Hand in 1 Løsning

Assignment 1

(a) $4 = e^x + y$

$e^x = 4 - y$

$x = \ln(4 - y)$

(b) $y = 10^{z + 1/x}$

$\log(y) = z + \frac{1}{x}$

$\frac{1}{x} = \log(y) - z$

$x = \frac{1}{\log(y) - z}$

(c) $10 = \ln(5x)^2$

$e^{10} = (5x)^2$

$5x = \pm\sqrt{e^{10}}$

$x = \frac{\pm e^5}{5}$

(d) $k + 1 = \log_2\left(\frac{n \cdot x}{2}\right)$

$2^{k+1} = \frac{n \cdot x}{2}$

$n \cdot x = 2 \cdot 2^{k+1}$

$n \cdot x = 2^{k+2}$

$x = \frac{2^{k+2}}{n}$

Assignment 2

$$E = Z_{1-\alpha} \frac{\sigma}{\sqrt{n}}$$

(a) Isoler n

$E = Z_{1-\alpha} \frac{\sigma}{\sqrt{n}}$

$\sqrt{n} \cdot E = Z_{1-\alpha} \sigma$

$\sqrt{n} = Z_{1-\alpha} \frac{\sigma}{E}$

$n = \left(Z_{1-\alpha} \cdot \frac{\sigma}{E}\right)^2$

(b) $Z_{1-\alpha} = 1{,}96$

$\sigma = 2$

$E \leq 0{,}5$

$n \geq \left(1{,}96 \cdot \frac{2}{0{,}5}\right)^2$

$n \geq 62$

Assignment 3

Find gcd og lcm

(a) $\gcd(2^2 \cdot 3^3 \cdot 5^5, 2^5 \cdot 3^3 \cdot 5^2) = \underline{2^2 \cdot 3^3 \cdot 5^2}$

$\operatorname{lcm}(2^2 \cdot 3^3 \cdot 5^5, 2^5 \cdot 3^3 \cdot 5^2) = \underline{2^5 \cdot 3^3 \cdot 5^5}$

(b) $\gcd(2 \cdot 3 \cdot 5 \cdot 7 \cdot 11 \cdot 13, 2^{11} \cdot 3^9 \cdot 11 \cdot 17^{14}) = \underline{2 \cdot 3 \cdot 11 \cdot}$

$\operatorname{lcm}(2 \cdot 3 \cdot 5 \cdot 7 \cdot 11 \cdot 13, 2^{11} \cdot 3^9 \cdot 11 \cdot 17^{14}) = \underline{2^{11} \cdot 3^9 \cdot 5 \cdot 7 \cdot 11 \cdot 13 \cdot 17^{14}}$

$a \cdot b = \gcd(a,b) \cdot \operatorname{lcm}(a,b)$

(c) Bekreft reglen for (a) og (b)

$a \cdot b = 2^2 \cdot 3^3 \cdot 5^5 \cdot 2^5 \cdot 3^3 \cdot 5^2 = \boxed{2^7 \cdot 3^6 \cdot 5^7}$ ← det passer

$\gcd(a,b) \cdot \operatorname{lcm}(a,b) = 2^2 \cdot 3^3 \cdot 5^2 \cdot 2^5 \cdot 3^3 \cdot 5^5 = \boxed{2^7 \cdot 3^6 \cdot 5^7}$

$a \cdot b = 2 \cdot 3 \cdot 5 \cdot 7 \cdot 11 \cdot 13 \cdot 2^{11} \cdot 3^9 \cdot 11 \cdot 17^{14} = \boxed{2^{12} \cdot 3^{10} \cdot 5 \cdot 7 \cdot 11^2 \cdot 13 \cdot 17^{14}}$ ← det passer

$\gcd(a,b) \cdot \operatorname{lcm}(a,b) = 2 \cdot 3 \cdot 11 \cdot 2^4 \cdot 3^9 \cdot 5 \cdot 7 \cdot 11 \cdot 13 \cdot 17^{14} = \boxed{2^{12} \cdot 3^{10} \cdot 5 \cdot 7 \cdot 11^2 \cdot 13 \cdot 17^{14}}$

(d) $a \cdot b = 2^7 \cdot 3^8 \cdot 5^2 \cdot 7^{11}$ og $\gcd(a,b) = 2^3 \cdot 3^4 \cdot 5$

$$\operatorname{lcm}(a,b) = \frac{a \cdot b}{\gcd(a,b)} = \frac{2^7 \cdot 3^8 \cdot 5^2 \cdot 7^{11}}{2^3 \cdot 3^4 \cdot 5} = \underline{2^4 \cdot 3^4 \cdot 5 \cdot 7^{11}}$$

Assignment 4

(a) $231 \bmod 12 = 3$ da $19 \cdot 12 + 3 = 228 + 3 = 231$

(b) $88 \bmod 12 = 4$ da $7 \cdot 12 + 4 = 84 + 4 = 88$

(c) $599 \bmod 9 = 5$ da $66 \cdot 9 + 5 = 594 + 5 = 599$

(d) $400 \bmod 9 = 4$ da $44 \cdot 9 + 4 = 396 + 4 = 400$

Tjck om $(a+b) \bmod m = (a \bmod m + b \bmod m) \bmod m$

(e) $(231+88) \bmod 12 = 319 \bmod 12 = \boxed{7}$ ✓

$(231 \bmod 12 + 88 \bmod 12) \bmod 12 = (3+4) \bmod 12 = \boxed{7}$

(f) $(599+400) \bmod 9 = 999 \bmod 9 = \boxed{0}$ ✓

$(599 \bmod 9 + 400 \bmod 9) \bmod 9 = (5+4) \bmod 9 = \boxed{0}$