HW1 Date: _____ Name_____

Use Scantron 882E to transfer the answers. Be sure you keep your scantron CLEAN and FLAT before its submission.
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the equation.

1) $-8x - 15 = -3x + 10$ 1) _____
A) {3} B) {–5} C) {5} D) {–3}

2) $6(x + 5) = 7[x - (3 - x)]$ 2) _____
A) $\left\{\frac{51}{8}\right\}$ B) $\left\{-\frac{51}{8}\right\}$ C) $\left\{-\frac{15}{4}\right\}$ D) $\left\{\frac{15}{4}\right\}$

3) $-9x + 8 + 7x = -2x + 13$ 3) _____
A) no solution B) all real numbers
C) {–8} D) {5}

4) $\frac{x}{6} - 3 = 1$ 4) _____
A) {12} B) {24} C) {–24} D) {–12}

5) $\frac{x}{5} - \frac{1}{5} = -6$ 5) _____
A) {–31} B) {31} C) {–29} D) {29}

6) $\frac{2x}{5} = 2 + \frac{x}{3}$ 6) _____
A) {–30} B) {60} C) {30} D) {–60}

7) $\frac{4}{3} - \frac{x}{4} = \frac{1}{12}$ 7) _____
A) $\left\{-\frac{15}{4}\right\}$ B) $\left\{\frac{15}{4}\right\}$ C) $\{5\}$ D) $\{-5\}$

8) $\frac{-5x + 6}{7} + \frac{4}{7} = -\frac{2x}{5}$ 8) _____
A) $\left\{\frac{50}{39}\right\}$ B) $\left\{-\frac{10}{11}\right\}$ C) $\left\{\frac{50}{11}\right\}$ D) $\left\{\frac{10}{11}\right\}$

9) $\frac{5}{x} + \frac{2}{5} = \frac{7}{x}$ 9) _____
A) {–5} B) {2} C) {5} D) {–2}

10) $x(1 + 3x) = (3x - 1)(x - 3)$ 10) _____
A) $\left\{\frac{3}{121}\right\}$ B) $\left\{\frac{3}{11}\right\}$ C) $\left\{-\frac{3}{121}\right\}$ D) $\left\{-\frac{3}{11}\right\}$

11) $x(x^2 + 3) = 6 + x^3$ 11) _____

A) {3} B) {6} C) $\{2\}$ D) $\left\{\frac{1}{2}\right\}$

12) $\frac{5 - x}{x} + \frac{3}{4} = \frac{7}{x}$ 12) _____

A) {8} B) {–4} C) $\left\{-\frac{8}{7}\right\}$ D) {–8}

13) $\frac{6}{2x - 3} = \frac{4}{2x + 5}$ 13) _____

A) $\left\{-\frac{2}{21}\right\}$ B) $\left\{\frac{2}{21}\right\}$ C) $\left\{-\frac{21}{2}\right\}$ D) $\left\{\frac{21}{2}\right\}$

Solve the equation. The letters a, b, and c are constants.

14) $\frac{x}{a} + \frac{x}{b} = c$, $a \neq 0$, $b \neq 0$, $a \neq -b$ 14) _____

A) $x = abc$ B) $x = \frac{c}{ab}$ C) $x = \frac{a + b}{abc}$ D) $x = \frac{abc}{a + b}$

Solve the formula for the indicated variable.

15) $S = 2\pi rh + 2\pi r^2$ for h 15) _____

A) $h = \frac{S - 2\pi r^2}{2\pi r}$ B) $h = 2\pi(S - r)$ C) $h = \frac{S}{2\pi r} - 1$ D) $h = S - r$

16) $A = P(1 + rt)$ for r 16) _____

A) $r = \frac{A + P}{tP}$ B) $r = -\frac{A + P}{tP}$ C) $r = \frac{A - P}{tP}$ D) $r = \frac{P - A}{tP}$

Solve the problem.

17) Mary and her brother John collect foreign coins. Mary has twice the number of coins that John has. Together they have 120 foreign coins. Find how many coins Mary has. 17) _____

A) 16 coins B) 72 coins C) 40 coins D) 80 coins

18) An auto repair shop charged a customer $264 to repair a car. The bill listed $89 for parts and the remainder for labor. If the cost of labor is $35 per hour, how many hours of labor did it take to repair the car? 18) _____

A) 4 hr B) 6 hr C) 5.5 hr D) 5 hr

19) After a 14% price reduction, a boat sold for $21,500. What was the boat's price before the reduction? (Round to the nearest cent, if necessary.) 19) _____

A) $25,000 B) $24,510.00 C) $153,571.43 D) $3010.00

20) Mary and her brother John collect foreign coins. Mary has four times the number of coins that John has. Together they have 225 foreign coins. Find how many coins Mary has. 20) _____

A) 180 coins B) 45 coins C) 171 coins D) 36 coins

21) An auto repair shop charged a customer $247 to repair a car. The bill listed $87 for parts and the remainder for labor. If the cost of labor is $40 per hour, how many hours of labor did it take to repair the car? 21) _____

A) 4.5 hr B) 3 hr C) 5 hr D) 4 hr

22) After a 16% price reduction, a boat sold for $21,840. What was the boat's price before the reduction? (Round to the nearest cent, if necessary.) 22) _____

A) $25,334.40 B) $136,500.00 C) $26,000 D) $3494.40

23) It costs $20 per hour plus a flat fee of $31 for a plumber to make a house call. What is an equation of the form $y = ax + b$ for this situation? 23) _____

A) $y = 31x$ B) $y = 31x + 20$ C) $y = 20x$ D) $y = 20x + 31$

Solve the equation by factoring.

24) $13x^2 - 9x = 0$ 24) _____

A) $\{-\frac{9}{13}, 0\}$ B) $\{\frac{9}{13}, 0\}$ C) $\{0\}$ D) $\{\frac{9}{13}, -\frac{9}{13}\}$

25) $39x^2 + 36x = 0$ 25) _____

A) $\{-\frac{12}{13}, 0\}$ B) $\{\frac{12}{13}, 0\}$ C) $\{0\}$ D) $\{\frac{12}{13}, -\frac{12}{13}\}$

26) $x^2 - 144 = 0$ 26) _____

A) {12} B) {144} C) {12, –12} D) {–12}

27) $x^2 - 6x - 16 = 0$ 27) _____

A) {2, –8} B) {–2, –8} C) {2, 8} D) {–2, 8}

28) $x(x - 11) + 30 = 0$ 28) _____

A) {–5, 6} B) {5, –6} C) {5, 6} D) {–5, –6}

29) $3x^2 - 5x = 0$ 29) _____

A) $\{-\frac{5}{3}, 0\}$ B) $\{\frac{5}{3}, 0\}$ C) $\{0\}$ D) $\{\frac{5}{3}, -\frac{5}{3}\}$

30) $27x^2 + 21x = 0$ 30) _____

A) $\{\frac{7}{9}, 0\}$ B) $\{0\}$ C) $\{\frac{7}{9}, -\frac{7}{9}\}$ D) $\{-\frac{7}{9}, 0\}$

31) $x^2 - 121 = 0$ 31) _____

A) {–11} B) {121} C) {11} D) {11, –11}

32) $x^2 - 7x - 18 = 0$ 32) _____

A) {2, –9} B) {2, 9} C) {–2, 9} D) {–2, –9}

33) $x(x - 5) + 4 = 0$ 33) _____

A) {1, –4} B) {1, 4} C) {–1, –4} D) {–1, 4}

Solve the equation by the Square Root Method.

34) $x^2 = 81$ 34) _____

A) {9} B) {40.5} C) {9, –9} D) {10, –10}

35) $(2x - 3)^2 = 9$ 35) _____

A) {0, –3} B) {0, –6} C) {6, 0} D) {3, 0}

36) $(x + 6)^2 = 11$ 36) _____

A) $\{-6 + \sqrt{11}, -6 - \sqrt{11}\}$ B) {5}

C) $\{\sqrt{11}, -\sqrt{11}\}$ D) $\{6 + \sqrt{11}, 6 - \sqrt{11}\}$

Solve the equation by completing the square.

37) $x^2 + 12x + 27 = 0$ 37) _____

A) {36, –9} B) {–3, –9} C) {3, 9} D) $\{\sqrt{3}, -1\}$

38) $x^2 + 8x - 5 = 0$ 38) _____

A) $\{-1 - \sqrt{21}, -1 + \sqrt{21}\}$ B) $\{-4 - 2\sqrt{21}, -4 + 2\sqrt{21}\}$

C) $\{4 + \sqrt{21}\}$ D) $\{-4 - \sqrt{21}, -4 + \sqrt{21}\}$

Find the real solutions, if any, of the equation. Use the quadratic formula.

39) $5x^2 + 11x - 12 = 0$ 39) _____

A) $\{-\frac{4}{5}, 3\}$ B) $\{\frac{4}{5}, -3\}$ C) $\{-\frac{4}{5}, -3\}$ D) $\{\frac{4}{5}, 3\}$

40) $x^2 + 8x - 7 = 0$ 40) _____

A) $\{-4 - \sqrt{23}, -4 + \sqrt{23}\}$ B) $\{-1 - \sqrt{23}, -1 + \sqrt{23}\}$

C) $\{4 + \sqrt{23}\}$ D) $\{-4 - 2\sqrt{23}, -4 + 2\sqrt{23}\}$

41) $49x^2 + 45 = -98x$ 41) _____

A) $\{-\frac{5}{49}, -\frac{9}{49}\}$ B) $\{-\frac{9}{49}, \frac{54}{49}\}$ C) $\{\frac{5}{7}, \frac{9}{7}\}$ D) $\{-\frac{5}{7}, -\frac{9}{7}\}$

42) $4x = 1 + \frac{-2}{x}$ 42) _____

A) $\{\frac{1 - \sqrt{33}}{8}\}$ B) $\{\frac{1 - \sqrt{33}}{8}, \frac{1 + \sqrt{33}}{8}\}$

C) $\{-\frac{1 + \sqrt{33}}{8}, \frac{1 - \sqrt{33}}{8}\}$ D) no real solution

Find the real solutions, if any, of the equation. Use the quadratic formula and a calculator. Express any solutions rounded to two decimal places.

43) $x^2 + \sqrt{11}x - 11 = 0$ 43) _____

A) {–2.05, 5.37} B) {–5.37, 2.05} C) {–5.37, 5.37} D) {–5.37, –2.05}

Find the real solutions, if any, of the equation. Use the quadratic formula and a calculator. Express any solutions rounded to two decimal places. Use 3.14 to approximate π.

44) $\pi x^2 + \pi x - 7 = 0$ 44) _____

A) {1.07, 2.07} B) {–2.07, 1.07} C) {–1.07, 2.07} D) {–2.07, –1.07}

Solve using the quadratic formula. Round any answers to two decimal places.

45) $\frac{1}{4}x^2 - 2\sqrt{3}x = 3$ 45) _____

A) {0.21, –14.67} B) {–0.82, 14.67} C) {–0.21, 14.67} D) {0.82, –14.67}

Solve the problem.

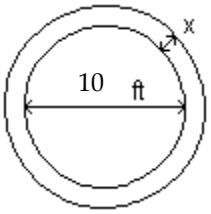
46) The length of a vegetable garden is 2 feet longer than its width. If the area of the garden is 99 square feet, find its dimensions. 46) _____

A) 10 ft by 12 ft B) 8 ft by 12 ft C) 8 ft by 10 ft D) 9 ft by 11 ft

47) The area of a circle is found by the equation $A = \pi r^2$. If the area A of a certain circle is 25π square centimeters, find its radius r. 47) _____

A) $5\sqrt{\pi}$ cm B) {5 cm, –5 cm} C) 5π cm D) 5 cm

48) A circular pool measures 10 feet across. One cubic yard of concrete is to be used to create a circular border of uniform width around the pool. If the border is to have a depth of 2 inches, how wide will the border be? Use 3.14 to approximate π. Express your solution rounded to two decimal places. (1 cubic yard = 27 cubic feet) 48) _____



A) 3.6 ft B) 6.78 ft C) 3.75 ft D) 10.34 ft

49) If a polygon, of n sides has $\frac{1}{2}n(n - 3)$ diagonals, how many sides will a polygon with 377 diagonals have? 49) _____

A) 31 sides B) 28 sides C) 29 sides D) 30 sides

Write the expression in the standard form a + bi.

50) (4 – 9i) + (2 + 5i) 50) _____

A) 6 + 4i B) 6 – 4i C) 2 + 14i D) –6 + 4i

51) (6 + 4i) – (–5 + i) 51) _____

A) –11 – 3i B) 11 + 3i C) 11 – 3i D) 1 + 5i

52) (–6 – 7i)(4 + i) 52) _____

A) –31 – 34i B) –17 + 22i C) –31 + 22i D) –17 – 34i

53) $(-9 + i)(-9 - i)$ 53) _____

A) 82 B) −80 C) −9 D) 81

54) $\frac{8}{8 + i}$ 54) _____

A) $\frac{64}{65} - \frac{8}{65}i$ B) $\frac{64}{63} + \frac{8}{63}i$ C) $\frac{64}{65} + \frac{8}{65}i$ D) $\frac{64}{63} - \frac{8}{63}i$

55) $\frac{3 - 2i}{2 + 3i}$ 55) _____

A) $-i$ B) i C) 1 D) −1

56) $(9 + 2i)^2$ 56) _____

A) 77 B) $81 + 36i + 4i^2$ C) $77 + 36i$ D) $85 + 36i$

57) i^4 57) _____

A) −1 B) 1 C) i D) $-i$

58) i^{17} 58) _____

A) 1 B) $-i$ C) i D) −1

59) $2i^{15} - i^7$ 59) _____

A) −1 B) i C) $-i$ D) 1

Perform the indicated operations and express your answer in the form a + bi.

60) $\sqrt{-25}$ 60) _____

A) ±5 B) −5i C) $-i\sqrt{5}$ D) 5i

61) $\sqrt{(12 + 5i)(5i - 12)}$ 61) _____

A) −13 B) 13i C) −13i D) 13

Write the expression in the standard form a + bi.

62) If $z = 5 - 2i$, evaluate $z + \overline{z}$. 62) _____

A) −4i B) 10 + 4i C) 10 D) 10 − 4i

63) If $w = 8 + 3i$, evaluate $w - \overline{w}$. 63) _____

A) 0 B) −16 + 6i C) 16 D) 6i

64) If $z = 6 + 8i$ and $w = -9 + i$, evaluate $\overline{z - w}$. 64) _____

A) 15 + 7i B) −3 + 9i C) 15 − 7i D) −15 − 7i

Solve the equation in the complex number system.

65) $x^2 + 4 = 0$ 65) _____

A) {2} B) {−2i, 2i} C) {−2, 2} D) {2i}

66) $x^2 + 10x + 34 = 0$ 66) _____

A) {–5 – 9i, –5 + 9i} B) {–8, –2} C) {–5 + 3i} D) {–5 – 3i, –5 + 3i}

67) $x^4 = 256$ 67) _____

A) {–4, 4} B) {4} C) {–4, 4, –4i, 4i} D) {–4, 4, 4i}

Find the real solutions of the equation.

68) $\sqrt{x + 2} = 8$ 68) _____

A) {100} B) {62} C) {64} D) {66}

69) $\sqrt{8x - 7} = 7$ 69) _____

A) $\{\frac{21}{4}\}$ B) $\{\frac{49}{8}\}$ C) {49} D) {7}

70) $x = 12\sqrt{x}$ 70) _____

A) {–12, 12} B) {0, 12} C) {–144, 144} D) {0, 144}

71) $\sqrt{8x + 48} = x$ 71) _____

A) {–4, 12} B) {12} C) $\{-\frac{48}{7}\}$ D) no real solution

72) $(3x + 5)^{1/2} = 3$ 72) _____

A) {15} B) $\{\frac{4}{3}\}$ C) $\{-\frac{5}{3}\}$ D) {3}

73) $x^4 - 10x^2 + 9 = 0$ 73) _____

A) {–3, 3} B) {–1, 1, –3, 3} C) {–9, 9} D) {–10, 10}

74) $x^6 - 7x^3 - 8 = 0$ 74) _____

A) {2, –1} B) {2} C) {–2, 1} D) {8}

75) $(x - 4)^2 + 3(x - 4) - 18 = 0$ 75) _____

A) {–7, 2} B) {–6, 1} C) {–1, 6} D) {–2, 7}

Find the real solutions of the equation by factoring.

76) $x^3 - 144x = 0$ 76) _____

A) {0, –12} B) {0, 144} C) {0, 12} D) {0, 12, –12}

77) $2x^5 = 50x^3$ 77) _____

A) {–5, 0, 5} B) {0} C) $\{-5\sqrt{2}, 0, 5\sqrt{2}\}$ D) {–5, 5}

78) $x^3 + 3x^2 - 4x - 12 = 0$ 78) _____

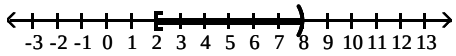
A) {4, –3} B) {–2, 2, –3} C) {2, –3} D) {–2, 2, 3}

79) $x^3 + 8x^2 - x - 8 = 0$ 79) _____

A) {64} B) {1, –8, 8} C) {–1, 1, –8} D) {–8, 8}

Express the graph shown using interval notation. Also express it as an inequality involving x.

