4.6

1) $\dfrac{5+3\,i}{2+4\,i} = \dfrac{(5+3\,i)\,(2-4\,i)}{(2+4\,i)\,(2-4\,i)} = \dfrac{10-20\,i+6\,i-12\,i^2}{4-8\,i+8\,i-16\,i^2} = \dfrac{10-14\,i+12}{4+16} =$

$\dfrac{22-14\,i}{20} = \dfrac{22}{20} - \dfrac{14}{20}\,i = \dfrac{11}{10} - \dfrac{7}{10}\,i$

2) $\dfrac{63+16\,i}{4+3\,i} = \dfrac{(63+16\,i)\,(4-3\,i)}{(4+3\,i)\,(4-3\,i)} = \dfrac{252-189\,i+64\,i-48\,i^2}{16-12\,i+12\,i-9\,i^2} =$

$\dfrac{252-125\,i+48}{16+9} = \dfrac{300-125\,i}{25} = \dfrac{300}{25} - \dfrac{125}{25}\,i = 12-5\,i$

3) $\dfrac{56+33\,i}{12-5\,i} = \dfrac{(56+33\,i)\,(12+5\,i)}{(12-5\,i)\,(12+5\,i)} = \dfrac{672+280\,i+396\,i+165\,i^2}{144+60\,i-60\,i-25\,i^2} =$

$\dfrac{672+676\,i-165}{144+25} = \dfrac{507+676\,i}{169} = \dfrac{507}{169} + \dfrac{676}{169}\,i = 3+4\,i$

4) $\dfrac{13-5\,i}{1-i} = \dfrac{(13-5\,i)\,(1+i)}{(1-i)\,(1+i)} = \dfrac{13+13\,i-5\,i-5\,i^2}{1+i-i-i^2} = \dfrac{13+8\,i+5}{1+1} =$

$\dfrac{18+8\,i}{2} = \dfrac{18}{2} + \dfrac{8}{2}\,i = 9+4\,i$

5) $\dfrac{2\,i}{1+3\,i} = \dfrac{2\,i(1-3\,i)}{(1+3\,i)\,(1-3\,i)} = \dfrac{2\,i-6\,i^2}{1-3\,i+3\,i-9\,i^2} = \dfrac{2\,i+6}{1+9} = \dfrac{6+2\,i}{10} =$

$\dfrac{6}{10} + \dfrac{2}{10}\,i = \dfrac{3}{5} + \dfrac{1}{5}\,i$

6) $\dfrac{i}{2-3\,i} = \dfrac{i\,(2+3\,i)}{(2-3\,i)\,(2+3\,i)} = \dfrac{2\,i+3\,i^2}{4+6\,i-6\,i-9\,i^2} = \dfrac{2\,i-3}{4+9} = \dfrac{-3+2\,i}{13} =$

$-\dfrac{3}{13} + \dfrac{2}{13}\,i$

7) $\dfrac{7+i}{3-2\,i} = \dfrac{(7+i)\,(3+2\,i)}{(3-2\,i)\,(3+2\,i)} = \dfrac{21+14\,i+3\,i+2\,i^2}{9+6\,i-6\,i-4\,i^2} = \dfrac{21+17\,i-2}{9+4} =$

$\dfrac{19+17\,i}{13} = \dfrac{19}{13} + \dfrac{17}{13}\,i$

8) $\dfrac{-3}{(1+i)\,(2-i)} = \dfrac{-3}{2-i+2\,i-i^2} = \dfrac{-3}{2+i+1} = \dfrac{-3}{3+i} = \dfrac{-3\,(3-i)}{(3+i)\,(3-i)} =$

$\dfrac{-9+3\,i}{9-3\,i+3\,i-i^2} = \dfrac{-9+3\,i}{9+1} = \dfrac{-9+3\,i}{10} = -\dfrac{9}{10} + \dfrac{3}{10}\,i$