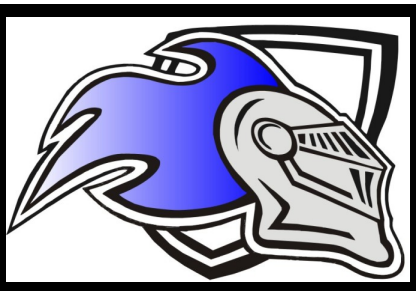

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Jan 27-10:05 AM

§1.3 Properties of Parent Functions

To simplify our study of functions, we classify functions as being members of a family. Within the family are functions that share common characteristics. At the head of the family is the most basic (unaltered) form of that function, known as the parent function.

In grade 9 you studied one particular parent function known as $f(x) = x$ (the linear parent function). You then extended that study to its family members when you included $f(x) = mx + b$.

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In grade 10 you ventured into a new family by studying various forms of the parent function $f(x) = x^2$ (the parent function of all quadratic functions). You then studied the family using $f(x) = ax^2+bx+c$ or $f(x) = a(x-h)^2 + k$.

In this course, you will be introduced to all the parents and some will be studied in depth. In grade 12, you will analyze them all in depth.

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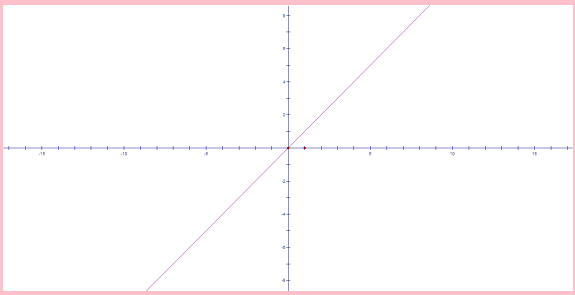
REVIEW: $f(x) = x$ is a linear function. The linear function produces a straight line from quadrant III to quadrant I. It passes through the origin. It has a slope of 1. The domain is $\{x \in R\}$ while the range is $\{f(x) \in R\}$.



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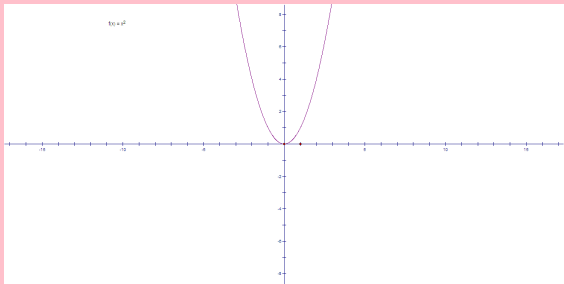
REVIEW: $f(x) = x^2$ is a quadratic function. The quadratic function produces a parabola opening upwards, from quadrant II to quadrant I. It passes through the origin. It has a minimum value at the origin. The domain is $\{x \in R\}$ while the range is $\{f(x) \in R | f(x) \geq 0\}$.



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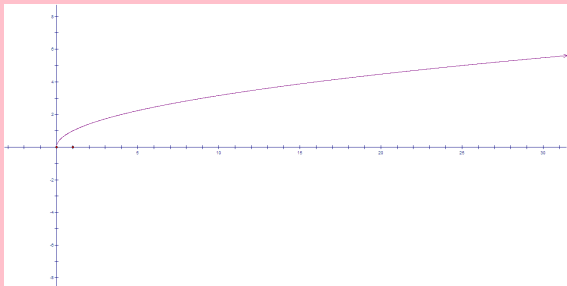
$f(x) = \sqrt{x}$ is a square root function. The square root function produces a half parabola opening sideways uniquely in quadrant I. It starts at the origin. The domain is $\{x \in R | x \geq 0\}$ while the range is $\{f(x) \in R | f(x) \geq 0\}$.



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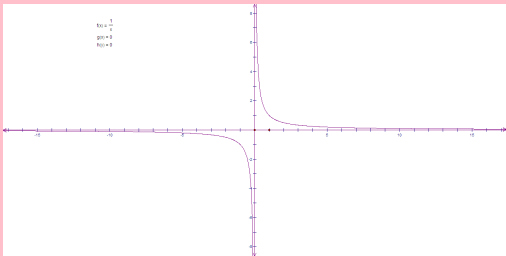
$f(x) = 1/x$ or $f(x) = x^{-1}$ is a reciprocal function. The reciprocal function produces two curves; one below the x-axis and one above. Two asymptotes exist because $x \neq 0$ and $y \neq 0$. A dashed line should be included at $x=0$ and $y=0$. The negative curve exists in quadrant III while the positive curve is in quadrant I. The domain is $\{x \in R | x \neq 0\}$ while the range is $\{f(x) \in R | f(x) \neq 0\}$.



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An asymptote is a line that the graph of a relation or a function gets closer and closer to, but never meets.

Imagine a store selling a dress for 100$. But wait, there is a 20% off sale because it is Tuesday! But wait, there is another 20% off because it is February! But wait, there is another 20% because you are older that 5 years old! But wait,there is addition 20% off if you purchase the dress during store hours! Alas, this could go on and on and on. Would you ever get the dress for free! Technically NEVER! Hence, if this were to continue, we would see an asymptote at $y = 0$.

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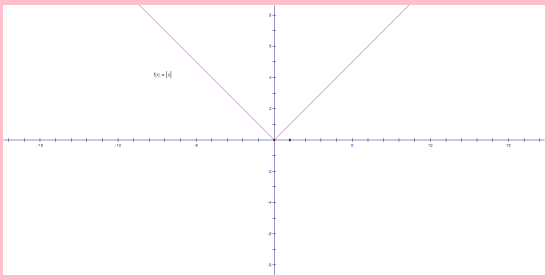
$f(x) = |x|$ is the absolute value function. The absolute value function produces two lines; both above the x-axis. It in essence forbids negative output values. One linear line exists in quadrant II and meets the other at the origin which exists in quadrant I. The domain is $\{x \in R\}$ while the range is $\{f(x) \in R | f(x) \geq 0\}$.



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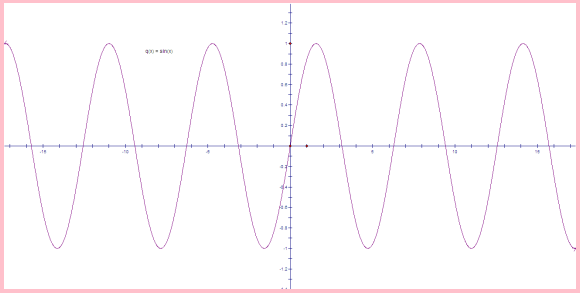
LATER $f(x) = \sin x$ is the sinusoidal trigonometric function.



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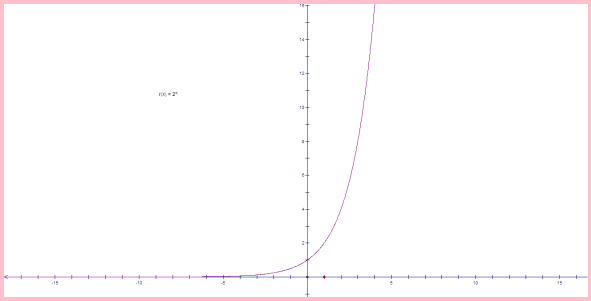
LATER $f(x) = 2^x$ is the exponential function.



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HOMEWORK: §1.3#A-M (record complete answers for J-M)

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