

## Odd-Numbered Answers to Exercise Set 1.1: Numbers

1. (a) Composite; 1, 2, 4, 8  
 (b) Prime  
 (c) Neither  
 (d) Neither  
 (e) Composite; 1, 2, 3, 4, 6, 12

3. (a)  $0.\overline{1}$   
 (b)  $0.\overline{2}$   
 (c)  $0.\overline{3}$   
 (d)  $0.\overline{4}$   
 (e)  $0.\overline{5}$   
 (f)  $0.\overline{6}$   
 (g)  $0.\overline{7}$   
 (h)  $0.\overline{8}$   
 (i)  $0.\overline{9} = 1$   
 (j)  $1.\overline{1}$  (since  $\frac{10}{9} = 1\frac{1}{9}$ )  
 (k)  $1.\overline{5}$  (since  $\frac{14}{9} = 1\frac{5}{9}$ )  
 (l)  $2.\overline{7}$  (since  $\frac{25}{9} = 2\frac{7}{9}$ )  
 (m)  $3.\overline{2}$  (since  $\frac{29}{9} = 3\frac{2}{9}$ )

5. (a) Rational;  $\frac{7}{10}$   
 (b) Irrational  
 (c) Rational;  $\frac{3}{7}$   
 (d) Rational;  $\frac{-5}{1}$   
 (e) Rational;  $\frac{4}{1}$   
 (f) Rational;  $\frac{1}{3}$   
 (g) Rational;  $\frac{12}{1}$   
 (h) Rational;  $\frac{23}{35}$   
 (i) Irrational  
 (j) Rational;  $\frac{-2}{1}$   
 (k) Irrational

7. Odd, Negative, Integer, Rational, Real

9. Positive, Irrational, Real

11. (a) -8, 0, 12  
 (b) 5  
 (c)  $\sqrt{7}, \pi, \frac{15}{4}, 5, 12$   
 (d) -8, -2.1,  $-0.\overline{4}$   
 (e) 5  
 (f) 12  
 (g) 5, 12  
 (h) 0, 5, 12

- (i) -8, 0, 5, 12  
 (j) All numbers in the set:  
 -8, -2.1,  $-0.\overline{4}$ , 0,  $\sqrt{7}$ ,  $\pi$ ,  $\frac{15}{4}$ , 5, 12  
 (k) -8, -2.1,  $-0.\overline{4}$ , 0,  $\frac{15}{4}$ , 5, 12  
 (l)  $\sqrt{7}, \pi$   
 (m) None

13.

	$\frac{\sqrt{25}}{0}$	1	$5\frac{3}{10}$	-55	$13.\overline{3}$
Undefined	Y	N	N	N	N
Natural	N	Y	N	N	N
Whole	N	Y	N	N	N
Integer	N	Y	N	Y	N
Rational	N	Y	Y	Y	Y
Irrational	N	N	N	N	N
Prime	N	N	N	N	N
Composite	N	N	N	N	N
Real	N	Y	Y	Y	Y

15. 2 is the *only* number that is both prime and even.

17. Answers vary. Some possible answers are:

$$\frac{2}{3}, -\frac{4}{7}, 0.6, 0.\overline{37}, -0.\overline{2}, -8$$

(Note: Any repeating decimal is a rational number. There are methods for changing repeating decimals to fractions which will not be learned in this course.)

19. Answers vary. Some possible answers are:

$$\sqrt{2}, -\sqrt{3}, \sqrt{5}, \sqrt{6}, -\sqrt{10}, \pi, e, 0.080080008\dots$$

21. Does not exist

23. Does not exist

25. True

27. True

29. False. The number 0 is a whole number but not a natural number.

31. True

33. False. A repeating decimal such as  $0.\overline{4} = \frac{4}{9}$  is a nonterminating decimal, but is a rational number.

35. 2, 3, 5, 7

37. 8, 9, 10, 12, 14, 15, 16, 18

39. 4, 6, 8

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41.  $<$

43.  $>$

45.  $=$

47.  $>$

49.  $>$

51.  $<$

53.  $<$

55.  $=$

57. (a)  $-3$

(b)  $4$

(c)  $-1$

(d)  $\frac{2}{3}$

(e)  $-2\frac{3}{7}$

59. (a)  $-\frac{1}{2}$

(b)  $\frac{9}{5}$

(c) Undefined

(d)  $\frac{5}{8}$  (Note:  $1\frac{3}{5} = \frac{8}{5}$ )

(e)  $-1$

61. (a)  $0$

(b)  $1$

63. Numbers ordered from least to greatest:

$$\left\{ -\frac{9}{4}, -\sqrt{2}, -1, \frac{0}{5}, 0.\bar{4}, \sqrt{0.49} \right\}$$

The above numbers plotted on a number line:

