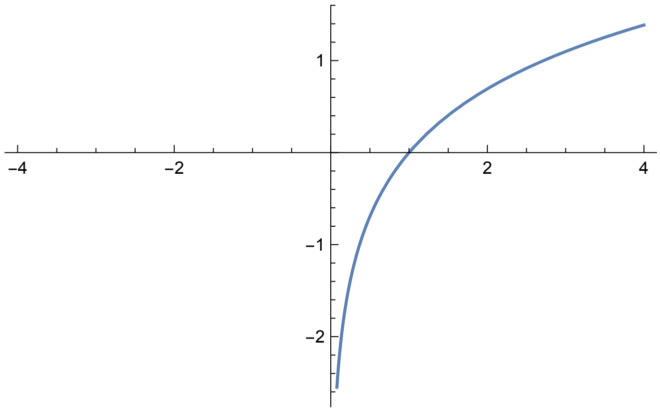
"3.1.1"

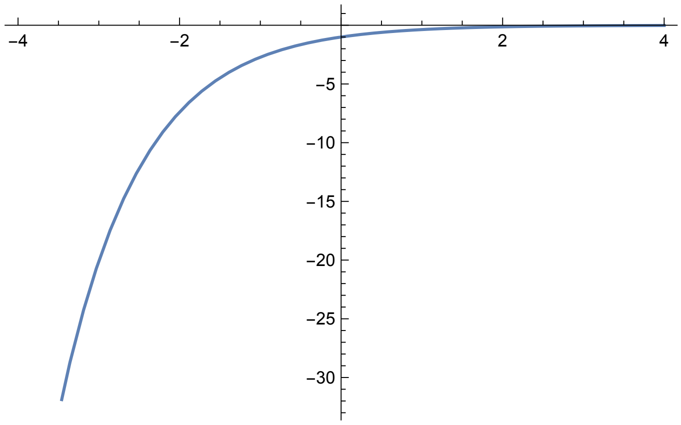
In[2]:= `Plot[Log[x], {x, -4, 4}]`



"Risk averse; does not have values for negative numbers, this violates completude, transitivity, continuity and independece"

"3.1.2"

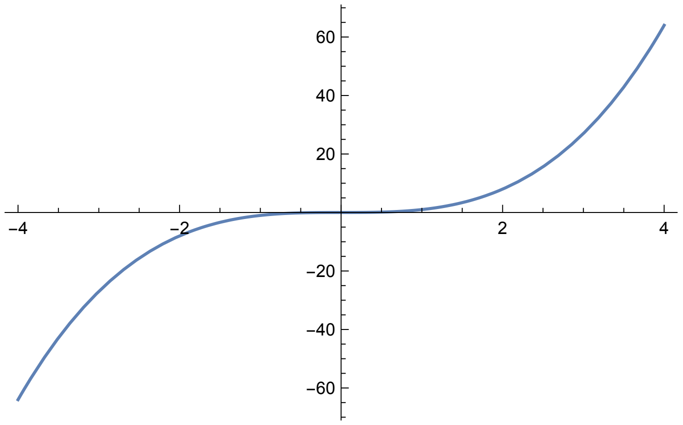
In[5]:= `Plot[-e^-x, {x, -4, 4}]`



"Risk Averse, The non-linearity violates only the independence axiom"

"3.1.3"

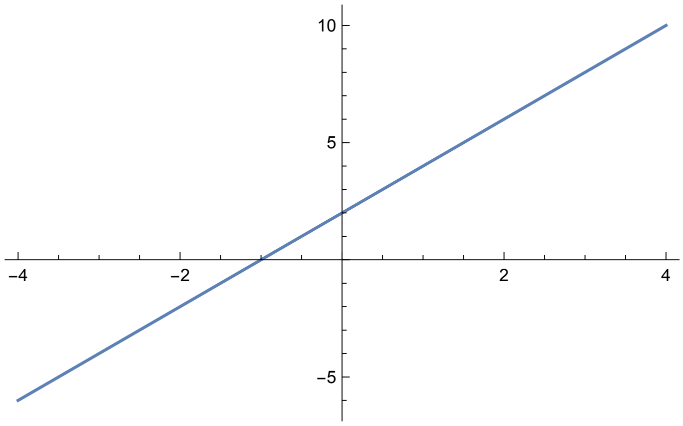
In[16]:= `Plot[x^3, {x, -4, 4}]`



"Utility monster, risk seeking but risk averse with negative values.The non-linearity violates only the independence axiom"

"3.1.4"

