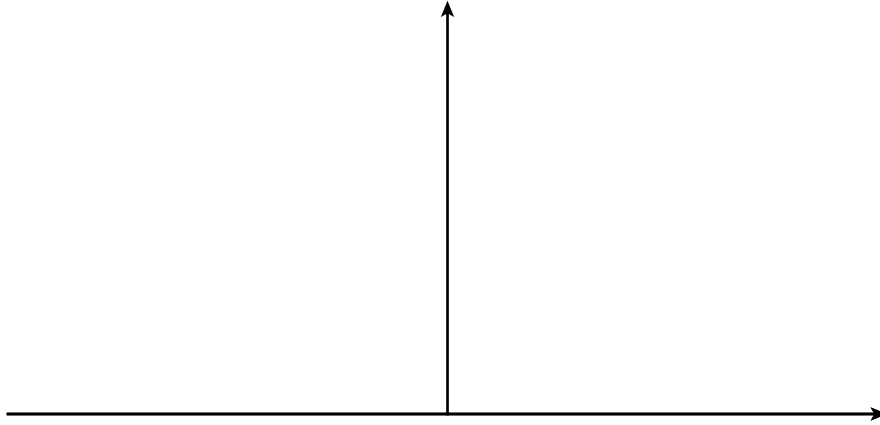
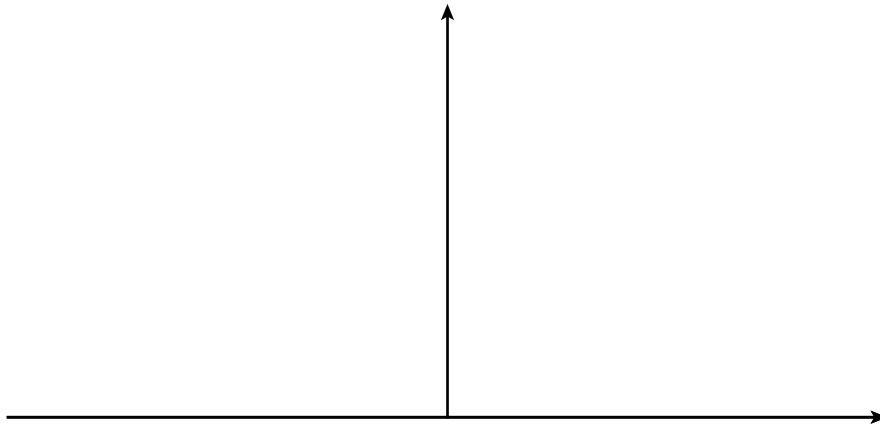


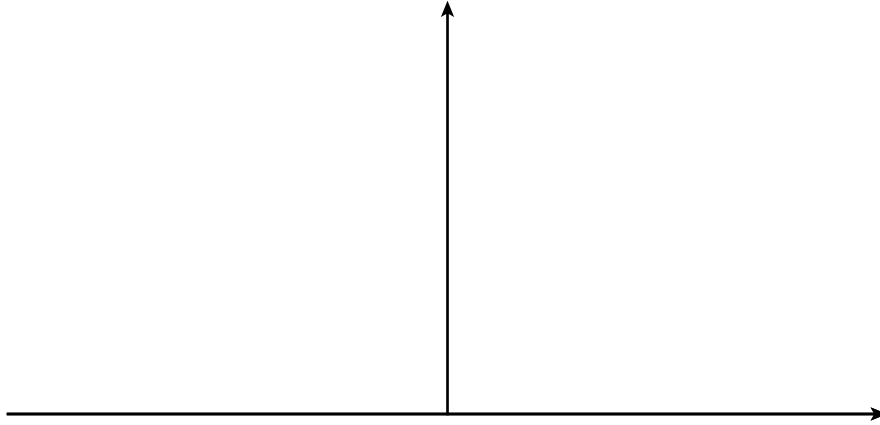
1. Sketch the graph of  $f(x) = 2^x$  by plotting points at  $x = -2, -1, 0, 1, 2$ .



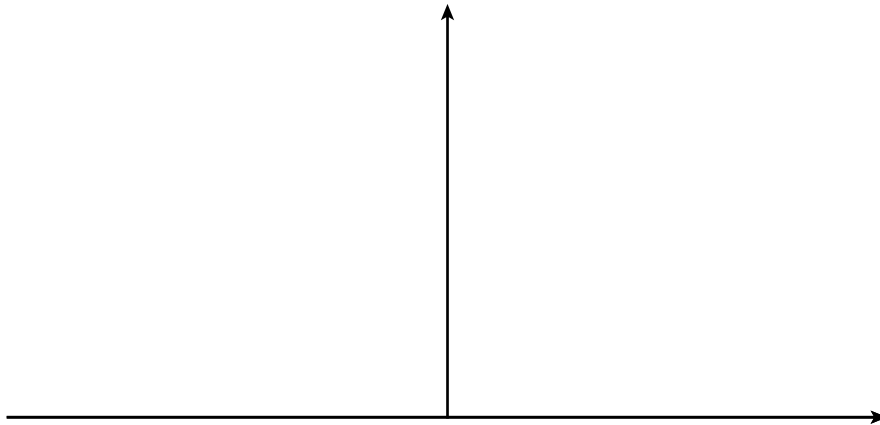
2. Sketch the graph of  $f(x) = 3^x$  and  $g(x) = 2^x$  on the same axes for  $-2 \leq x \leq 2$ .



3. Sketch the graph of  $f(x) = 2^x$  and  $g(x) = 2^{-x}$  on the same axes.



4. Sketch the graphs of  $f(x) = 2^x$ ,  $g(x) = 2^{2x}$  and  $h(x) = 4^x$  on the same axes for  $-2 \leq x \leq 2$ .



5. I inject a 100mg aspirin at noon. Aspirin in the body, at this dosage, has a half life of 3 hours. How much aspirin is in my body at:

a) 6pm

$$25\text{mg}$$

b) 3pm

$$50\text{ mg}$$

c) 1pm

$$r(1) = 100 \cdot 2^{-1/3} = 79.37$$

d) 4:45pm

$$r(4.75) = 100 \cdot 2^{-4.75/3} = 33.37$$

6. Find a function  $r(t)$  that describes the amount of aspirin in my body in the previous problem where  $t$  is measured in hours since noon and  $r$  is in milligrams.

$$r(t) = 100 \cdot \left(\frac{1}{2}\right)^{t/3} = 100 \cdot 2^{-t/3}$$

$$r(3) = 100 \left(\frac{1}{2}\right)^{3/3} = 100 \cdot \frac{1}{2} = 50$$

7. A population of *e coli* starts with 500 cells at time  $t = 0$  hours and doubles every three hours. Find a function  $P(t)$  that describes the population size, where  $t$  is measured in hours and  $P$  is measured in number of cells.

$$P(t) = 500 \cdot 2^{t/3}$$

8. A population of Caribou is growing by 20% per year and starts with 1000 animals at time  $t = 2010$ . Find a function  $P(t)$  that describes the population size where  $t$  is measured in calendar years and  $P$  is measured in the number of animals.

$$P(t) = 1000 (1.2)^{(t-2010)}$$