

Name _____

Solve the rational equation.

1) $\frac{1}{x-3} = \frac{6}{x^2-9}$

1) _____

2) $\frac{1}{x-2} = \frac{4}{x^2-4}$

2) _____

3) $\frac{x+5}{x+3} = \frac{2}{x+3}$

3) _____

4) $\frac{x+9}{x+7} = \frac{2}{x+7}$

4) _____

5) $1 + \frac{1}{x} = \frac{20}{x^2}$

5) _____

6) $1 + \frac{1}{x} = \frac{6}{x^2}$

6) _____

$$7) \frac{1}{x} + \frac{1}{x+4} = \frac{x+5}{x+4}$$

7) _____

$$8) \frac{1}{x} + \frac{1}{x-6} = \frac{x-5}{x-6}$$

8) _____

$$9) \frac{1}{x} + \frac{1}{x+7} = \frac{x+8}{x+7}$$

9) _____

$$10) \frac{1}{x} + \frac{1}{x-7} = \frac{x-6}{x-7}$$

10) _____

$$11) \frac{5x}{x+2} - \frac{10}{x-2} = \frac{5x^2+20}{x^2-4}$$

11) _____

$$12) \frac{5x}{x+1} - \frac{5}{x-1} = \frac{5x^2+5}{x^2-1}$$

12) _____

$$13) \frac{x+2}{x^2+5x+6} - \frac{2}{x^2+6x+9} = \frac{x-2}{x^2+5x+6}$$

13) _____

Solve.

14) A bank loaned out \$62,000, part of it at the rate of 11% per year and the rest at a rate of 8% per year. If the interest received was \$5830, how much was loaned at 11%?

14) _____

- 15) A chemist needs 5 liters of a 50% salt solution. All she has available is a 20% salt solution and a 70% salt solution. How much of each of the two solutions should she mix to obtain her desired solution? 15) _____
- 16) Sue took her collection of nickels and dimes to deposit in the bank. She has five fewer nickels than dimes. Her total deposit was \$19.55. How many dimes did she deposit? 16) _____
- 17) Sue took her collection of nickels and dimes to deposit in the bank. She has five fewer nickels than dimes. Her total deposit was \$23.90. How many dimes did she deposit? 17) _____
- 18) Molly has \$14.90 in coins. She has five more nickels than dimes. She has seven fewer quarters than dimes. How many quarters does she have? 18) _____
- 19) Molly has \$11.45 in coins. She has five more nickels than dimes. She has eight fewer quarters than dimes. How many quarters does she have? 19) _____
- 20) Molly has \$13.90 in coins. She has four more nickels than dimes. She has six fewer quarters than dimes. How many quarters does she have? 20) _____
- 21) A chemist needs 12 liters of a 50% salt solution. All she has available is a 20% salt solution and a 70% salt solution. How much of each of the two solutions should she mix to obtain her desired solution? 21) _____
- 22) A chemist needs 7 liters of a 50% salt solution. All she has available is a 20% salt solution and a 70% salt solution. How much of each of the two solutions should she mix to obtain her desired solution? 22) _____

23) A chemist needs 12 liters of a 50% salt solution. All she has available is a 20% salt solution and a 70% salt solution. How much of each of the two solutions should she mix to obtain her desired solution? 23) _____

24) A chemist needs 4 liters of a 50% salt solution. All she has available is a 20% salt solution and a 70% salt solution. How much of each of the two solutions should she mix to obtain her desired solution? 24) _____

Factor completely.

25) $(a + 1)^2 - (a + 1) - 12$ 25) _____

26) $(1 + x^2)^2 + 7(1 + x^2) - 60$ 26) _____

27) $(a^2 + 2a)^2 - 9(a^2 + 2a) + 8$ 27) _____

28) $(y + 2)^2 - (y + 2) - 40$ 28) _____

29) $x^2 + 7xy + 10y^2$ 29) _____

30) $u^2 - 3uv - 40v^2$ 30) _____

31) $x^2(y - 3) - 5x(y - 3) + 6(y - 3)$ 31) _____

$$32) x^2(y - 7) - 8x(y - 7) + 15(y - 7)$$

32) _____

Factor completely using the grouping method to factor trinomials. If unfactorable, indicate that the polynomial is prime.

