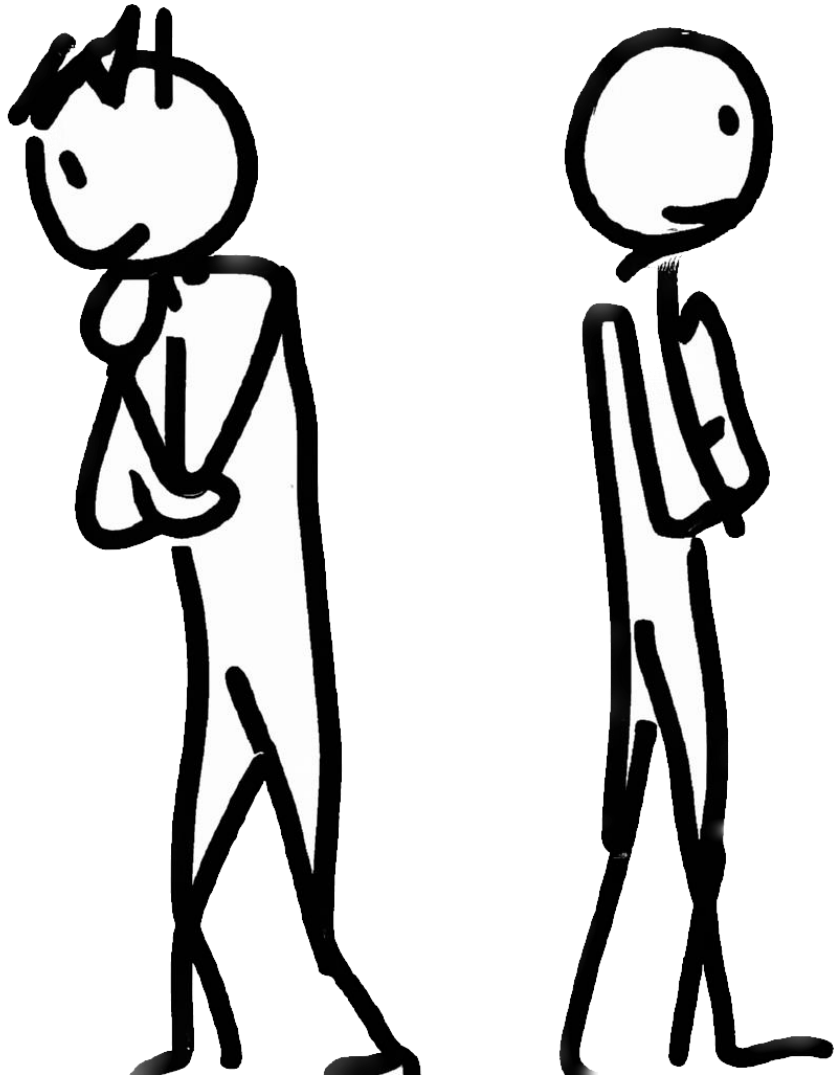
Prospect theory examples I

Notes on Behavioural Economics

Jason Collins



A 50:50 gamble

$$v(x) = \begin{cases} x^{1/2} \text{ where } x \geq 0 \\ -2(-x)^{1/2} \text{ where } x < 0 \end{cases}$$

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$$A = (0.5, \$110; 0.5, -\$100)$$

A 50:50 gamble: accept or reject?

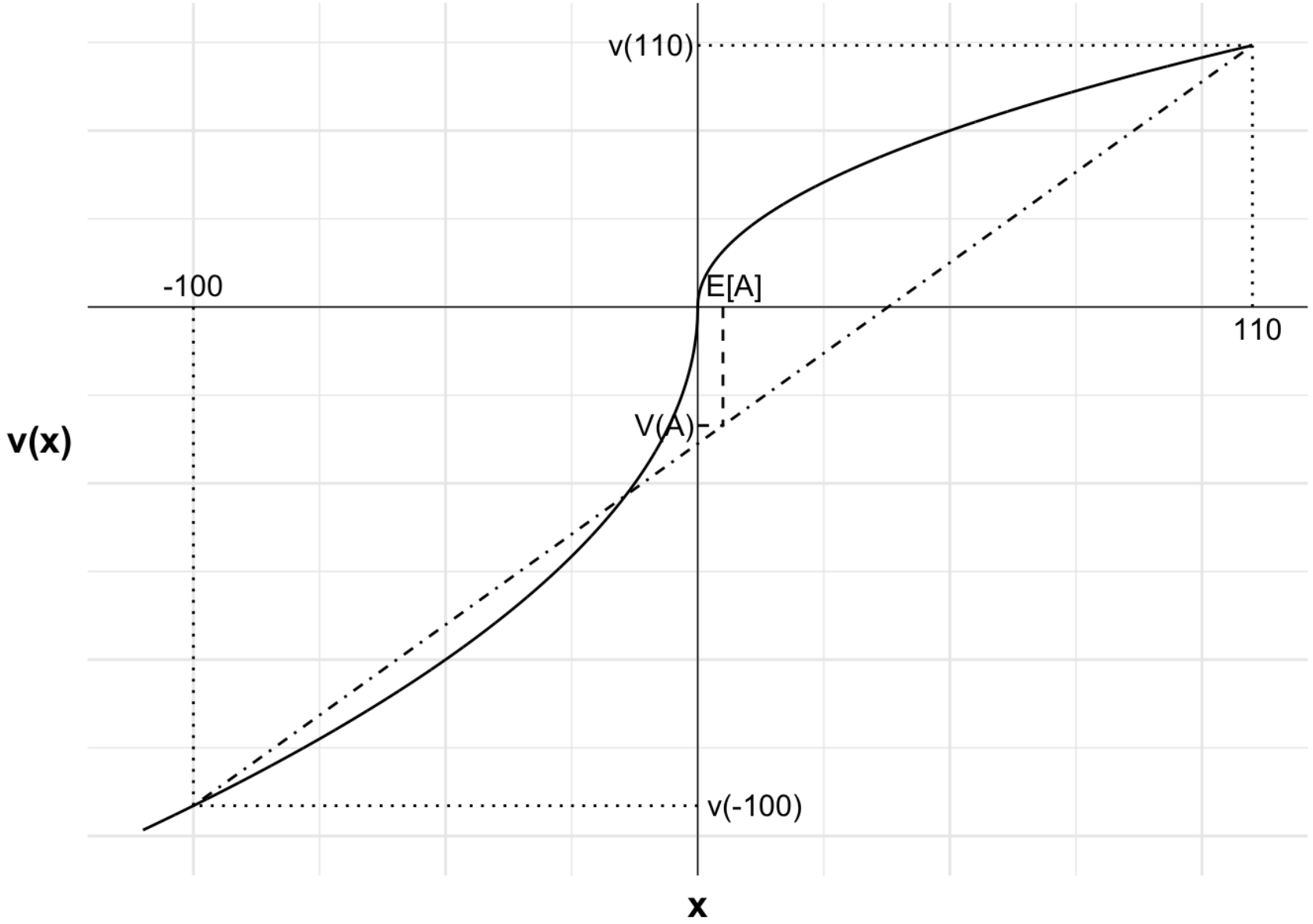
$$V(A) = p_1 v(x_1) + p_2 v(x_2)$$

$$= 0.5 \times v(110) + 0.5 \times v(-100)$$

$$= 0.5 \times 110^{0.5} - 0.5 \times 2 \times 100^{0.5}$$

$$= -4.76$$

A 50:50 gamble: accept or reject?



A 50:50 gamble: accept or reject after a loss?

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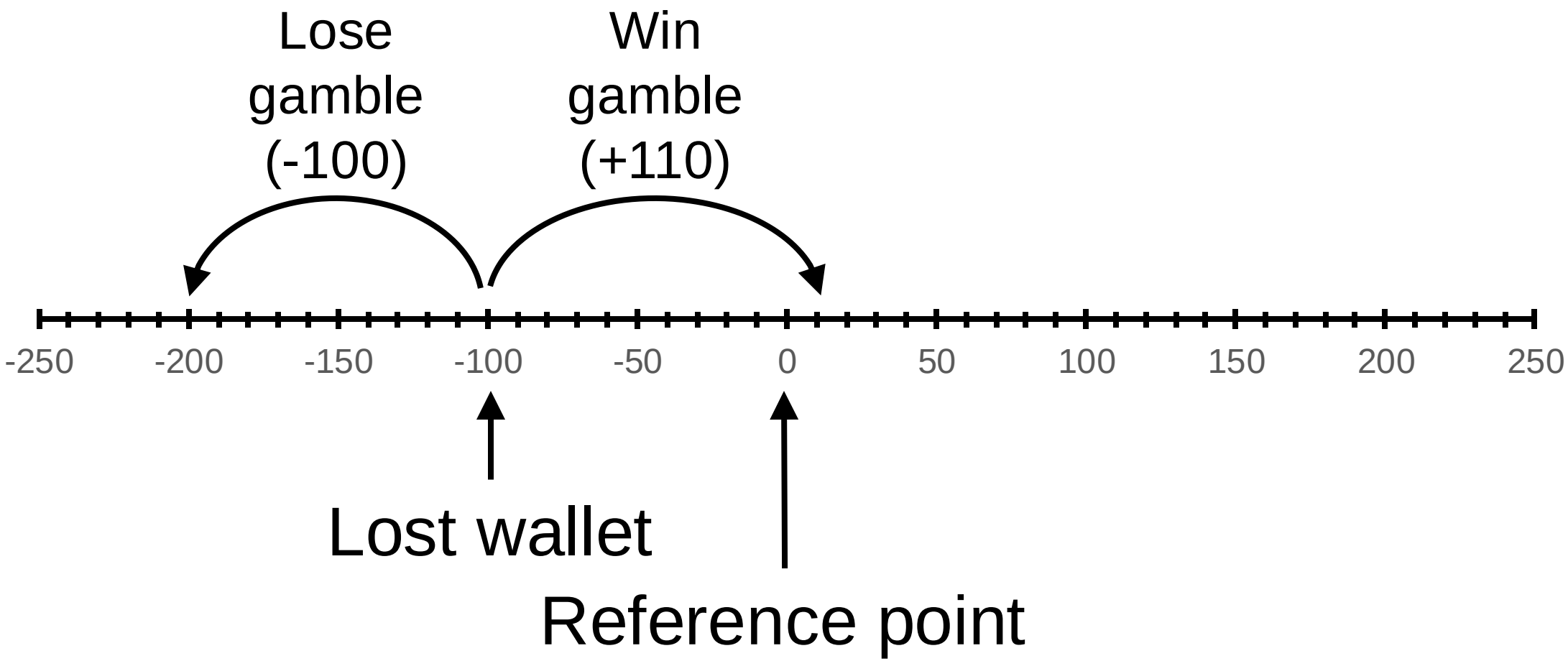


A 50:50 gamble: accept or reject after a loss?

