

Pre-Test Unit 7: Real Numbers KEY

No calculator necessary. Please do not use a calculator.

Convert the following fraction to a decimal or decimal to a fraction. (5 pts; 3 pts for correct set-up/work, 2 pts for correct answer)

1. $0.\overline{45}$

2. $\frac{3}{11}$

$\frac{5}{11}$

Identify if the given number is rational or irrational and explain how you know. (5 pts; 2 pts for correct answer, 3 pts for explanation)

3. $\sqrt{25}$

4. $\sqrt{2}$

5. π

6. 0.45

Rational

Irrational

Evaluate the following roots. (5 pts; no partial credit)

7. $\sqrt{49}$

8. $\sqrt[3]{-27}$

7

Approximate the square roots to one decimal place. (5 pts; 2 pts for whole number accuracy, 1 pt if within 0.1)

9. $\sqrt{20}$

10. $\sqrt{8}$

≈ 4.5

Compare the following irrational numbers using < or >. (5 pts; no partial credit)

11. $\sqrt{21} \square \sqrt{19}$

12. $-\sqrt{17} \square -\sqrt{15}$

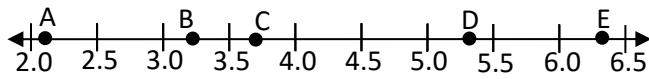
List the following numbers in order from least to greatest. (5 pts; no partial credit)

13. $\sqrt{7}, \pi, 3, 4.\overline{15}, \frac{11}{2}$

14. $\sqrt{27}, \sqrt{23}, 5, \frac{17}{2}$

$\sqrt{7}, 3, \pi, 4.\overline{15}, \frac{11}{2}$

Match the given number with the letter that approximates that number's position on the number line. (5 pts; no partial credit)



15. $\sqrt{14}$

C

16. $\sqrt{5}$

17. $\sqrt{40}$

E

Estimate the value of the expressions to the nearest whole number. (5 pts; 3 pts for correct $\sqrt{\quad}$ approximations)

18. $2\sqrt{35}$

19. $5 + \sqrt{50}$

≈ 12

Answer the following question. (5 pts; partial credit at teacher discretion)

20. A calculator displays the following number in its display: 0.37 which does not fill the display screen. Is this enough to determine whether this number is rational or irrational? In at least one complete sentence, explain why.

Lesson 7.1

Unit 7 Homework Key

Identify which of the following numbers are rational or irrational and explain how you know.

1. $\sqrt{25}$

Rational
Integer

2. $\sqrt{24}$

3. $-\sqrt{36}$

Rational
Integer

4. $-\sqrt{64}$

5. $-\sqrt{27}$

Irrational
No repeat

6. $\frac{3}{8}$

7. 0.45

Rational
Repeats 0

8. $0.\bar{2}$

9. $\sqrt{49}$

Rational
Integer

10. $\sqrt{18}$

11. $-\sqrt{10}$

Irrational
No repeat

12. $\frac{11}{21}$

13. $\frac{2}{13}$

Rational
Fraction

14. $0.\overline{42}$

15. 0.39

Rational
Repeats 0

16. $-\sqrt{100}$

17. $-\sqrt{16}$

Rational
Integer

18. $-\sqrt{43}$

19. If the number 0.77 is displayed on a calculator that can only display ten digits, do we know whether it is rational or irrational? In one complete sentence explain why.

Rational because it terminates (or repeats the digit zero).

20. If the number 0.123456789 is displayed on a calculator that can only display ten digits, do we know whether it is rational or irrational? In one complete sentence explain why.

21. If the number 0.987098709 is displayed on a calculator that can only display ten digits, do we know whether it is rational or irrational? In one complete sentence explain why.

Our best guess is that it is rational because there appears to be a pattern, but we can't be sure.

22. If the number 0.425364758 is displayed on a calculator that can only display ten digits, do we know whether it is rational or irrational? In one complete sentence explain why.

Lesson 7.2

Convert the following fractions to repeating decimals.

1. $\frac{7}{15}$

$0.4\bar{6}$

2. $\frac{2}{3}$

3. $\frac{7}{9}$

$0.\bar{7}$

4. $\frac{10}{33}$

5. $\frac{1}{9}$

$0.\bar{1}$

6. $\frac{2}{11}$

7. $\frac{11}{12}$

$0.91\bar{6}$

8. $\frac{1}{3}$

9. $\frac{5}{6}$

$0.8\bar{3}$

10. $\frac{5}{11}$

11. $\frac{1}{6}$

$0.1\bar{6}$

12. $\frac{7}{18}$

Convert the following repeating decimals to fractions.

13. $0.\bar{2}$

$\frac{2}{9}$

14. $0.1\bar{5}$

15. $0.3\bar{6}$

$\frac{11}{30}$

16. $0.4\bar{8}$

17. $1.2\bar{3}$

$\frac{37}{30}$ or $1\frac{7}{30}$

18. $1.\bar{5}$

19. $0.\overline{81}$

$\frac{9}{11}$

20. $0.\overline{35}$

21. $0.2\overline{15}$

$\frac{71}{330}$

22. $0.1\overline{23}$

23. $1.\overline{16}$

$\frac{115}{99}$ or $1\frac{16}{99}$

24. $3.\overline{25}$

Lesson 7.3

Find both square roots of the given numbers.

1. 49

± 7

2. 64

3. 25

± 5

4. 16

5. 1

± 1

6. 121

7. 9

± 3

8. 196

9. 625

± 25

10. 4

11. 36

± 6

12. 81

Evaluate the following roots giving the principal root.

13. $\sqrt{81}$

9

14. $-\sqrt{100}$

15. $\sqrt{36}$

6

16. $\sqrt{-4}$

17. $\sqrt{144}$

12

18. $-\sqrt{225}$

19. $-\sqrt{169}$

-13

20. $\sqrt{400}$

21. $-\sqrt{900}$

-30

22. $\sqrt[3]{-27}$

23. $\sqrt[3]{125}$

5

24. $\sqrt[3]{1}$

25. $\sqrt[3]{-1}$

-1

26. $\sqrt[3]{-64}$

27. $\sqrt[3]{216}$

6

28. $\sqrt[3]{8}$

29. $\sqrt[3]{-1000}$

-10

30. $\sqrt[3]{27}$

31. $-\sqrt[3]{27}$

-3

32. $-\sqrt[3]{1}$

Approximate the following irrational numbers to the nearest whole number.

33. $\sqrt{28}$	34. $\sqrt{14}$	35. $-\sqrt{39}$	36. $-\sqrt{56}$	37. $-\sqrt{77}$	38. $\sqrt{18}$
≈ 5		≈ -6		≈ -9	

39. $\sqrt{2}$	40. $\sqrt{41}$	41. $\sqrt{21}$	42. $-\sqrt{65}$	43. $-\sqrt{12}$	44. $-\sqrt{120}$
≈ 1		≈ 5		≈ -3	

45. $\sqrt{8}$	46. $\sqrt{13}$	47. $\sqrt{32}$	48. $\sqrt{47}$	49. $-\sqrt{99}$	50. $-\sqrt{5}$
≈ 3		≈ 6		≈ -10	

Approximate the following irrational numbers to one decimal place.

51. $\sqrt{30}$	52. $\sqrt{10}$	53. $-\sqrt{40}$	54. $-\sqrt{17}$	55. $\sqrt{101}$	56. $\sqrt{7}$
≈ 5.5		≈ -6.3		≈ 10.0	

57. $\sqrt{3}$	58. $\sqrt{90}$	59. $\sqrt{35}$	60. $-\sqrt{11}$	61. $-\sqrt{22}$	62. $\sqrt{61}$
≈ 1.7		≈ 5.9		≈ -4.7	

63. $\sqrt{50}$	64. $\sqrt{6}$	65. $\sqrt{67}$	66. $\sqrt{140}$	67. $-\sqrt{55}$	68. $-\sqrt{45}$
≈ 7.1		≈ 8.2		≈ -7.4	

Lesson 7.4

Place a point on the number line given for each of the following irrational numbers.