$$33) 7x^2 + 78x + 11$$

33) _____

$$34) 2x^2 + 23x + 11$$

34) _____

$$35) 3x^2 + 10x - 8$$

35) _____

$$36) 2x^2 - 5x - 12$$

36) _____

$$37) 3x^2 + 13x - 20$$

37) _____

$$38) 3x^2 + 19x + 20$$

38) _____

Solve the equation.

$$39) x - \sqrt{3x - 2} = 4$$

39) _____

$$40) x - \sqrt{3x - 2} = 4$$

40) _____

$$41) \sqrt{2x} + 5 = x + 1$$

41) _____

$$42) \sqrt{2x} + 8 = x + 4$$

42) _____

$$43) \sqrt{x - 3} = x - 5$$

43) _____

$$44) \sqrt{x} + 2 = \sqrt{x + 32}$$

44) _____

$$45) \sqrt{x} + 1 = \sqrt{x + 7}$$

45) _____

$$46) \sqrt{x} - 1 = \sqrt{x - 7}$$

46) _____

$$47) \sqrt{x} - 1 = \sqrt{x - 5}$$

47) _____

$$48) \sqrt{x} - 2 = \sqrt{x + 28}$$

48) _____

$$49) \sqrt{x} - 3 = \sqrt{x + 33}$$

49) _____

Solve the problem.

50) A formula used to determine the velocity v in feet per second of an object (neglecting air resistance) after it has fallen a certain height is $v = \sqrt{2gh}$, where g is the acceleration due to gravity and h is the height the object has fallen. If the acceleration g due to gravity on Earth is approximately 32 feet per second per second, find the velocity of a bowling ball after it has fallen 20 feet. (Round to the nearest tenth.) 50) _____

51) For a cone, the formula $r = \sqrt{\frac{3V}{\pi h}}$ describes the relationship between the radius r of the base, the volume V , and the height h . Find the volume if the radius is 7 inches and the cone is 3 inches high. (Use 3.14 as an approximation for π , and round to the nearest tenth.) 51) _____

52) Police use the formula $s = \sqrt{30fd}$ to estimate the speed s of a car in miles per hour, where d is the distance in feet that the car skidded and f is the coefficient of friction. If the coefficient of friction on a certain gravel road is 0.25 and a car skidded 300 feet, find the speed of the car, to the nearest mile per hour. 52) _____

Find the power of i .

53) i^{12} 53) _____

54) i^{19} 54) _____

55) i^9 55) _____

56) i^{10} 56) _____

57) i^{-8}

57) _____

58) i^{-7}

58) _____

59) i^{-13}

59) _____

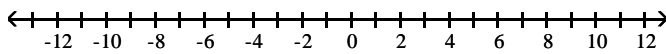
60) i^{-14}

60) _____

Solve the absolute value inequality. Other than \emptyset , use interval notation to express the solution set and graph the solution set on a number line.

