

Exercise WS5.1

- Plot the graphs of the following cubic functions. Do not aim at a high degree of accuracy, but instead try to draw a sketch which is accurate enough to identify the main features of the graph, especially turning points and intercepts on the x and y axes.
 - $y = -3x^3 + 9x^2 + 3x - 9$. Take integer values of x between -2 and $+4$.
 - $y = 5x^3 + 15x^2$. Take values of x between -4 and $+3$.

Exercise WS5.2

- Plot the graphs of the following rectangular hyperbolas. Do not aim at a high degree of accuracy, but instead try to draw a sketch which is accurate enough to identify the main features of the graph, especially discontinuities, asymptotes and intercepts on the x and y axes.
 - $y = \frac{5}{x+1}$. Take values of x between -2 and $+2$.
 - $y = \frac{50}{x+5} - 1$. Take values of x between -6 and $+6$.

Would case (b) be plausible as a demand function, with either y as q^D and x as p , or vice versa?

Exercise WS5.3

- Plot the graphs of the following circles and ellipses. Do not aim at a high degree of accuracy, but instead try to draw a sketch which is accurate enough to identify the main features of the graph, especially intercepts on the x and y axes.
 - $\frac{1}{2}x^2 + \frac{1}{2}y^2 = 50$. Take values of x and y between -10 and $+10$.
 - $x^2 + \frac{3}{2}xy + y^2 = 25$. Take $-7 \leq x \leq 7$ and $-7 \leq y \leq 7$.

Exercise WS5.4

- If x is restricted by the condition $-10 < x < 10$, find the range of values that $y = -\frac{1}{2}x + 9$ can take.

2. If x is restricted by the condition $1 < x < 5$, find the range of values that $y = \frac{2x}{x-1}$ can take.
3. A consumer's income or budget is 1200. She buys two goods, x and y with prices 3 and 4 respectively.
 - (a) Derive the budget constraint (i) as an implicit function, and (ii) with the quantity of y purchased as an explicit function of the quantity of x purchased.
 - (b) What is the opportunity cost of x in terms of y ?
 - (c) What is the consumer's real income, measured in units of (i) good y and (ii) good x ?
 - (d) If the consumer buys 80 units of x and spends all of her budget, calculate the shares or proportions of total expenditure devoted to each good.
 - (e) Sketch the graph of the budget constraint, indicating its slope and intercepts on the x and y axes.