

Algebra 2

State the property of real numbers illustrated in each problem.

1) $12 + (-12) = 0$

2) $4(8 + 13) = 4(8) + 4(13)$

3) $3(5 \cdot 9) = (3 \cdot 5)9$

Additive Inverse

Distributive

Associative (x)

4) $6 + 15 = 15 + 6$

5) $23(1) = 23$

6) $12(1/12) = 1$

Commutative (+)

Multiplicative Identity

Multiplicative Inverse

7) $6(9) = 9(6)$

8) $15 + (2 + 11) = (15 + 2) + 11$

9) $16 + 0 = 16$

Commutative (x)

Associative (+)

Additive Identity

Simplify the following expressions.

10) $\left(\frac{36}{27}\right)^3$

11) $\left(\frac{17}{34}\right)^5$

12) $\left(\frac{5+4^2}{8+6}\right)^2$

13) $\sqrt{\frac{64}{81}}$

14) $\sqrt{\frac{98}{2}}$

$$= \left(\frac{4}{3}\right)^3 = \frac{4^3}{3^3}$$

$$= \left(\frac{1}{2}\right)^5 = \frac{1^5}{2^5}$$

$$= \left(\frac{21}{14}\right)^2 = \left(\frac{3}{2}\right)^2$$

$$= \frac{\sqrt{64}}{\sqrt{81}}$$

$$= \sqrt{49}$$

$$= \frac{64}{27}$$

$$= \frac{1}{32}$$

$$= \frac{9}{4}$$

$$= \frac{8}{9}$$

$$= 7$$

15) $\sqrt[3]{\frac{32}{2}}$

16) $\sqrt[3]{\frac{81}{64}}$

17) $\sqrt[3]{\frac{8}{5}}$

18) $\sqrt[3]{\frac{216}{32}}$

19) $\sqrt[3]{\frac{16}{18}}$

$$= \sqrt[3]{16}$$

$$= \frac{\sqrt[3]{81}}{\sqrt[3]{64}}$$

$$= \frac{2}{\sqrt[3]{5}} \cdot \frac{\sqrt[3]{25}}{\sqrt[3]{25}}$$

$$= \frac{6}{\sqrt[3]{8 \cdot 4}}$$

$$= \sqrt[3]{\frac{8}{9}}$$

$$= \sqrt[3]{8 \cdot 2}$$

$$= \frac{\sqrt[3]{27 \cdot 3}}{4}$$

$$= \frac{2\sqrt[3]{25}}{\sqrt[3]{125}}$$

$$= \frac{6}{2\sqrt[3]{4}} \cdot \frac{\sqrt[3]{2}}{\sqrt[3]{2}}$$

$$= \frac{2}{\sqrt[3]{9}} \cdot \frac{\sqrt[3]{3}}{\sqrt[3]{3}}$$

$$= \frac{6\sqrt[3]{2}}{2\sqrt[3]{8}} = \frac{6\sqrt[3]{2}}{2 \cdot 2}$$

$$= \frac{2\sqrt[3]{3}}{\sqrt[3]{27}}$$

$$= 2\sqrt[3]{2}$$

$$= \frac{3\sqrt[3]{3}}{4}$$

$$= \frac{2\sqrt[3]{25}}{5}$$

$$= \frac{3\sqrt[3]{2}}{2}$$

$$= \frac{2\sqrt[3]{3}}{3}$$

Simplify.

$$20) \sqrt{-4}$$

$$= \sqrt{4(-1)}$$

$$= 2i$$

$$21) \sqrt{-169}$$

$$= \sqrt{169(-1)}$$

$$= 13i$$

$$22) \sqrt{-20}$$

$$= \sqrt{4 \cdot 5(-1)}$$

$$= 2i\sqrt{5}$$

$$23) \sqrt{-10}$$

$$= \sqrt{10(-1)}$$

$$= i\sqrt{10}$$

$$24) \sqrt{-x^2}$$

$$= \sqrt{x^2(-1)}$$

$$= ix$$

$$25) \sqrt{-b^3}$$

$$= \sqrt{b^2 \cdot b(-1)}$$

$$= ib\sqrt{b}$$

$$26) \sqrt{-t^7}$$

$$= \sqrt{t^6 \cdot t(-1)}$$

$$= it^3\sqrt{t}$$

$$27) \sqrt{-25p^2}$$

$$= \sqrt{25p^2(-1)}$$

$$= 5ip$$

$$28) \sqrt{-63c^5}$$

$$= \sqrt{9 \cdot 7 \cdot c^4 \cdot c(-1)}$$

$$= 3ic^2\sqrt{7c}$$

$$29) \sqrt{-15d}$$

$$= \sqrt{15d(-1)}$$

$$= i\sqrt{15d}$$

Identify the sets of complex numbers to which each of the following belongs.

$$30) 10$$

C, R, Q, Z, W, N

$$31) 3i$$

C, Imag., Pure

$$32) 2 + 5i$$

C, Imag., N.P.

$$33) -7 + 0i$$

C, R, Q, Z

$$34) 13/17$$

C, R, Q

$$35) 0 + 12i = 12i$$

C, Imag., Pure

$$36) 0$$

C, R, Q, Z, W

$$37) \sqrt{17}$$

C, R, I

$$38) -9 - i$$

C, Imag, N.P.

$$39) .875$$

C, R, Q

Simplify.

$$40) 2i + 3i + 4i$$

$$= 9i$$

$$41) 5 + 8 + 6i$$

$$= 13 + 6i$$

$$42) (4 + i) + (3 + 7i)$$

$$= 7 + 8i$$

$$43) (6 - 13i) + (-7 - 3i)$$

$$= -1 - 16i$$

$$44) (22 + 15i) - (16 + 6i)$$

$$= 6 + 9i$$

$$45) 8i - 14 - 7i$$

$$= -14 + i$$

$$46) (-10 + 18i) - (9 + 2i)$$

$$= -19 + 16i$$