80) 80) _____



A) [2, 8]
$2 \le x \le 8$

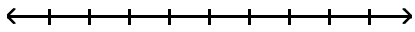
B) (2, 8)
$2 < x < 8$

C) [2, 8)
$2 \le x < 8$

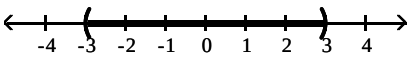
D) (2, 8]
$2 < x \le 8$

Write the inequality using interval notation, and illustrate the inequality using the real number line.

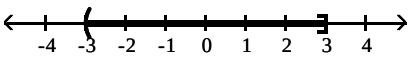
81) $-3 \le x \le 3$ 81) _____



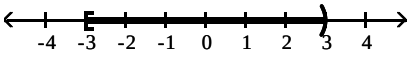
A) (–3, 3)



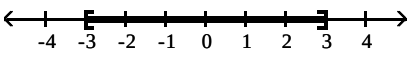
B) (–3, 3]



C) [–3, 3]

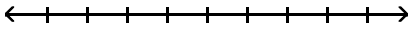


D) [–3, 3]

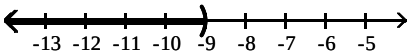


Write the interval as an inequality involving x, and illustrate the inequality using the real number line.

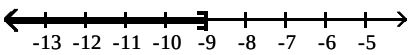
82) $(-\infty, -9)$ 82) _____



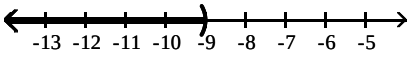
A) $x < -9$



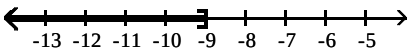
B) $x \le -9$



C) $x \le -9$

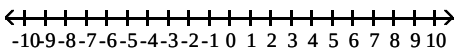


D) $x < -9$

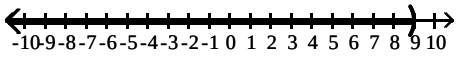


Solve the inequality. Express your answer using interval notation.

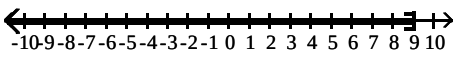
83) $4x + 7 < 43$ 83) _____



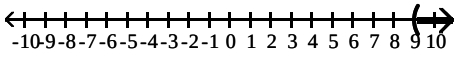
A) $(-\infty, 9)$



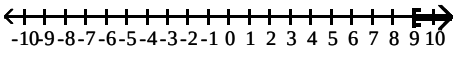
B) $(-\infty, 9]$



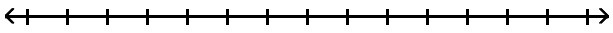
C) $(9, \infty)$



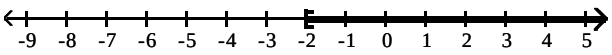
D) $[9, \infty)$



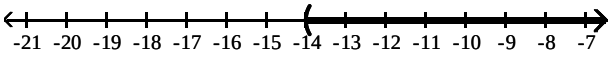
84) $-3x - 6 \geq -4x - 8$ 84) _____



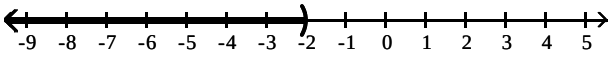
A) $[-2, \infty)$



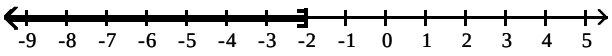
B) $(-14, \infty)$



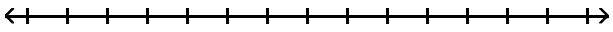
C) $(-\infty, -2)$



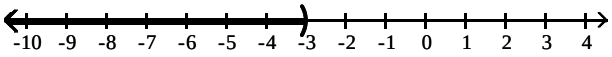
D) $(-\infty, -2]$



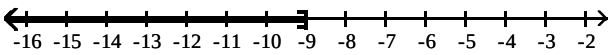
85) $-2(6x - 6) < -14x + 6$ 85) _____



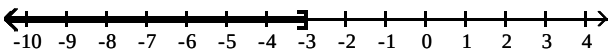
A) $(-\infty, -3)$



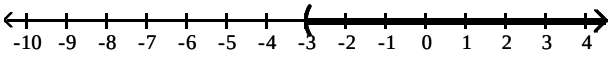
B) $(-\infty, -9]$



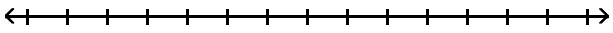
C) $(-\infty, -3]$



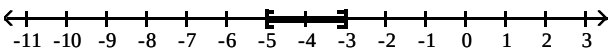
D) $(-3, \infty)$



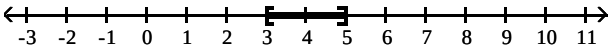
86) $19 \le 5x + 4 \le 29$ 86) _____



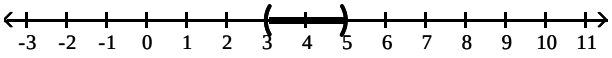
A) [–5, –3]



