Secondary Math 2 HONORS Name_____

Unit 1 Number Theory Review

Date_____ Period____

List all sets to which the number belongs.

1) $\frac{15}{3}$

2) $\sqrt{-64}$

3) 5.184759983665743625...

4) 0

Determine if the result of each situation will be rational or irrational. Give examples to support your answer.

5) Sum of a rational and an irrational number

6) Sum of two rational numbers

7) Product of two irrational numbers

8) Product of two rational numbers

9) Sum of two irrational numbers

10) Product of a rational and an irrational number

Write each expression in exponential form.

11) $\sqrt[3]{(7n)^5}$

12) $\sqrt[4]{5m^3}$

Write each expression in radical form.

13) $(5x)^{\frac{3}{4}}$

14) $2v^{\frac{3}{4}}$

Simplify. Your answer should contain only positive exponents.

15) $2xy^2 \cdot \left(y^0\right)^{-1}$

16) $x^{-1}y^4 \cdot \left(xy^2\right)^4$

17) $\dfrac{y^2}{2x^4y^3 \cdot x^2}$

18) $\dfrac{3x^2y^4}{x^{-3}y^2 \cdot x^{-3}y^3}$

19) $\dfrac{b^3}{\left(2a^4\right)^3}$

20) $\dfrac{2b^3}{\left(2a^4b^2\right)^{-2}}$

Simplify. Your answer should contain only positive exponents with no fractional exponents in the denominator.

21) $\left(x^{-\frac{4}{3}}y^{\frac{5}{3}}\right)^{\frac{3}{2}} \cdot xy^{2}$

22) $x^{-\frac{1}{4}} \cdot \left(x^{-\frac{5}{3}}y^{-\frac{4}{3}}\right)^{-\frac{3}{2}}$

23) $\dfrac{3x^{\frac{5}{3}}y^{-\frac{3}{2}}}{3yx^{-2} \cdot 2x^{-1}y^{\frac{3}{2}} \cdot 4yx^{\frac{3}{4}}}$

24) $\dfrac{4y^{\frac{3}{2}}}{2xy^{\frac{3}{4}} \cdot 4x^{2}y^{\frac{3}{4}}}$

25) $\dfrac{\left(x^{\frac{2}{3}}y^{\frac{1}{2}}\right)^{\frac{3}{2}}}{x^{2}y^{\frac{2}{3}}}$

26) $\dfrac{\left(a^{\frac{2}{3}}b^{0}\right)^{2}}{a^{\frac{3}{4}}}$

Simplify. Use absolute value signs when necessary.

27) $-\sqrt{80}$

28) $7\sqrt{-50}$

29) $\sqrt{125x^2y^4}$

30) $\sqrt[4]{648x^5y^6}$

Simplify.

31) $-\sqrt{18} + 2\sqrt{3} + 3\sqrt{12}$

32) $2\sqrt{45} - \sqrt{3} - 2\sqrt{6} + 2\sqrt{20}$

33) $\sqrt{6a^2} \cdot 3\sqrt{2a^3}$

34) $-5\sqrt{3m^2} \cdot \sqrt{12m^2}$

35) $\left(\sqrt{2} - 1\right)\left(-\sqrt{2} + 2\right)$

36) $\left(-1 + \sqrt{3}\right)\left(-5 + \sqrt{3}\right)$

37) $\dfrac{5\sqrt{15}}{\sqrt{16}}$

38) $\dfrac{5\sqrt{4}}{\sqrt{9}}$

39) $\dfrac{4\sqrt{3}}{\sqrt{5}}$

40) $\dfrac{4 - 4\sqrt{5}}{2\sqrt{9}}$

41) $\dfrac{2 - 3\sqrt{5}}{\sqrt{4}}$

42) $\dfrac{3}{3 - \sqrt{5}}$

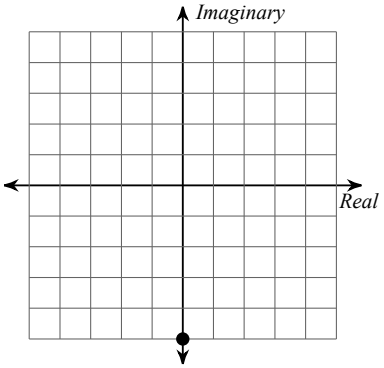
43) $\dfrac{4}{4\sqrt{3} - 2\sqrt{2}}$

44) $\dfrac{3 - \sqrt{5}}{3 - \sqrt{2}}$

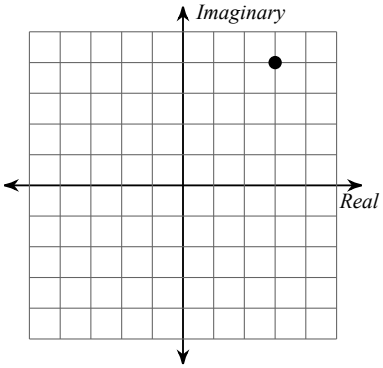
45) $\dfrac{2\sqrt{2} + \sqrt{5}}{3 + 3\sqrt{5}}$

Identify each complex number graphed.

46)

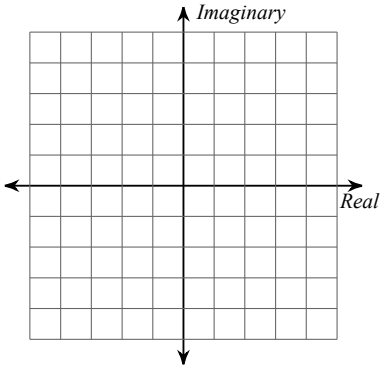


47)

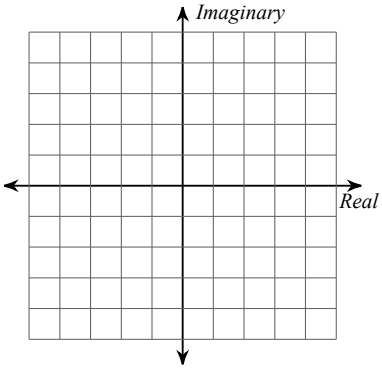


Graph each number in the complex plane.

48) $1 + i$



49) $3 + 3i$



Find the modulus of each complex number.

50) $\left|4 - 12i\right|$

51) $\left|8 + 2i\right|$

Simplify.

52) $(-3 + 3i) + (3 + 4i)$

53) $(4 - 6i) - (-7 + i)$

54) $(-8 - 2i)(2 + 3i)$

55) $(-6 - 2i)(3 - 6i)$

56) $(7 - 4i)^2$

57) $\dfrac{5 + 4i}{-7i}$

58) $\dfrac{-4}{-8i}$

59) $\dfrac{-4}{-7i}$

60) $\dfrac{1}{9 - i}$

61) $\dfrac{4i}{2 - 8i}$

62) $\dfrac{-10 + 9i}{4 + 3i}$

63) What is a conjugate? Where does it come from? In what situations do you need to use a conjugate?

64) Define a complex number. Why is every number a complex number?

65) What does a rational exponent represent? Give an example.

66) Explain why anything to the 0 power equals 1 (zero exponent property).

67) Show, using rational exponents, why $\sqrt[3]{12} \cdot \sqrt[3]{4} = \sqrt[3]{48}$.

68) Kim encounters a problem in which she needs to rationalize the denominator. She performs the step below to simplify. Explain why her work is incorrect, then do the problem correctly. BE THOROUGH WITH YOUR EXPLANATION.

Ex: Simplify $\frac{12}{\sqrt{5}}$

$$\left(\frac{12}{\sqrt{5}}\right)^2 = \frac{144}{5}$$