

### Applications

1. Given  $d = 4.8 \sin\left[\frac{\pi}{8}(t-2)\right] + 5.2$ ,  $t \geq 0$ .

a) Determine the amplitude, period, phase shift and vertical shift.

b) Determine the maximum and when it occurs, in one period.

c) Determine the maximum and when it occurs, for all  $t$  where  $t \geq 0$ .

d) Determine the minimum and when it occurs, in one period.

e) Determine the minimum and when it occurs, for all  $t$  where  $t \geq 0$ .

f) Determine  $d$  when  $t=13$ , accurate to one decimal place.

2. A small windmill has its centre 6 m above the ground and blades 2 m long. In a steady wind, a point P at the tip of one blade makes a complete revolution in 12 seconds.
- a) Use this information to sketch the function over a 12 second interval. Assume the rotation starts at the highest possible point.
- b) Determine a function that gives the height of P above the ground at any time  $t$ .
- c) Determine the height of the blade at 5 seconds. State the EXACT answer, then round the answer to one decimal place.