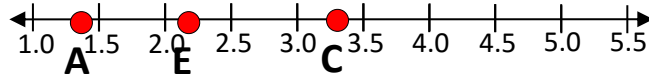
1. Point A: $\sqrt{2}$

2. Point B: $\sqrt{17}$

3. Point C: $\sqrt{11}$

4. Point D: $\sqrt{8}$

5. Point E: $\sqrt{5}$



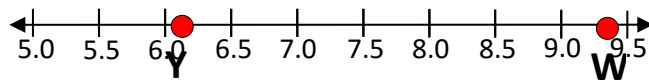
6. Point V: $\sqrt{26}$

7. Point W: $\sqrt{88}$

8. Point X: $\sqrt{77}$

9. Point Y: $\sqrt{37}$

10. Point Z: $\sqrt{30}$



Name the point on the number line associated with each irrational number.

11. $\sqrt{50}$

12. $\sqrt{103}$

13. $\sqrt{62}$

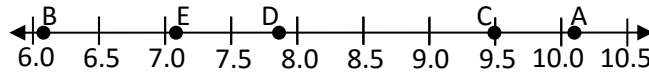
14. $\sqrt{90}$

15. $\sqrt{37}$

E

D

B



16. $\sqrt{7}$

17. $\sqrt{22}$

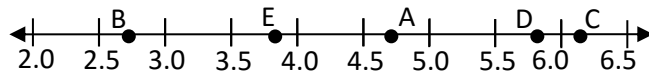
18. $\sqrt{34}$

19. $\sqrt{38}$

20. $\sqrt{15}$

A

C



Compare the following numbers using < or >.

21. $\sqrt{32} \boxed{>} 5.1$

22. $\sqrt{38} \boxed{} \sqrt{42}$

23. $\sqrt{17} \boxed{<} \frac{9}{2}$

24. $\sqrt{49} \boxed{} 7.1$

25. $\sqrt{99} \boxed{>} \frac{28}{3}$

26. $\sqrt{17} \boxed{} 4.5$

27. $\frac{43}{5} \boxed{>} \sqrt{65}$

28. $\sqrt{12} \boxed{} \sqrt{21}$

29. $\sqrt{16} \boxed{>} 3.9$

30. $\sqrt{2} \boxed{} \frac{7}{4}$

31. $\sqrt{50} \boxed{<} \frac{15}{2}$

32. $\sqrt{9} \boxed{} 3.01$

List the following numbers in order from least to greatest.

33. $\sqrt{16}, 4.2, \frac{39}{8}$

34. $\sqrt{24}, \sqrt{33}, 5.1$

$\sqrt{16}, 4.2, \frac{39}{8}$

35. $\sqrt{100}, \sqrt{110}, \frac{32}{7}$

36. $9.4, \frac{19}{2}, \sqrt{80}$

$\frac{32}{7}, \sqrt{100}, \sqrt{110}$

37. $\sqrt{35}, \sqrt{32}, \sqrt{37}, \frac{22}{3}$

38. $\sqrt{10}, 3.5, \sqrt{15}, \frac{13}{3}$

$\sqrt{32}, \sqrt{35}, \sqrt{37}, \frac{22}{3}$

39. $\sqrt{65}, \sqrt{60}, 8.5, \frac{37}{4}$

40. $\sqrt{39}, \sqrt{25}, 5.3, \sqrt{26}, \frac{23}{4}$

$\sqrt{60}, \sqrt{65}, 8.5, \frac{37}{4}$

41. $\sqrt{12}, \sqrt{15}, 4.3, \sqrt{9}, \frac{14}{5}$

42. $\sqrt{49}, \sqrt{63}, 7.3, \sqrt{38}, \frac{15}{2}$

$\frac{14}{5}, \sqrt{9}, \sqrt{12}, \sqrt{15}, 4.3$

Lesson 7.5

Estimate the following expressions to the nearest whole number.