$$V(A) = p_1 v(x_1) + p_2 v(x_2)$$

$$= 0.5 \times v(-100 + 110) + 0.5 \times v(-100 - 100)$$

$$= 0.5 \times (10)^{0.5} - 0.5 \times 2 \times 200^{0.5}$$

$$= -12.56$$

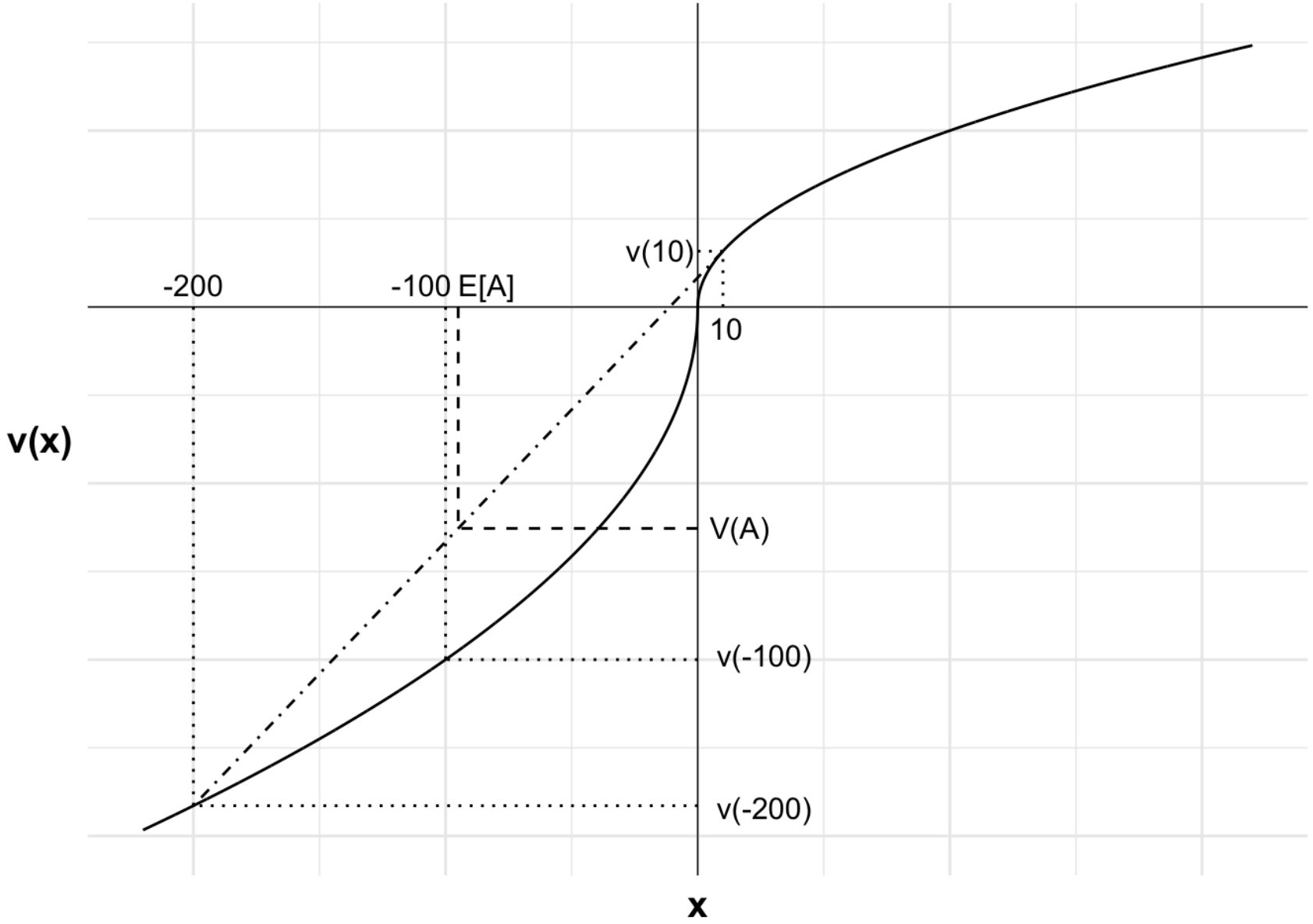
A 50:50 gamble: accept or reject after a loss?

$$V(\neg A) = v(-100)$$
$$= -2 \times (100)^{0.5}$$
$$= -20$$

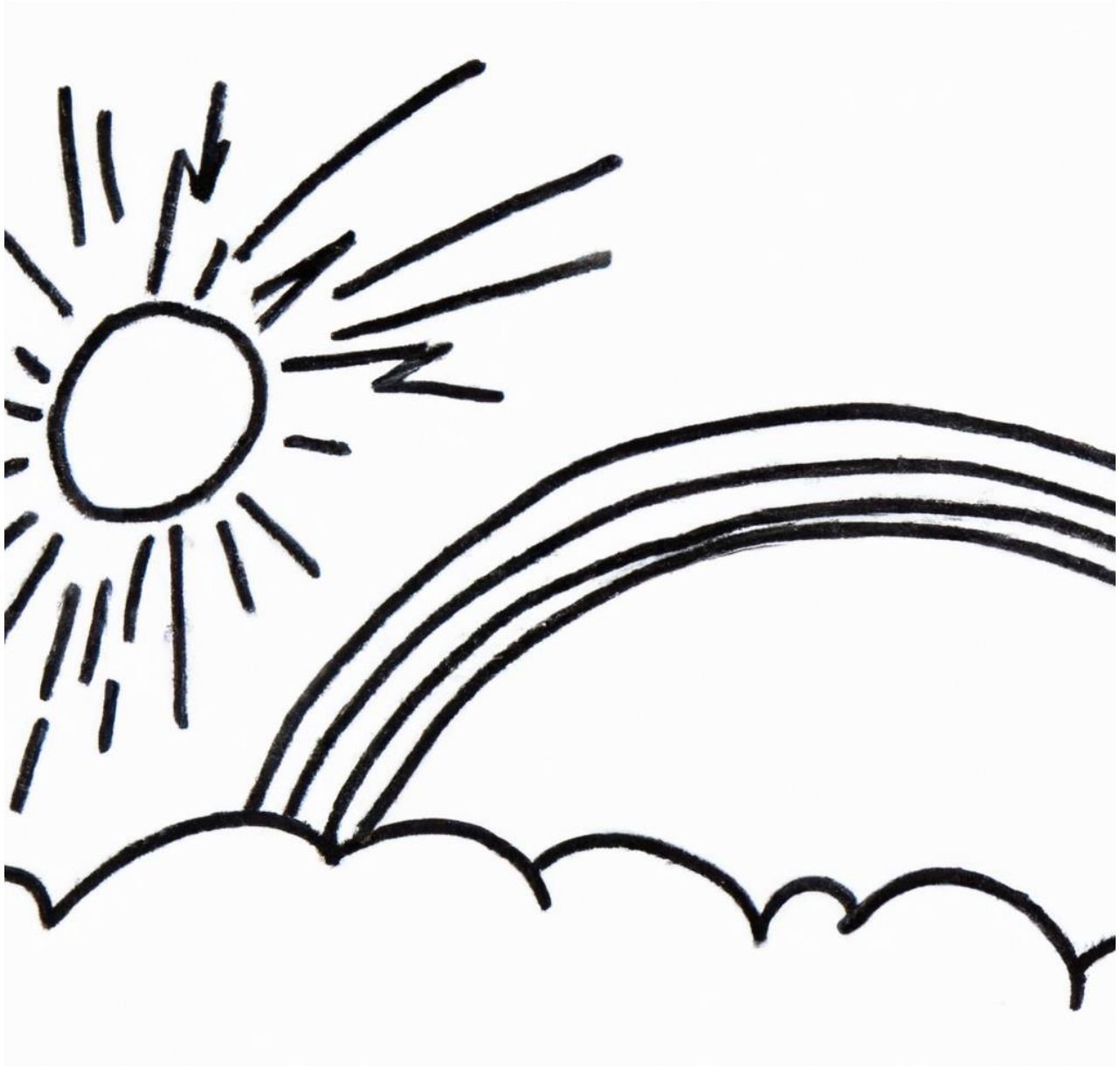
A 50:50 gamble: accept or reject after a loss?

