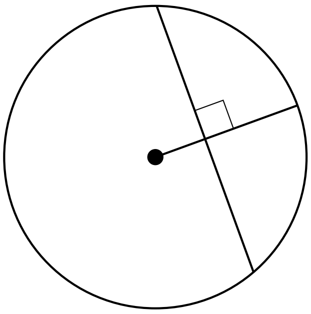
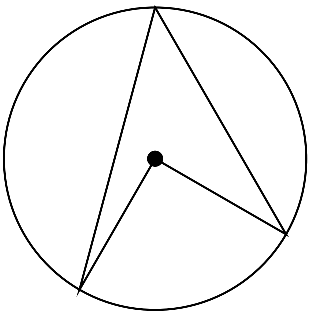


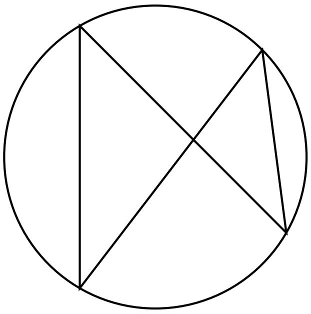
If you can differentiate it, check that

$$f'(x) > 0$$

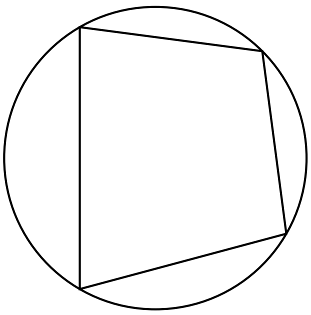


If you can differentiate it, check that

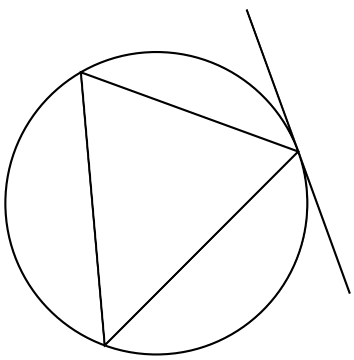
$$f'(x) < 0$$



Translation by a units in the positive direction parallel to the y-axis



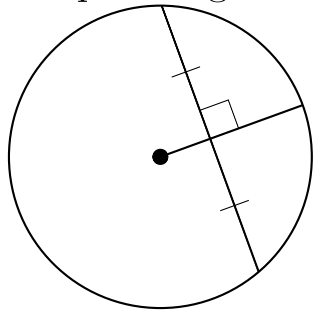
Stretch by a factor of a parallel to the y-axis



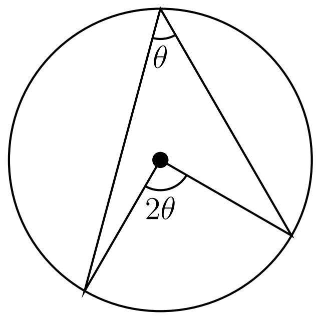
$$\int_a^b f(x)\,\mathrm{d}x$$

$f(x)$ is a strictly increasing function

Equal lengths



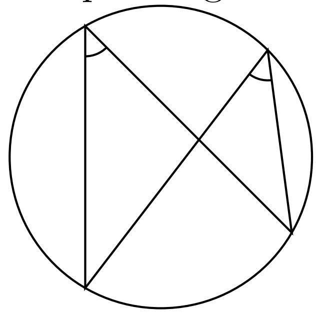
$f(x)$ is a strictly decreasing function



Graph of

$y = f(x) + a$

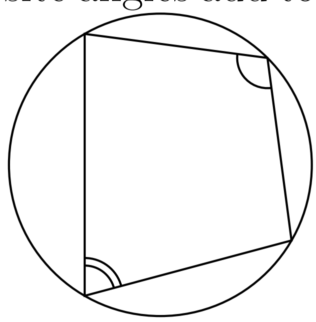
Equal angles



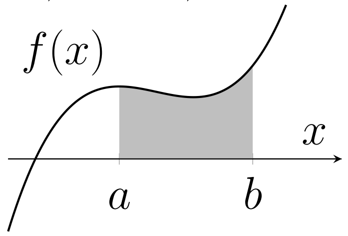
Graph of

$y = af(x)$

Opposite angles add to 180°.



Area between $y = f(x)$, the x-axis, $x = a$, and $x = b$?



Equal angles.