2.2 Power Functions with Modeling

Power Function

$f(x) = k \cdot x^a$, k & a are nonzero constants

$k \rightarrow$ constant of variation / const. of proportion

$a \rightarrow$ the power

"$f(x)$ varies as the a^{th} power of x"

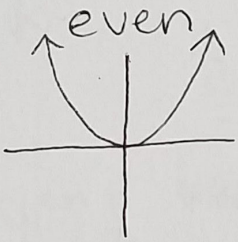
"$f(x)$ is proportional to the a^{th} power of x"

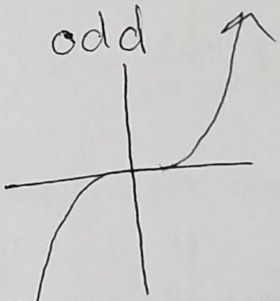
direct variation: positive a

inverse variation: negative a

Graphs (If $k < 0$, reflect all of these over the x-axis)

$a > 1$





turn decimals/fractions into radical form

e.g. $y = x^{1.5} = x^{3/2} = (\sqrt{x})^3$ → even root

D: $[0, \infty)$

$\sqrt[2]{x}, \sqrt[4]{x}, \sqrt[6]{x}$

odd root

$\sqrt[3]{x}, \sqrt[5]{x}, \sqrt[7]{x}$

D: $(-\infty, \infty)$

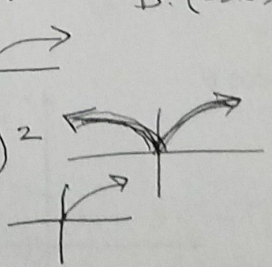
$0 < a < 1$ (do the same as above)

e.g. $y = x^{.2} = x^{2/10} = x^{1/5} = \sqrt[5]{x}$

$y = x^{.4} = x^{4/10} = x^{2/5} = (\sqrt[5]{x})^2$

$y = x^{.5} = x^{5/10} = x^{1/2} = \sqrt{x}$

$y = x^{.7} = x^{7/10} = (\sqrt[10]{x})^7$



$a < 0$