$$V(\neg A) = -20 < -12.56 = V(A)$$

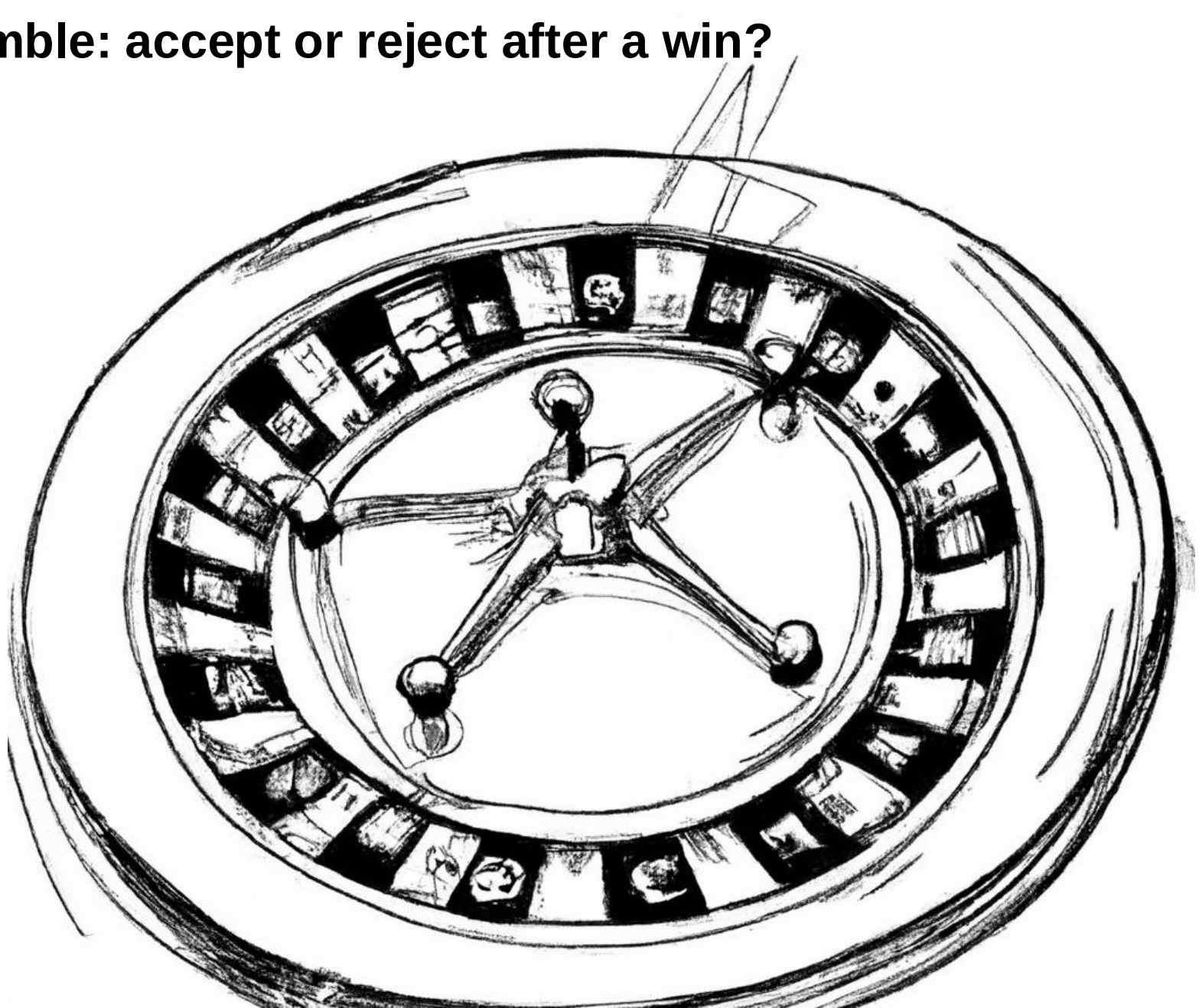
A 50:50 gamble: accept or reject after a loss?



A 50:50 gamble: accept or reject after adaptation to loss?



A 50:50 gamble: accept or reject after a win?



A 50:50 gamble: accept or reject after a win?

$$V(A) = p_1 v(x_1) + p_2 v(x_2)$$

$$= 0.5 \times v(10000 + 110) + 0.5 \times v(10000 - 100)$$

$$= 0.5 \times (10110)^{0.5} + 0.5 \times (9900)^{0.5}$$

$$= 100.02$$

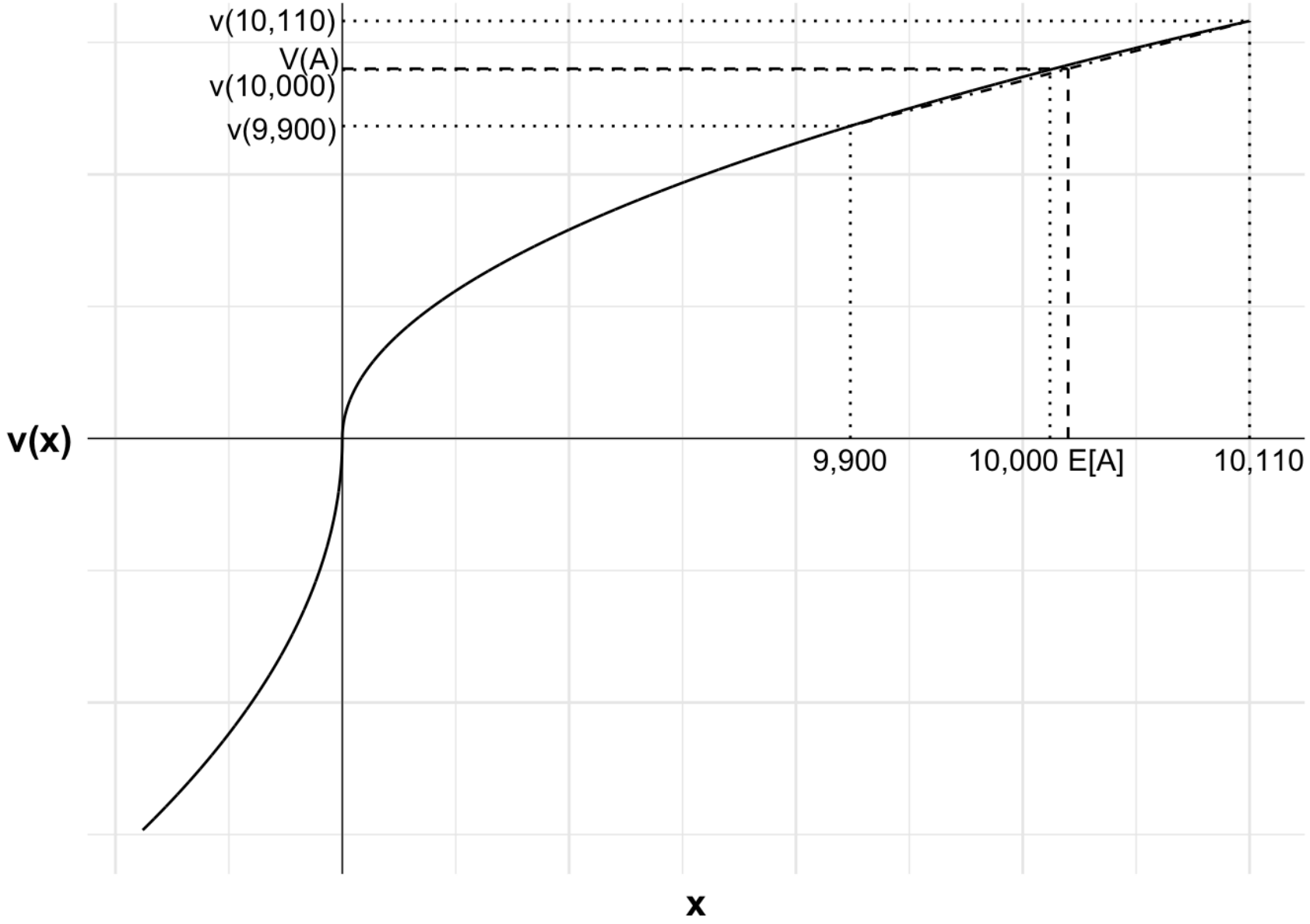
A 50:50 gamble: accept or reject after a win?