1. $\sqrt{8} + \sqrt{18}$

≈ 7

2. $11 - \sqrt{80}$

3. $4\sqrt{48}$

≈ 28

4. $3\sqrt{24} + 3$

5. $2\sqrt{35} - 3\sqrt{8}$

≈ 3

6. $\sqrt{14} + \sqrt{26}$

7. $\sqrt{120} - 7$

≈ 4

8. $2\sqrt{63}$

9. $4\sqrt{15} - 5$

≈ 11

10. $2\sqrt{66} - 3\sqrt{5}$

11. $\sqrt{9} + \sqrt{10}$

≈ 6

12. $20 - \sqrt{102}$

13. $2\sqrt{15}$

≈ 8

14. $3\sqrt{15} + 1$

15. $4\sqrt{24} - 3\sqrt{3}$

≈ 14

16. $\sqrt{14} + \sqrt{34}$

17. $\sqrt{105} - 9$

≈ 1

18. $5\sqrt{26}$

19. $2\sqrt{83} - 8$

≈ 10

20. $3\sqrt{17} - 2\sqrt{1}$

21. $\sqrt{47} + \sqrt{8}$

≈ 10

22. $8 - \sqrt{48}$

23. $7\sqrt{10}$

≈ 21

24. $4\sqrt{5} + 9$

25. $3\sqrt{24} - 5\sqrt{5}$

≈ 5

26. $\sqrt{65} + \sqrt{63}$

27. $\sqrt{100} - 2$

$= 8$

28. $6\sqrt{5}$

29. $2\sqrt{26} - 3$

≈ 7

30. $4\sqrt{26} - 3\sqrt{4}$

Review Unit 7: Real Numbers KEY

No calculator necessary. Please do not use a calculator.

Unit 7 Goals

- Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert to a decimal expansion which repeats eventually into a rational number. (8.NS.1)
- Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions. (8.NS.2)

Convert the following fractions into decimals or decimals into lowest terms fractions.

1. $\frac{2}{15}$

0.1 $\bar{3}$

2. $\frac{5}{9}$

3. $0.2\bar{8}$

$\frac{13}{45}$

4. $0.\overline{16}$

Identify if the given number is rational or irrational and explain how you know.

5. $\sqrt{21}$

Irrational

6. $0.\bar{4}$

7. $\sqrt{0.04}$

Rational

8. $-\frac{2}{3}$

Evaluate the following roots.

9. $\sqrt{81}$

9

10. $-\sqrt{4}$

11. $\sqrt[3]{-1000}$

-10

12. $\sqrt[3]{125}$

Approximate the square roots to one decimal place.

13. $\sqrt{84}$

≈ 9.2

14. $-\sqrt{27}$

15. $-\sqrt{50}$

≈ -7.1

16. $\sqrt{95}$

Compare the following numbers using < or >.

17. $\sqrt{20}$ \square 5.1

18. $-\frac{20}{21}$ \square $-\sqrt{2}$

19. $\sqrt{15}$ \square $\sqrt{13}$

20. π \square $\sqrt{5}$

List the following numbers in order from least to greatest.

21. $\sqrt{8}$, π , 9, 3.1, $\frac{15}{7}$

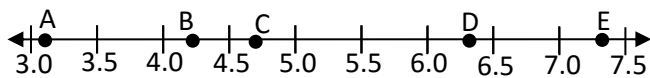
22. $\sqrt{35}$, $\sqrt{40}$, 6.01, $\frac{22}{3}$

23. $\sqrt{3}$, 1.1, 2, $\frac{1}{2}$

$\frac{15}{7}$, $\sqrt{8}$, 3.1, π , 9

$\frac{1}{2}$, 1.1, $\sqrt{3}$, 2

Match the given number with the letter that approximates that number's position on the number line.



24. $\sqrt{10}$

25. $\sqrt{40}$

26. $\sqrt{18}$

27. $\sqrt{21}$

D

C

Estimate the value of the expressions to the nearest whole number.

28. $3\sqrt{15}$

29. $4 + \sqrt{35}$

≈ 10

Answer the following questions.

30. A calculator displays the following number in its display: 0.4153 which does not fill the display screen. Is this enough to determine whether this number is rational or irrational? In at least one complete sentence, explain why.