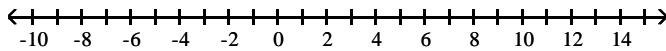
61) $|x + 3| < 9$

61) _____



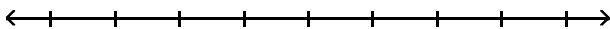
62) $|x + 7| < 2$

62) _____



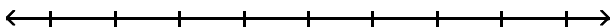
63) $|x - 8| - 2 \leq 4$

63) _____

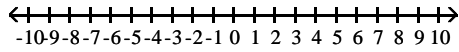


64) $|x - 2| + 3 \leq 5$

64) _____

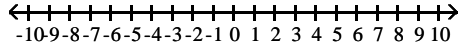


$$65) |2(x + 1) + 6| \leq 8$$



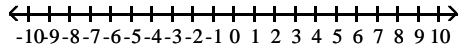
65) _____

$$66) |3(x + 1) + 6| \leq 18$$



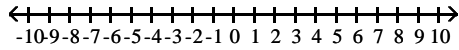
66) _____

$$67) \left| \frac{2y + 6}{3} \right| < 2$$



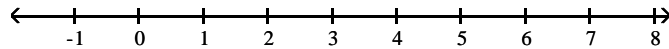
67) _____

$$68) \left| \frac{3y + 12}{4} \right| < 3$$



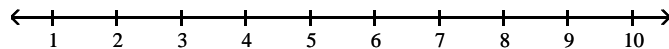
68) _____

$$69) |5x + 2| - 2 < -8$$



69) _____

$$70) |4x - 6| + 3 < 0$$



70) _____

Answer Key

Testname: E1PREP_0.1TO1.8V01

- 1) \emptyset
- 2) \emptyset
- 3) \emptyset
- 4) \emptyset
- 5) $\{-5, 4\}$
- 6) $\{-3, 2\}$
- 7) $\{1\}$
- 8) $\{1\}$
- 9) $\{1\}$
- 10) $\{1\}$
- 11) \emptyset
- 12) \emptyset
- 13) $\{-4\}$
- 14) \$29,000
- 15) 2 liters of the 20% solution; 3 liters of the 70% solution
- 16) 132 dimes
- 17) 161 dimes
- 18) 34 quarters
- 19) 25 quarters
- 20) 32 quarters
- 21) 4.8 liters of the 20% solution; 7.2 liters of the 70% solution
- 22) 2.8 liters of the 20% solution; 4.2 liters of the 70% solution
- 23) 4.8 liters of the 20% solution; 7.2 liters of the 70% solution
- 24) 1.6 liters of the 20% solution; 2.4 liters of the 70% solution
- 25) $((a + 1) + 3)((a + 1) - 4)$
- 26) $((1 + x^2) + 12)((1 + x^2) - 5)$
- 27) $((a^2 + 2a) - 1)((a^2 + 2a) - 8)$
- 28) Prime
- 29) $(x + 5y)(x + 2y)$
- 30) $(u + 5v)(u - 8v)$
- 31) $(x - 2)(x - 3)(y - 3)$
- 32) $(x - 3)(x - 5)(y - 7)$
- 33) $(7x + 1)(x + 11)$
- 34) $(2x + 1)(x + 11)$
- 35) $(3x - 2)(x + 4)$
- 36) $(2x + 3)(x - 4)$
- 37) prime
- 38) prime
- 39) $\{9\}$
- 40) $\{9\}$
- 41) $\{8\}$
- 42) $\{8\}$
- 43) $\{7\}$
- 44) $\{49\}$
- 45) $\{9\}$
- 46) $\{16\}$
- 47) $\{9\}$
- 48) \emptyset
- 49) \emptyset
- 50) 35.8 ft per sec

Answer Key

Testname: E1PREP_0.1TO1.8V01

51) 153.9 cu. in.

52) 47 mph

53) 1

54) -i

55) i

56) -1

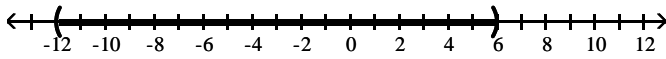
57) 1

58) i

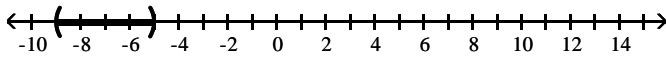
59) -i

60) -1

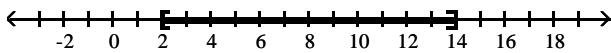
61) (-12, 6)



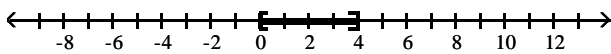
62) (-9, -5)



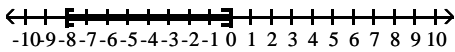
63) [2, 14]



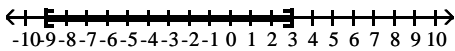
64) [0, 4]



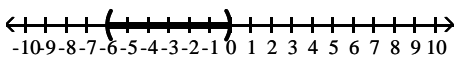
65) [-8, 0]



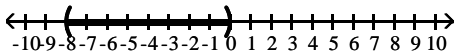
66) [-9, 3]



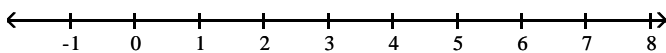
67) (-6, 0)



68) (-8, 0)



69) \emptyset



70) \emptyset