$$V(\neg A) = v(10000)$$
$$= 10000^{0.5}$$
$$= 100$$

A 50:50 gamble: accept or reject after a win?

$$V(\neg A) = 100 < -100.02 = V(A)$$

A 50:50 gamble: accept or reject after a win?



A 60:40 gamble

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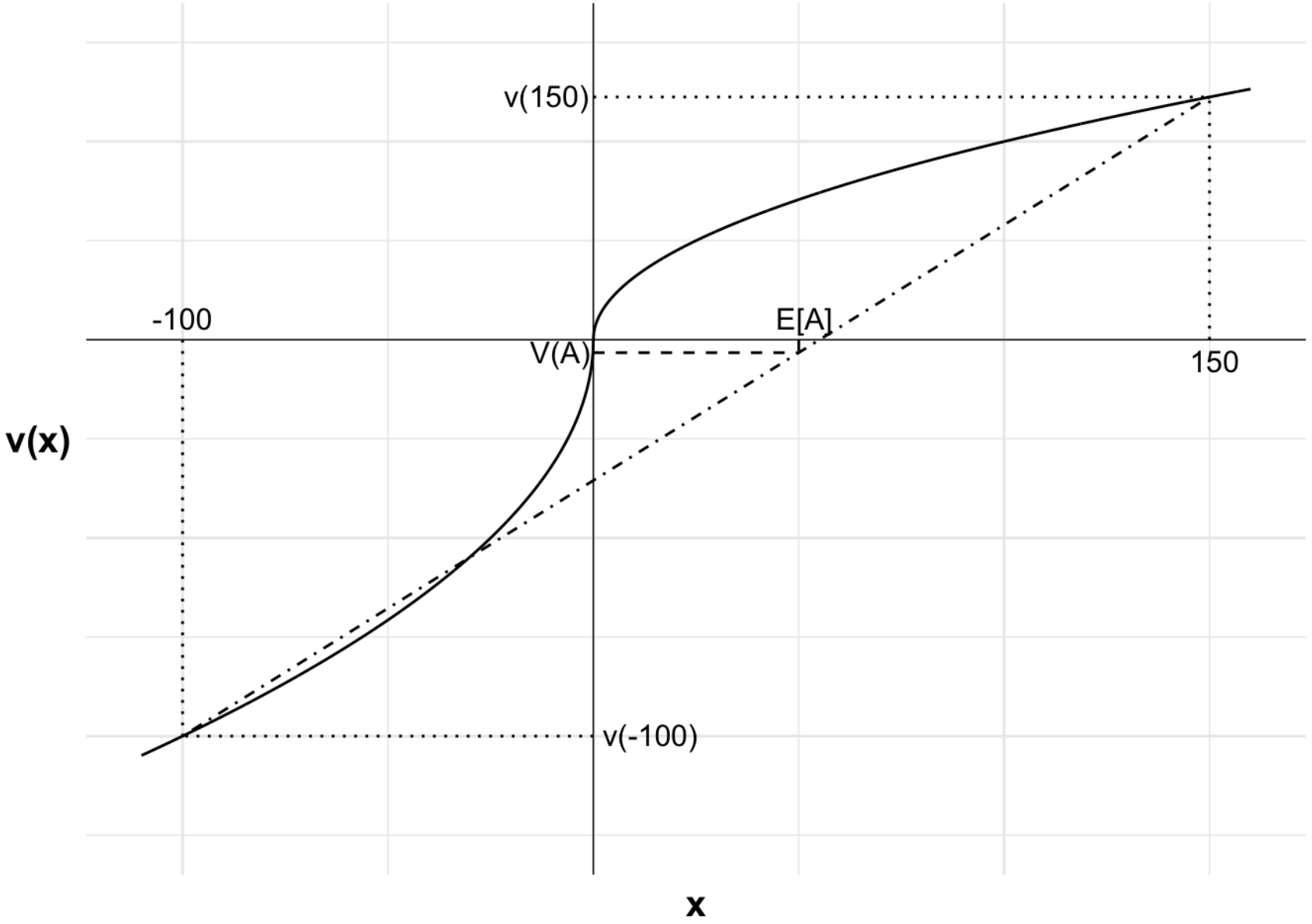
$$A = (0.6, \$150; 0.4, -\$100)$$

A 60:40 gamble: accept or reject?

$$
\begin{aligned}
V(A) &= p_1 v(x_1) + p_2 v(x_2) \\
&= 0.6 \times v(150) + 0.4 \times v(-100) \\
&= 0.6 \times 150^{0.5} - 0.4 \times 2 \times 100^{0.5} \\
&= -0.652
\end{aligned}
$$

A 60:40 gamble: accept or reject?



A 60:40 gamble: accept or reject after a loss?

