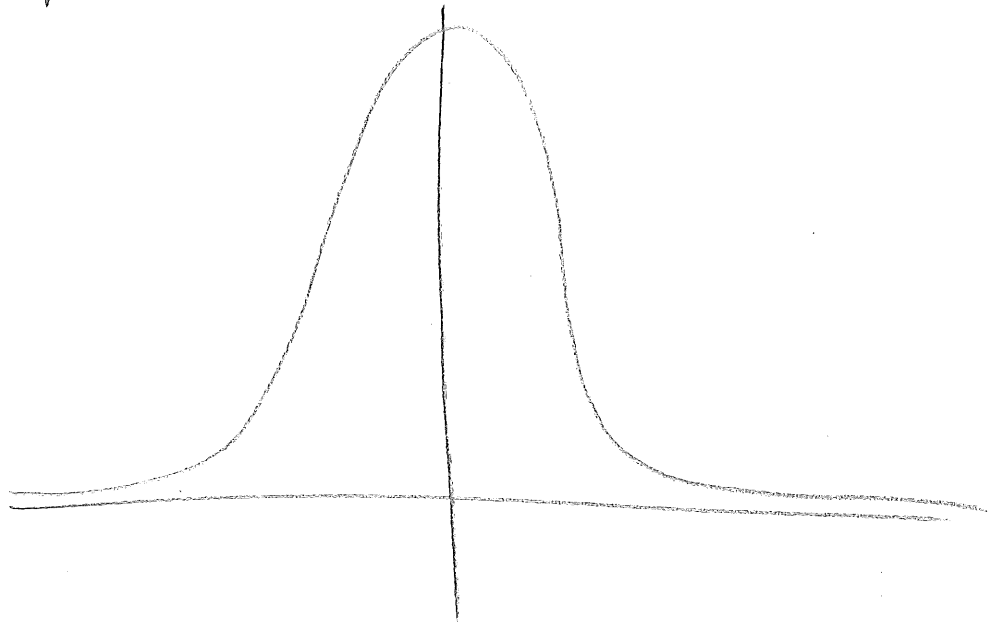


5.1

$$y = a e^{-bx^2}$$



$$y = a e^{-b(x+10)^2}$$

5.3

a) 1, 2 and not 3.

↳ funktioner av $x \pm vt$

- b)
- | | | |
|----|----|-------|
| 1. | -z | 1 m/s |
| 2. | +x | 1 m/s |

5.5

$$A = 2$$

neg dir

$$\lambda = 5$$

1

$$T = 3$$

$$a = 0$$

$$a) \quad s = 2 \sin \left(2\pi \left(\frac{t}{3} + \frac{x}{5} \right) \right)$$

$$b) \quad s = 2 \sin \left(2\pi / 5 \left(\frac{5}{3} t + x \right) \right)$$

$$c) \quad 2e^{2\pi i \left(\frac{x}{5} + \frac{t}{3} \right)}$$

5.10

$$s_0 = \frac{\pi}{2} - \left(\frac{2\pi}{\lambda} \right) x_0 \quad (t=0)$$

$$S = \sin(kx + \varphi) = \sin \left(kx + \frac{\pi}{2} - \frac{2\pi}{\lambda} x_0 \right)$$

$$() = \frac{\pi}{2} \Rightarrow kx = \frac{2\pi}{\lambda} x_0, \quad k = \frac{2\pi}{\lambda}$$

$$\Rightarrow \boxed{x = x_0} \quad \#$$

5.10

b) Insättning av $\lambda = 10$ och

$$x_0 = 0, 5/6, 5/2, 5, -\frac{1}{2} \text{ etc.}$$

$$S = \sin\left(kx + \frac{\pi}{2} - \frac{2\pi}{\lambda} x_0\right) \text{ ger då}$$

$$x=0 \text{ ~~etc~~ BLABLA}$$

c) Vi tar bort $\pi/2$.

5.12

$$a) \frac{\bar{z} + z}{2} = \frac{a+bi + a-bi}{2} = \boxed{a}$$

$$\operatorname{Re}(\bar{z}) = \operatorname{Re}(a+bi) = \boxed{a} \quad \#$$

$$b) \frac{a+bi - a-bi}{2i} = \boxed{b} = \operatorname{Im}(z) \quad \#$$

$$c) \frac{e^{i\theta} + e^{-i\theta}}{2} = \frac{\cos\theta + i\sin\theta + \cos(-\theta) + i\sin(-\theta)}{2} =$$

$$= \frac{2\cos\theta}{2} = \boxed{\cos\theta} \quad \#$$

$$d) \frac{\cos\theta + i\sin\theta - \cos\theta + i\sin\theta}{2i} = \boxed{\sin\theta} \quad \#$$

5.13

$$a) e^{i(kx - \omega t)} \cdot i =$$

$$i \cos(kx - \omega t) + i \cdot i \sin(kx - \omega t) =$$

$$= i \sin\left(\frac{\pi}{2} - (\quad)\right) - \cos\left(\frac{\pi}{2} - (\quad)\right) =$$

$$i \cdot e^{ix} = e^{i\frac{\pi}{2}} e^{ix} = \boxed{e^{i\left(x + \frac{\pi}{2}\right)}}$$

$$b) -1 \cdot e^{ix} = e^{i\pi} e^{ix} = \boxed{e^{i\left(x + \pi\right)}}$$
