

Name \_\_\_\_\_

**Solve the rational equation.**

1)  $\frac{1}{x-9} = \frac{18}{x^2-81}$

1) \_\_\_\_\_

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

2) \_\_\_\_\_

3)  $\frac{x+7}{x+4} = \frac{3}{x+4}$

3) \_\_\_\_\_

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

4) \_\_\_\_\_

5)  $1 + \frac{1}{x} = \frac{30}{x^2}$

5) \_\_\_\_\_

6)  $1 + \frac{1}{x} = \frac{42}{x^2}$

6) \_\_\_\_\_

$$7) \frac{1}{x} + \frac{1}{x+5} = \frac{x+6}{x+5}$$

7) \_\_\_\_\_

$$8) \frac{1}{x} + \frac{1}{x-3} = \frac{x-2}{x-3}$$

8) \_\_\_\_\_

$$9) \frac{1}{x} + \frac{1}{x+4} = \frac{x+5}{x+4}$$

9) \_\_\_\_\_

$$10) \frac{1}{x} + \frac{1}{x-5} = \frac{x-4}{x-5}$$

10) \_\_\_\_\_

$$11) \frac{7x}{x+5} - \frac{35}{x-5} = \frac{7x^2 + 175}{x^2 - 25}$$

11) \_\_\_\_\_

$$12) \frac{3x}{x+4} - \frac{12}{x-4} = \frac{3x^2 + 48}{x^2 - 16}$$

12) \_\_\_\_\_

$$13) \frac{x+5}{x^2 + 2x - 15} - \frac{5}{x^2 + 10x + 25} = \frac{x-5}{x^2 + 2x - 15}$$

13) \_\_\_\_\_

**Solve.**

14) A bank loaned out \$59,000, part of it at the rate of 13% per year and the rest at a rate of 7% per year. If the interest received was \$6050, how much was loaned at 13%?

14) \_\_\_\_\_

- 15) A chemist needs 11 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 \$68.15. 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 \$31.10. How many dimes did she deposit? 17) \_\_\_\_\_
- 18) Molly has \$4.80 in coins. She has five more nickels than dimes. She has nine fewer quarters than dimes. How many quarters does she have? 18) \_\_\_\_\_
- 19) Molly has \$10.05 in coins. She has four more nickels than dimes. She has seven fewer quarters than dimes. How many quarters does she have? 19) \_\_\_\_\_
- 20) Molly has \$10.75 in coins. She has five more nickels than dimes. She has six fewer quarters than dimes. How many quarters does she have? 20) \_\_\_\_\_
- 21) 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? 21) \_\_\_\_\_
- 22) A chemist needs 10 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 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? 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)  $(a + 1)^2 - (a + 1) - 42$  25) \_\_\_\_\_

26)  $(1 + x^2)^2 + 6(1 + x^2) - 40$  26) \_\_\_\_\_

27)  $(a^2 + 2a)^2 + 5(a^2 + 2a) - 24$  27) \_\_\_\_\_

28)  $(y + 2)^2 - (y + 2) - 63$  28) \_\_\_\_\_

29)  $x^2 + 4xy - 45y^2$  29) \_\_\_\_\_

30)  $u^2 - 4uv - 32v^2$  30) \_\_\_\_\_

31)  $x^2(y - 9) - 11x(y - 9) + 30(y - 9)$  31) \_\_\_\_\_

$$32) x^2(y - 8) - 16x(y - 8) + 60(y - 8)$$

32) \_\_\_\_\_

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

$$33) 3x^2 + 34x + 11$$

33) \_\_\_\_\_

$$34) 5x^2 + 56x + 11$$

34) \_\_\_\_\_

$$35) 3x^2 - 19x + 20$$

35) \_\_\_\_\_

$$36) 3x^2 + 14x + 15$$

36) \_\_\_\_\_

$$37) 3x^2 - 17x + 20$$

37) \_\_\_\_\_

$$38) 3x^2 - 11x - 10$$

38) \_\_\_\_\_

**Solve the equation.**

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

39) \_\_\_\_\_

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

40) \_\_\_\_\_

$$41) \sqrt{2x} + 2 = x - 2$$

41) \_\_\_\_\_

$$42) \sqrt{2x} + 5 = x + 1$$

42) \_\_\_\_\_

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

43) \_\_\_\_\_

$$44) \sqrt{x} + 2 = \sqrt{x + 24}$$

44) \_\_\_\_\_

$$45) \sqrt{x} + 3 = \sqrt{x + 27}$$

45) \_\_\_\_\_

$$46) \sqrt{x} - 3 = \sqrt{x - 33}$$

46) \_\_\_\_\_

$$47) \sqrt{x} - 2 = \sqrt{x - 28}$$

47) \_\_\_\_\_

$$48) \sqrt{x} - 2 = \sqrt{x + 24}$$

48) \_\_\_\_\_

$$49) \sqrt{x} - 1 = \sqrt{x + 11}$$

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 70 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 10 inches and the cone is 5 inches high. (Use 3.14 as an approximation for  $\pi$ , 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 0.29 and a car skidded 340 feet, find the speed of the car, to the nearest mile per hour. 52) \_\_\_\_\_