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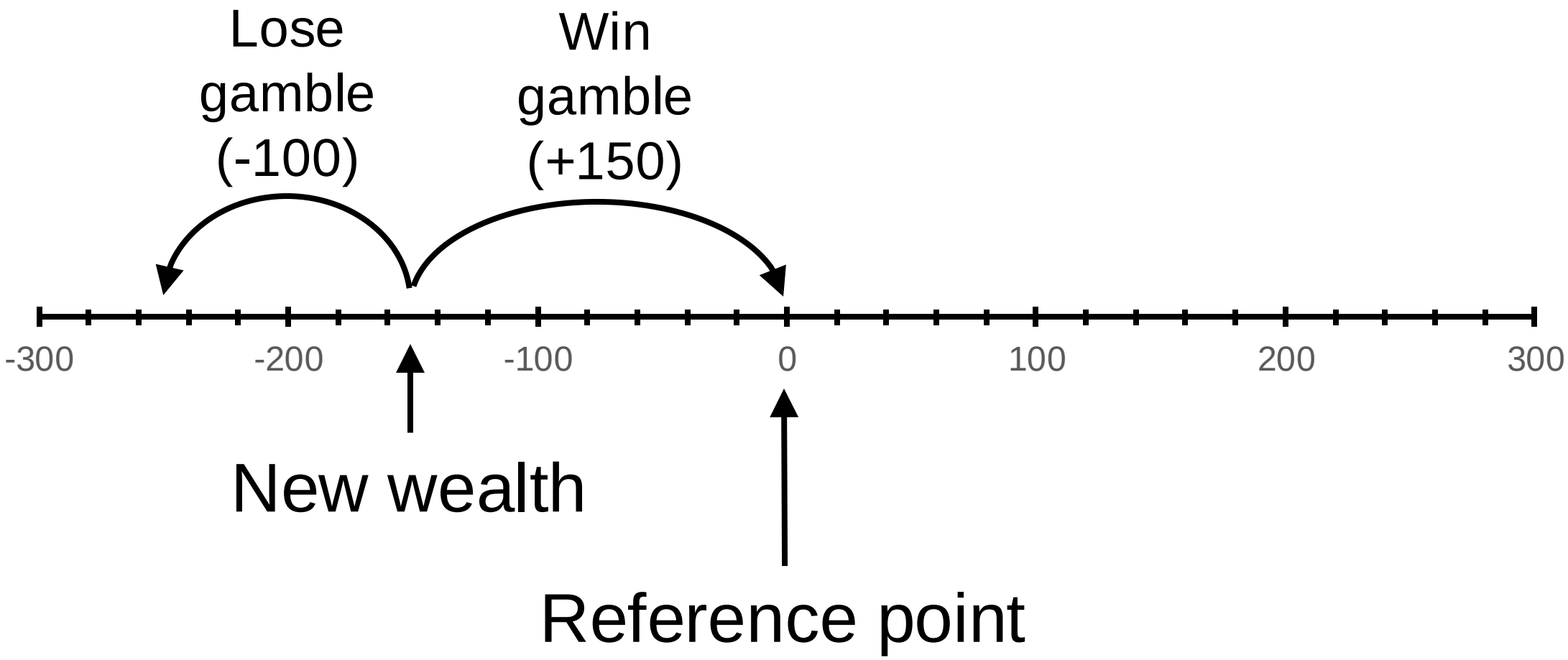


A 60:40 gamble: accept or reject after a loss?

$$
\begin{aligned}
V(A) &= p_1 v(x_1) + p_2 v(x_2) \\
&= 0.6 \times v(-150 + 150) + 0.4 \times v(-150 - 100) \\
&= 0.6 \times 0^{0.5} - 0.4 \times 2 \times 250^{0.5} \\
&= -12.649
\end{aligned}
$$

A 60:40 gamble: accept or reject after a loss?