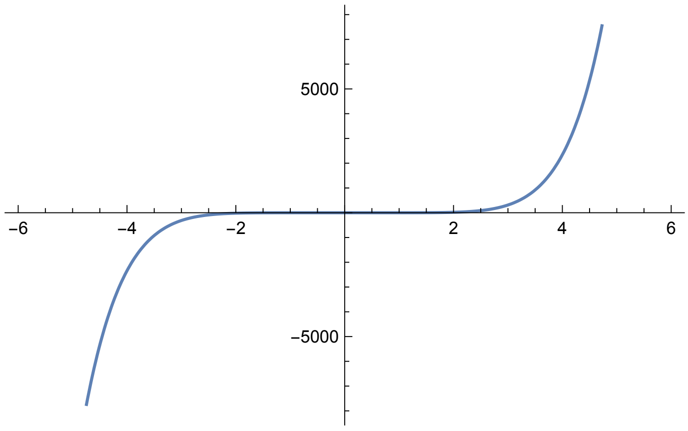
In[7]:= `Plot[2 x + 2, {x, -4, 4}]`



"Risk Neutral, Does not violate any axioms"

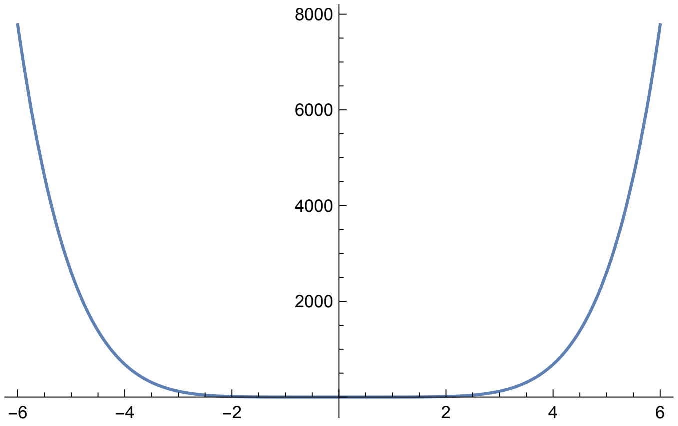
"3.1.5"

In[14]:= Plot$\left[\frac{x^7}{7}, \{x, -6, 6\}\right]$



"Utility monster, risk seeking but risk averse with negative values. When r is an odd integer greater than 1 then only the independence axiom is violated"

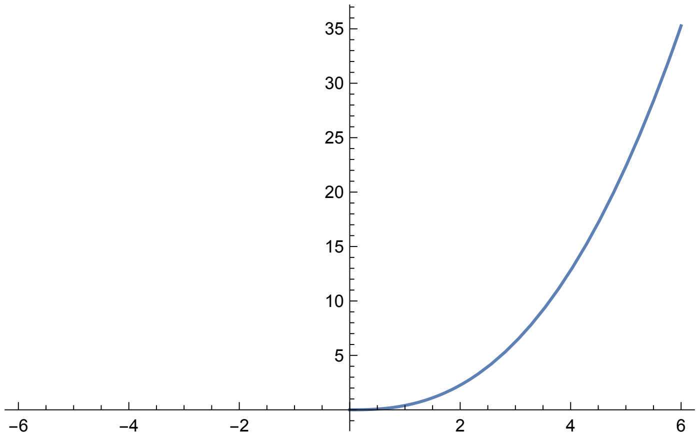
In[20]:= Plot$\left[\frac{x^6}{6}, \{x, -6, 6\}\right]$



"Risk seeking in every dimension. When r is an even integer greater than 1 then monotonicity and the independence axiom are violated"

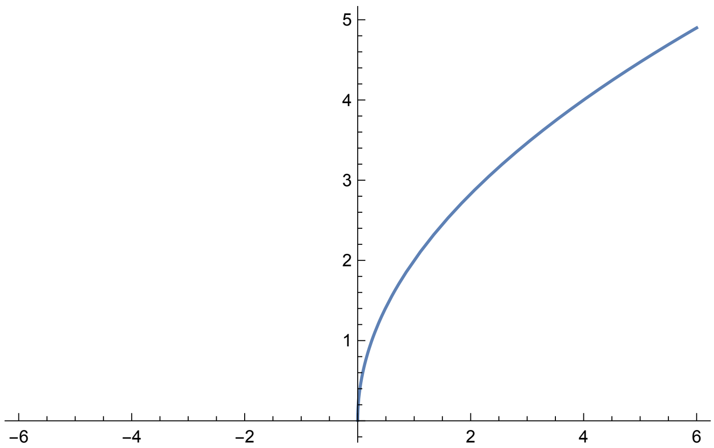
In[30]:= Plot$\left[\frac{x^{2.5}}{2.5}, \{x, -6, 6\}\right]$

Out[30]=



"Risk seeking; When r is greater than 1 but not an integer and then the function is convex, violates continuity/transitivity/independece"

Plot$\left[\frac{x^{0.5}}{0.5}, \{x, -6, 6\}\right]$



"Risk Averse; When r is smaller than 1 the function is concave, it violates continuity/transitivity/transitivity "

"3.2.1, already answered"

"3.2.2"

