

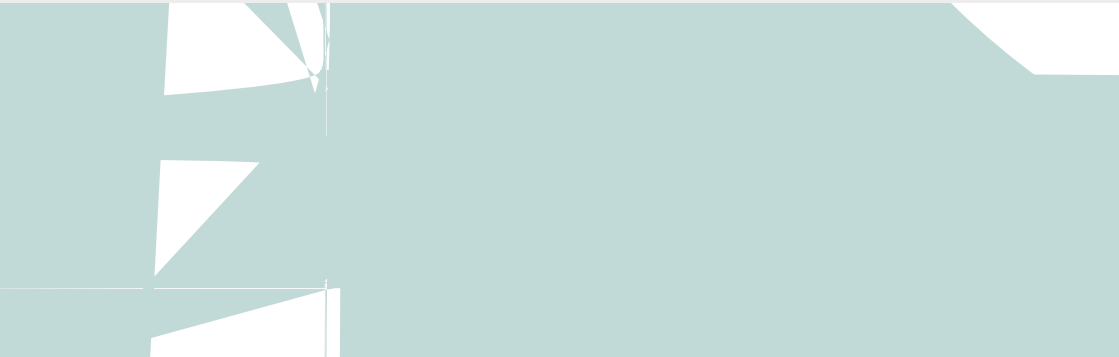
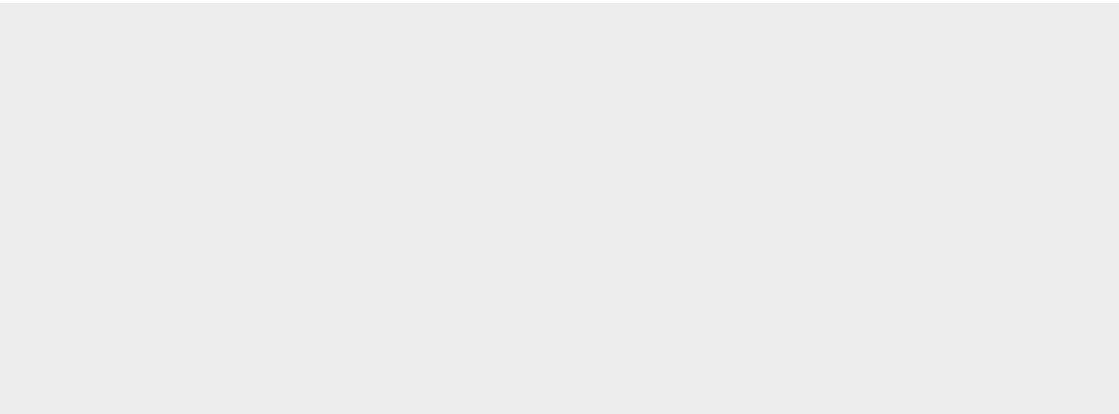


1. $f(x) = x^2 + 2x - 3$, $f(1) = 0$, $f(3) = 0$
2. $f(x) = x^2 - 4x + 4$, $f(2) = 0$
3. $f(x) = x^2 - 5x + 6$, $f(2) = 0$, $f(3) = 0$
4. $f(x) = x^2 - 6x + 9$, $f(3) = 0$

5. $f(x) = x^2 - 7x + 12$, $f(3) = 0$, $f(4) = 0$
6. $f(x) = x^2 - 8x + 16$, $f(4) = 0$

7. $f(x) = x^2 - 9x + 18$, $f(3) = 0$, $f(6) = 0$
8. $f(x) = x^2 - 10x + 25$, $f(5) = 0$

9. $f(x) = x^2 - 11x + 30$, $f(5) = 0$, $f(6) = 0$
10. $f(x) = x^2 - 12x + 36$, $f(6) = 0$



1. (continued) $\frac{1}{2} \ln 2$

→ given $\int_0^1 \frac{1}{1+x^2} dx = \frac{1}{2} \ln 2$, find $\int_0^1 \frac{1}{1+x^2} dx$
→ by using the identity $\frac{1}{1+x^2} = \frac{1}{2} \left(\frac{1}{1+ix} + \frac{1}{1-ix} \right)$
→ $\int_0^1 \frac{1}{1+x^2} dx = \frac{1}{2} \left(\int_0^1 \frac{1}{1+ix} dx + \int_0^1 \frac{1}{1-ix} dx \right)$

$$\begin{aligned} & \int_0^1 \frac{1}{1+ix} dx = \int_0^1 \frac{1}{1+ix} dx = \frac{1}{i} \ln(1+ix) \Big|_0^1 = \frac{1}{i} \ln(1+i) \\ & \int_0^1 \frac{1}{1-ix} dx = \int_0^1 \frac{1}{1-ix} dx = \frac{1}{-i} \ln(1-ix) \Big|_0^1 = \frac{1}{-i} \ln(1-i) \\ & \int_0^1 \frac{1}{1+x^2} dx = \frac{1}{2} \left(\frac{1}{i} \ln(1+i) - \frac{1}{i} \ln(1-i) \right) \\ & \int_0^1 \frac{1}{1+x^2} dx = \frac{1}{2} \ln 2 \end{aligned}$$

→ $\int_0^1 \frac{1}{1+x^2} dx = \frac{1}{2} \ln 2$
→ by using the identity $\frac{1}{1+x^2} = \frac{1}{2} \left(\frac{1}{1+ix} + \frac{1}{1-ix} \right)$
→ $\int_0^1 \frac{1}{1+x^2} dx = \frac{1}{2} \ln 2$

2. (continued) $\frac{1}{2} \ln 2$

→ given $\int_0^1 \frac{1}{1+x^2} dx = \frac{1}{2} \ln 2$, find $\int_0^1 \frac{1}{1+x^2} dx$
→ by using the identity $\frac{1}{1+x^2} = \frac{1}{2} \left(\frac{1}{1+ix} + \frac{1}{1-ix} \right)$

3. (continued) $\frac{1}{2} \ln 2$

→ given $\int_0^1 \frac{1}{1+x^2} dx = \frac{1}{2} \ln 2$, find $\int_0^1 \frac{1}{1+x^2} dx$
→ by using the identity $\frac{1}{1+x^2} = \frac{1}{2} \left(\frac{1}{1+ix} + \frac{1}{1-ix} \right)$
→ $\int_0^1 \frac{1}{1+x^2} dx = \frac{1}{2} \ln 2$

$$\begin{aligned} & \int_0^1 \frac{1}{1+ix} dx = \int_0^1 \frac{1}{1+ix} dx = \frac{1}{i} \ln(1+ix) \Big|_0^1 = \frac{1}{i} \ln(1+i) \\ & \int_0^1 \frac{1}{1-ix} dx = \int_0^1 \frac{1}{1-ix} dx = \frac{1}{-i} \ln(1-ix) \Big|_0^1 = \frac{1}{-i} \ln(1-i) \\ & \int_0^1 \frac{1}{1+x^2} dx = \frac{1}{2} \left(\frac{1}{i} \ln(1+i) - \frac{1}{i} \ln(1-i) \right) \\ & \int_0^1 \frac{1}{1+x^2} dx = \frac{1}{2} \ln 2 \end{aligned}$$

→ $\int_0^1 \frac{1}{1+x^2} dx = \frac{1}{2} \ln 2$
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