

$$w=3+4i$$

$$z=5-2i$$

$$\frac{w}{z} = \frac{3+4i}{5-2i} = \text{multiply by conjugate of bottom} = \frac{3+4i}{5-2i} \cdot \frac{5+2i}{5+2i} = \frac{7+26i}{29} = \frac{7}{29} + \frac{26}{29}i$$

1) Bottom result comes from FOIL:

$$\begin{aligned}(5-2i)(5+2i) &= 25+10i-10i-4i^2 \\ &= 25-4(-1)=29\end{aligned}$$

FOIL

replace i^2 with -1 and simplify

2) Top result also comes from FOIL:

$$\begin{aligned}(3+4i)(5+2i) &= 15+6i+20i+8i^2 \\ &= 15+26i+8(-1) \\ &= 15+26i-8 \\ &= 7+26i\end{aligned}$$

FOIL

Replace i^2 with -1

Simplify