Normal Distribution Introduction

Here Z refers to the standard normal $Z \sim N(0, 1^2)$. X refers to a 'real life' normal $X \sim N(\mu, \sigma^2)$.

1. $\mathbb{P}(Z < 0)$. $\boxed{0.5000}$
2. $\mathbb{P}(Z < 1)$. $\boxed{0.8413}$
3. $\mathbb{P}(Z \geqslant 1.2)$. $\boxed{0.1151}$
4. $\mathbb{P}(Z < -0.3)$. $\boxed{0.3821}$
5. $\mathbb{P}(Z > 2.61)$. $\boxed{0.0045}$
6. $\mathbb{P}(Z \geqslant -0.717)$. $\boxed{0.2368}$
7. $\mathbb{P}(0 \leqslant Z < 2)$. $\boxed{0.4772}$
8. $\mathbb{P}(-0.8 < Z < 0.4)$. $\boxed{0.4435}$
9. $\mathbb{P}(|Z| \leqslant 1.35)$. $\boxed{0.8230}$

Now for real life...

10. If $X \sim N(20, 2^2)$ calculate:
    (a) $\mathbb{P}(X > 20)$. $\boxed{0.5000}$
    (b) $\mathbb{P}(X \leqslant 17)$. $\boxed{0.0668}$
    (c) $\mathbb{P}(21 < X < 25)$. $\boxed{0.3023}$
    (d) $\mathbb{P}(X \leqslant 200)$. $\boxed{1.000}$
11. If $X \sim N(35, 10)$ calculate:
    (a) $\mathbb{P}(X < 34)$. $\boxed{0.3761}$
    (b) $\mathbb{P}(X \geqslant 32)$. $\boxed{0.8287}$
    (c) $\mathbb{P}(35 \leqslant X \leqslant 39)$. $\boxed{0.3971}$
    (d) $\mathbb{P}(|X - \mu| < 5)$. $\boxed{0.8860}$