

Print your name: _____

Answer each question completely. You must justify your answers to get credit. Even a correct answer with no justification will get no credits. Each problem is worth 5 points.

1. Write i^{42} on the form $a + bi$.

Solution. In polar form we have $i = e^{\frac{i\pi}{2}}$, so we have

$$i^{42} = \left(e^{\frac{i\pi}{2}}\right)^{42} = e^{\frac{42i\pi}{2}} = e^{21i\pi} = e^{i\pi} = -1.$$

□

2. Write $\frac{3+2i}{1-i}$ on the form $a + bi$.

Solution. We carry out the division by multiplying the numerator and the denominator by $1 + i$, which is the complex conjugate of the denominator.

$$\frac{3+2i}{1-i} = \frac{(3+2i)(1+i)}{(1-i)(1+i)} = \frac{3+3i+2i+2i^2}{1+1} = \frac{1+5i}{2} = \frac{1}{2} + \frac{5}{2}i.$$

□