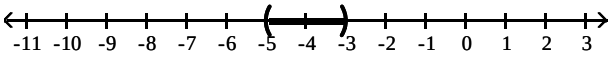
B) [3, 5]



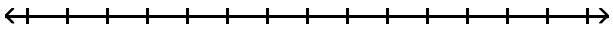
C) (3, 5)



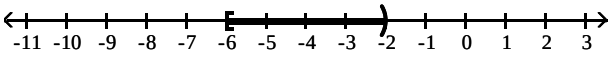
D) (–5, –3)



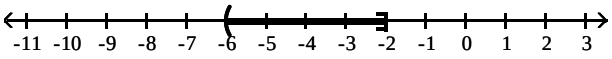
87) $-34 \le -5x - 4 < -14$ 87) _____



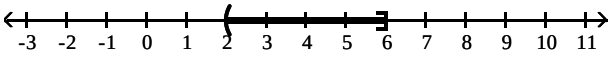
A) [–6, –2)



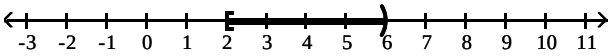
B) (–6, –2]



C) (2, 6]



D) [2, 6)



Solve the problem.

88) Jim has gotten scores of 73 and 100 on his first two tests. What score must he get on his third test to keep an average of 80 or better? 88) _____

A) at least 86.5 B) at least 84 C) at least 67 D) at least 65

Solve the equation.

89) $3|x - 3| = 18$ 89) _____

A) {3} B) {9, –3} C) {3, –9} D) no solution

90) $|6x + 4| + 7 = 12$ 90) _____

A) $\{-\frac{1}{6}, \frac{3}{2}\}$ B) $\{\frac{1}{6}, -\frac{3}{2}\}$ C) $\{\frac{1}{4}, -\frac{9}{4}\}$ D) no solution

91) $\left|\frac{11x + 22}{2}\right| = 11$ 91) _____

A) {–4, 4} B) {4, 0} C) {–4, 0} D) no solution

Solve the inequality. Express your answer using interval notation.

92) $|x| < 9$ 92) _____

A) (–9, 9) B) (–∞, –9) or (9, ∞)
C) (–∞, –9) and (9, ∞) D) [0, 9]

93) $|x| < -12$ 93) _____

A) {–12} B) (–12, 12) C) (–∞, ∞) D) no solution

94) $|x| > -2$ 94) _____

A) (–2, 2) B) {2} C) (–∞, ∞) D) no solution

95) $|x + 5| + 5 \leq 11$ 95) _____

A) (–∞, –11) or (1, ∞) B) [–11, 1]
C) [11, 11] D) no solution

96) $|5x - 1| \geq 5$ 96) _____

A) $[-\frac{4}{5}, \frac{6}{5}]$ B) $(-\infty, -\frac{4}{5}]$ or $[\frac{6}{5}, \infty)$

C) $(-\infty, -\frac{4}{5})$ or $(\frac{6}{5}, \infty)$ D) $(-\frac{4}{5}, \frac{6}{5})$

Solve the problem.

97) The manager of a coffee shop has one type of coffee that sells for $7 per pound and another type that sells for $11 per pound. The manager wishes to mix 60 pounds of the $11 coffee to get a mixture that will sell for $8 per pound. How many pounds of the $7 coffee should be used? 97) _____

A) 120 lb B) 240 lb C) 90 lb D) 180 lb

98) How much pure acid should be mixed with 8 gallons of a 50% acid solution in order to get an 80% acid solution? 98) _____

A) 4 gal B) 32 gal C) 12 gal D) 20 gal

99) The radiator in a certain make of car needs to contain 30 liters of 40% antifreeze. The radiator now contains 30 liters of 20% antifreeze. How many liters of this solution must be drained and replaced with 100% antifreeze to get the desired strength? 99) _____

A) 15 L B) 12 L C) 10.0 L D) 7.5 L

100) BJ can overhaul a boat's diesel inboard engine in 30 hours. His apprentice takes 60 hours to do the same job. How long would it take them working together assuming no gain or loss in efficiency? 100) _____

A) 12 hr B) 90 hr C) 20 hr D) 8 hr