$$V(\neg A) = v(-150)$$

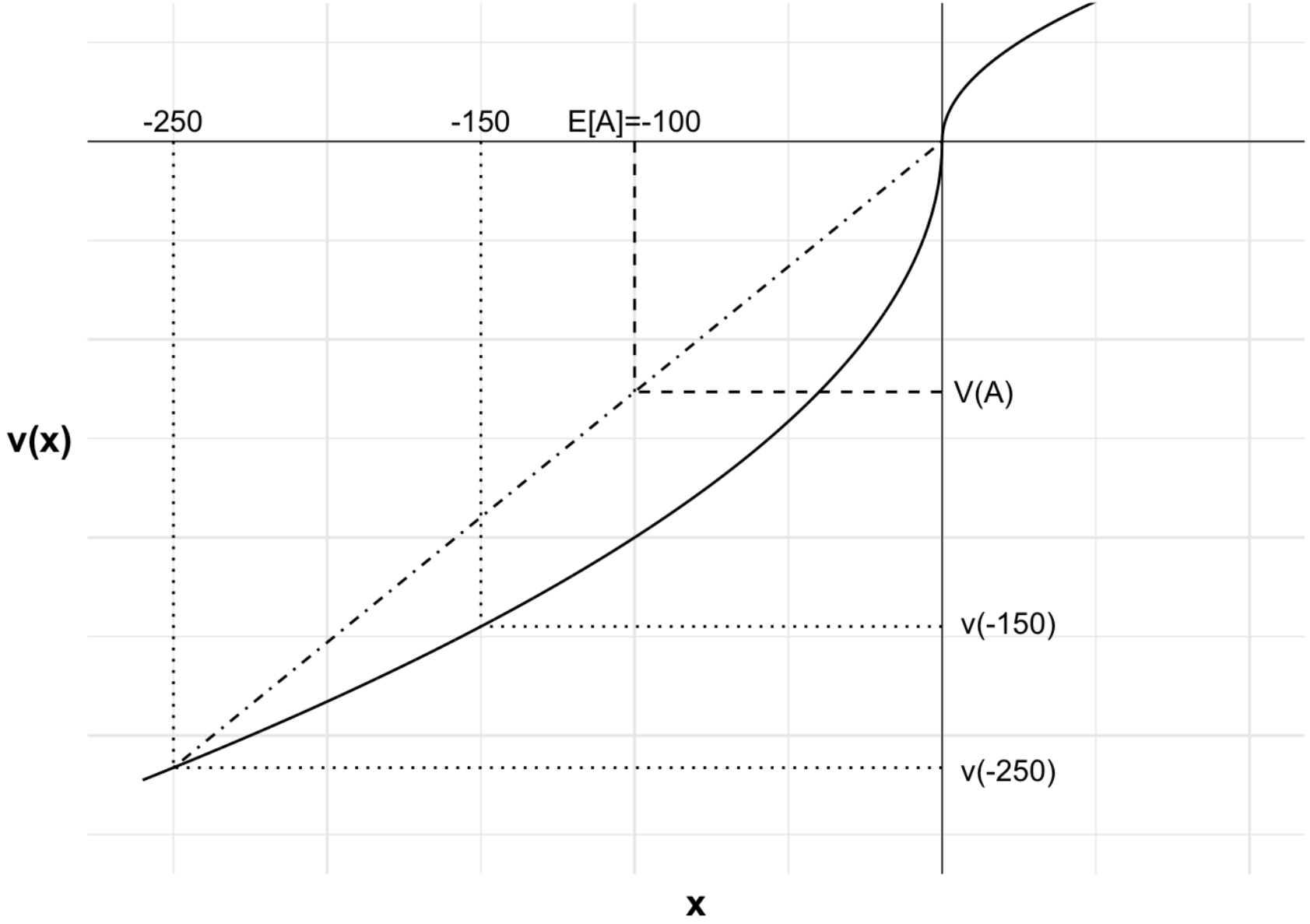
$$= -2 \times 150^{\frac{1}{2}}$$

$$= -24.495$$

A 60:40 gamble: accept or reject after a win?

$$V(\neg A) = -24.495 < -12.649 = V(A)$$

A 60:40 gamble: accept or reject after a loss?



A gamble in the gain domain

$$v(x) = \begin{cases} x^{1/2} \text{ where } x \geq 0 \\ -2(-x)^{1/2} \text{ where } x < 0 \end{cases}$$

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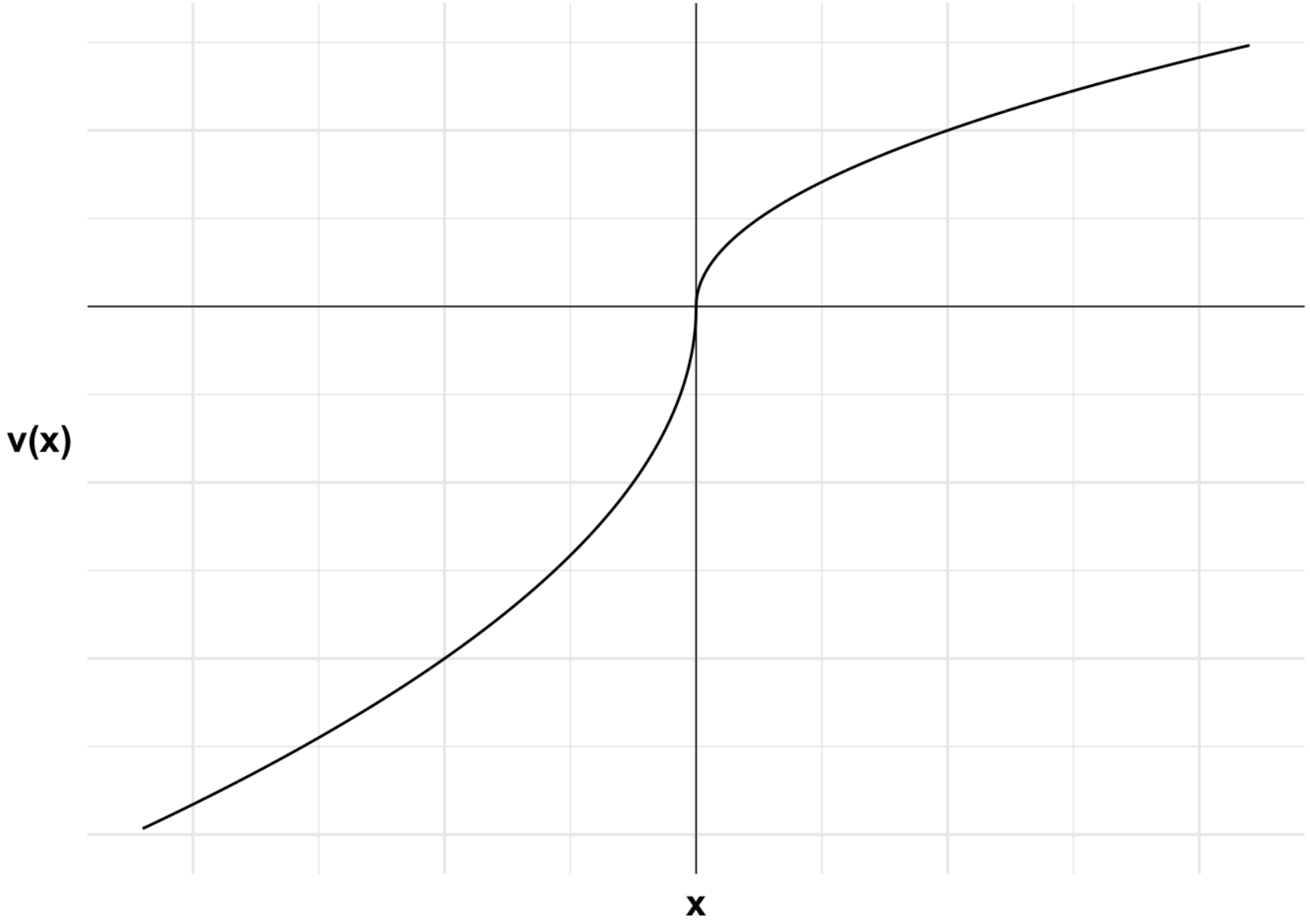


A gamble in the gain domain

$$v(x) = \begin{cases} x^{1/2} \text{ where } x \geq 0 \\ -2(-x)^{1/2} \text{ where } x < 0 \end{cases}$$

$\$100$

OR

$A = (0.5, \$250; 0.5, 0)$

A gamble in the gain domain: accept or reject?

$$V(A) = p_1 v(x_1) + p_2 v(x_2)$$

$$= 0.5 \times v(250) + 0.5 \times v(0)$$

$$= 0.5 \times 250^{0.5} - 0.5 \times 2 \times 0^{0.5}$$

$$= 7.91$$

A gamble in the gain domain: accept or reject?