$w = 169$

$p * \sqrt{w - 25 + g} + (1 - p) * \sqrt{w - 25} = \sqrt{169}$

$p * \sqrt{144 + g} + (1 - p) * \sqrt{144} = \sqrt{169}$

$p^2 * (144 + g) + (1 - p)^2 * 144 = 169$

$g = \frac{25}{p^2} + \frac{288}{p} - 288 = \frac{25}{p^2} + 288 \left(\frac{1}{p} - 1\right);$

"3.2.3"

$p * \sqrt{w - 60 + 1380} + (1 - p) * \sqrt{w - 60} = \sqrt{w}$

$p * \sqrt{w + 1320} + (1 - p) * \sqrt{w - 60} = \sqrt{w}$

$p^2 * (w + 1320) + (1 - p)^2 * (w - 60) = w$

$p^2 * (w + 1320) + \left(1 - 2p + p^2\right) (w - 60) = w$

$wp^2 + 1320 p^2 + w - w2p + wp^2 - 60 + 120 p - 60 p^2 = w$

$2 wp^2 + 1320 p^2 - 2 wp - 60 + 120 p - 60 p^2 = 0$

$w \left(2 p^2 - 2 p\right) = 60 p^2 - 120 p + 60 - 1320 p^2$

$w2p (p - 1) = 60 p (p - 2 - 22 p) + 60$

$w2p (p - 1) = 60 (p (p - 2 - 22 p) + 1)$ ²

$wp (p - 1) = 30 (p (p - 2 - 22 p) + 1)$

$w = \frac{30 (p (p - 2 - 22 p) + 1)}{p (p - 1)}$

"3.3.1"

$E (w) = \frac{1}{2} (10 + 30) \sqrt{\lambda} - \lambda$

$\frac{\delta E (w)}{\delta \lambda} = \frac{1}{4} (10 + 30) \lambda^{-\frac{1}{2}} - 1 = 0$

$4 = 40 \lambda^{-\frac{1}{2}}$

$\frac{1}{10} = \lambda^{-\frac{1}{2}}$

$100 = \lambda$

$w = 100;$

"3.3.2"

$$k = \frac{1}{1000};$$

$$u\ (w) = E\ (w) - k\sigma^2\ (w);$$

$$u\ (w) = E\ (w\ (\lambda)) - \frac{1}{1000}\ \sigma^2\ (w\ (\lambda));$$

$$\sigma^2\ (w\ (\lambda)) = \left(30\sqrt{\lambda} - \lambda - E\ (w)\right)^2 \frac{1}{2} + \left(10\sqrt{\lambda} - \lambda - E\ (w)\right)^2 \frac{1}{2}$$

$$\sigma^2\ (w\ (\lambda)) = \left(30\sqrt{\lambda} - \lambda - 20\sqrt{\lambda} + \lambda\right)^2 \frac{1}{2} + \left(10\sqrt{\lambda} - \lambda - 20\sqrt{\lambda} + \lambda\right)^2 \frac{1}{2}$$

$$\sigma^2\ (w\ (\lambda)) = \left(10\sqrt{\lambda}\right)^2 \frac{1}{2} + \left(-10\sqrt{\lambda}\right)^2 \frac{1}{2}$$

$$\sigma^2\ (w\ (\lambda)) = 100\,\lambda\,\frac{1}{2} + 100\,\lambda\,\frac{1}{2} = 100\,\lambda$$

$$u\ (w) = \frac{1}{2}\ (40)\ \sqrt{\lambda} - \lambda - \frac{1}{10}\,\lambda$$

$$\frac{\delta u\ (w)}{\delta\lambda} = \frac{1}{4}\ (40)\ \lambda^{-\frac{1}{2}} - 1 - \frac{1}{10} = 0$$

$$\frac{\delta u\ (w)}{\delta\lambda} = \frac{1}{4}\ (40)\ \lambda^{-\frac{1}{2}} = 1.1$$

$$\frac{\delta u\ (w)}{\delta\lambda} = (40)\ \lambda^{-\frac{1}{2}} = 4.4$$

$$\frac{\delta u\ (w)}{\delta\lambda} = \lambda^{-\frac{1}{2}} = \frac{1.1}{10}$$

$$\frac{\delta u\ (w)}{\delta\lambda} = \lambda = \left(\frac{100}{11}\right)^2 = \frac{10\,000}{121} = 82.6444$$

"3.3.3"

$$u\ (\lambda) = \sqrt{20\sqrt{\lambda} - \lambda}$$

$$f[x\_] := \sqrt{20\sqrt{x} - x}$$

In[51]:= $f[x\_] := \sqrt{20\sqrt{x} - x}$

f'[x]

$$\frac{-1 + \frac{10}{\sqrt{x}}}{2\sqrt{20\sqrt{x} - x}}$$

$$\lambda = x = 10$$

"3.4.1"

u (w) = 2 w; if w ⩽ 100

u (w) = w + 100; if w > 100

E (u (w)) = .25 * 180 + .75 * 210 = 45 + 157.5 = 202.5;

w = 102.5

p = 2.5

π = E (x) - p = 2.5