Simplify the following expressions.

1) $(\dfrac{5+3}{11-5})^2$ 2) $(\dfrac{13}{65})^3$ 3) $\sqrt{\dfrac{12}{49}}$ 4) $\sqrt{\dfrac{98}{150}}$ 5) $\sqrt{\dfrac{24}{9}}$

$(\dfrac{8}{6})^2$

$\dfrac{(4)^2}{(3)^2}$

$\boxed{\dfrac{16}{9}}$

$\boxed{\dfrac{1}{125}}$

$\dfrac{\sqrt{12}}{\sqrt{49}}$

$\dfrac{\sqrt{4\cdot3}}{7}$

$\boxed{\dfrac{2\sqrt{3}}{7}}$

$\dfrac{\sqrt{\dfrac{49}{75}}}{7}$

$\dfrac{7}{\sqrt{25\cdot3}}$

$\dfrac{7}{5\sqrt{3}}\cdot\dfrac{\sqrt{3}}{\sqrt{3}}$

$\boxed{\dfrac{7\sqrt{3}}{15}}$

$\boxed{\dfrac{2\sqrt{6}}{3}}$

Simplify.

6) $\sqrt{-14}$ 7) $\sqrt{-72}$ 8) $\sqrt{-24x^5y^2}$ 9) $\sqrt{-169p^4q^4}$ 10) $\sqrt[3]{-125}$

$\boxed{i\sqrt{14}}$

$\sqrt{36\cdot2\cdot(-1)}$

$\boxed{6i\sqrt{2}}$

$\boxed{2ix^2y\sqrt{6x} \qquad\qquad 13ip^2q^2 \qquad\qquad 5i}$

11) What are the two facts you must remember when working with imaginary numbers?

$\boxed{\text{1) } i^2 = -1 \qquad\qquad \text{2) } \sqrt{-1} = i}$

Simplify.

12) $(-8 - 4i) + (5 + 14i)$ 13) $(2 - 9i) - (12 - 4i)$ 14) $5(9i)$ 15) $8i(2)(3i)$

$48i^2$

$\boxed{-3 + 10i \qquad\qquad\qquad -10 - 5i \qquad\qquad 45i}$

$48(-1)$

$\boxed{-48}$

16) 9(1 - 7i)

$$\boxed{9 - 63i}$$

17) $8(8i - 5i^2)$

$64i - 40i^2$

$64i - 40(-1)$

$\boxed{40 + 64i}$

18) (12 - i)(10 + 7i)

$120 + 84i - 10i - 7i^2$

$120 + 74i - 7(-1)$

$127 + 74i$

19) (11 − i)(-2 + 6i)

$-22 + 66i + 2i - 6i^2$

$-22 + 68i - 6(-1)$

$-16 + 68i$

Simplify.

20) $\dfrac{-12}{9i}$

21) $\dfrac{4 - 5i}{2i}$

22) $\dfrac{5}{2 + 3i}$

23) $\dfrac{2 + i}{4 + 5i}$

24) $\dfrac{5 + 4i}{3 - 6i}$

20)

$\dfrac{-4}{3i} \cdot \dfrac{i}{i}$

$\dfrac{-4i}{3i^2}$

$\dfrac{-4i}{3(-1)}$

$\boxed{\dfrac{4i}{3}}$

21)

$\dfrac{4 - 5i}{2i} \cdot \dfrac{i}{i}$

$\dfrac{4i - 5i^2}{2i^2}$

$\dfrac{4i - 5(-1)}{2(-1)}$

$\boxed{\dfrac{4i + 5}{-2}}$

22)

$\dfrac{5}{2 + 31} \cdot \dfrac{2 - 3i}{2 - 3i}$

$\dfrac{10 - 15i}{(2 - 3i)(2 + 3i)}$

$\dfrac{10 - 15i}{4 - 9i^2}$

$\dfrac{10 - 15i}{4 - 9(-1)}$

$\boxed{\dfrac{10 - 15i}{13}}$

23)

$\boxed{\dfrac{13 - 6i}{41}}$

24)

$\boxed{\dfrac{-9 + 42i}{45}}$

25) i^2

26) i^9

27) i^{22}

28) i^{51}

29) i^{48}

30) i^{25}

$\boxed{\begin{array}{cccccc} -1 & i & -1 & -i & 1 & i \end{array}}$