**Find the power of  $i$ .**

53)  $i^4$  53) \_\_\_\_\_

54)  $i^{11}$  54) \_\_\_\_\_

55)  $i^{21}$  55) \_\_\_\_\_

56)  $i^{18}$  56) \_\_\_\_\_

57)  $i^{-16}$

57) \_\_\_\_\_

58)  $i^{-11}$

58) \_\_\_\_\_

59)  $i^{-9}$

59) \_\_\_\_\_

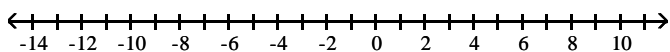
60)  $i^{-10}$

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.**

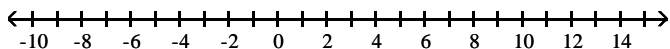
61)  $|x + 9| < 4$

61) \_\_\_\_\_



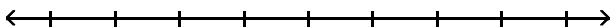
62)  $|x + 6| < 3$

62) \_\_\_\_\_



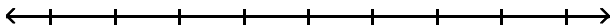
63)  $|x + 4| + 5 \leq 10$

63) \_\_\_\_\_



64)  $|x - 9| + 8 \leq 12$

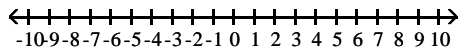
64) \_\_\_\_\_





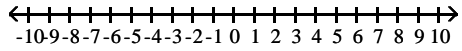
$$65) |3(x + 1) + 9| \leq 15$$

65) \_\_\_\_\_



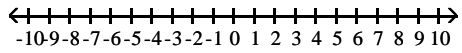
$$66) |3(x + 1) + 6| \leq 12$$

66) \_\_\_\_\_



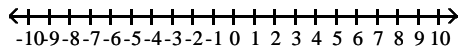
$$67) \left| \frac{8y + 24}{3} \right| < 8$$

67) \_\_\_\_\_



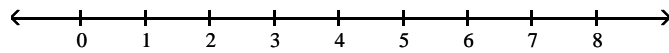
$$68) \left| \frac{7y + 21}{3} \right| < 7$$

68) \_\_\_\_\_



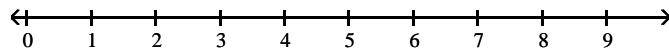
$$69) |7x + 1| + 7 < 3$$

69) \_\_\_\_\_



$$70) |8x - 7| + 9 < 3$$

70) \_\_\_\_\_



## Answer Key

Testname: E1PREP\_0.1TO1.8V02

- 1)  $\emptyset$
- 2)  $\emptyset$
- 3)  $\emptyset$
- 4)  $\emptyset$
- 5)  $\{-6, 5\}$
- 6)  $\{-7, 6\}$
- 7)  $\{1\}$
- 8)  $\{1\}$
- 9)  $\{1\}$
- 10)  $\{1\}$
- 11)  $\emptyset$
- 12)  $\emptyset$
- 13)  $\{-13\}$
- 14) \$32,000
- 15) 4.4 liters of the 20% solution; 6.6 liters of the 70% solution
- 16) 456 dimes
- 17) 209 dimes
- 18) 8 quarters
- 19) 22 quarters
- 20) 24 quarters
- 21) 1.6 liters of the 20% solution; 2.4 liters of the 70% solution
- 22) 4 liters of the 20% solution; 6 liters of the 70% solution
- 23) 2 liters of the 20% solution; 3 liters of the 70% solution
- 24) 1.6 liters of the 20% solution; 2.4 liters of the 70% solution
- 25)  $((a + 1) + 6)((a + 1) - 7)$
- 26)  $((1 + x^2) + 10)((1 + x^2) - 4)$
- 27)  $((a^2 + 2a) + 8)((a^2 + 2a) - 3)$
- 28) Prime
- 29)  $(x - 5y)(x + 9y)$
- 30)  $(u + 4v)(u - 8v)$
- 31)  $(x - 5)(x - 6)(y - 9)$
- 32)  $(x - 10)(x - 6)(y - 8)$
- 33)  $(3x + 1)(x + 11)$
- 34)  $(5x + 1)(x + 11)$
- 35)  $(3x - 4)(x - 5)$
- 36)  $(3x + 5)(x + 3)$
- 37) prime
- 38) prime
- 39)  $\{9\}$
- 40)  $\{9\}$
- 41)  $\{8\}$
- 42)  $\{8\}$
- 43)  $\{7\}$
- 44)  $\{25\}$
- 45)  $\{9\}$
- 46)  $\{49\}$
- 47)  $\{64\}$
- 48)  $\emptyset$
- 49)  $\emptyset$
- 50) 66.9 ft per sec

Answer Key

Testname: E1PREP\_0.1TO1.8V02

51) 523.3 cu. in.

52) 54 mph

53) 1

54) -i

55) i

56) -1

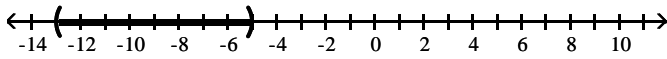
57) 1

58) i

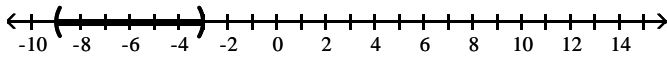
59) -i

60) -1

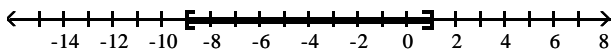
61) (-13, -5)



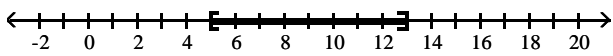
62) (-9, -3)



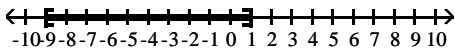
63) [-9, 1]



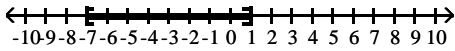
64) [5, 13]



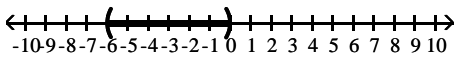
65) [-9, 1]



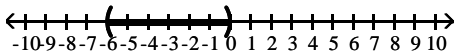
66) [-7, 1]



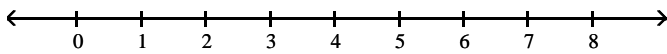
67) (-6, 0)



68) (-6, 0)



69)  $\emptyset$



70)  $\emptyset$