$$V(\$100) = v(100)$$

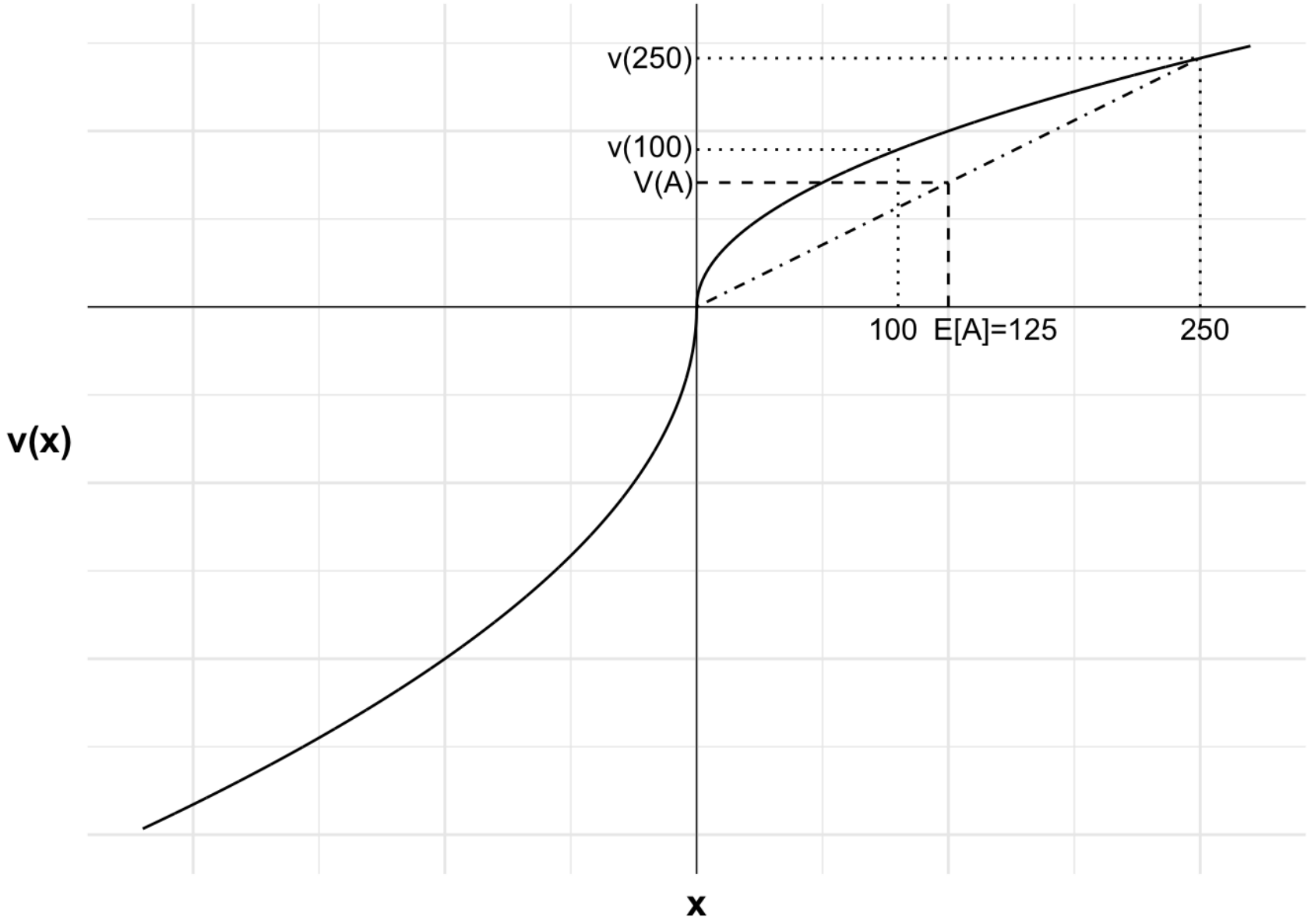
$$= 100^{0.5}$$

$$= 10$$

A gamble in the gain domain: accept or reject?

$$V(\$100) = 10 > 7.91 = V(A)$$

A gamble in the gain domain: accept or reject?



A gamble in the gain domain: accept or reject after a negative shock?

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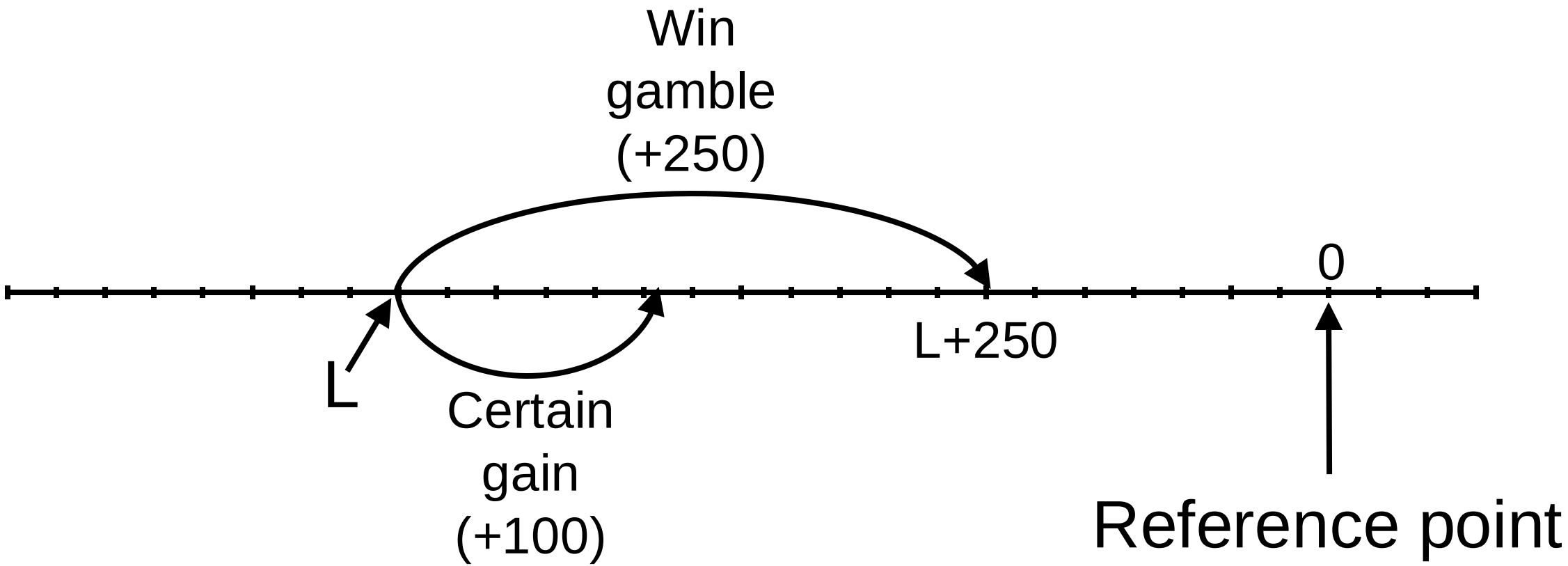

A gamble in the gain domain: accept or reject after a negative shock?