EXAM_2_PREPARATION

Alex Jordan

These exercises are to help you practice for the second exam. The actual exam will have about 40 questions, all taken from this practice set, usually with numbers and some other small details changed. Exercises 1 through 43 are the same questions as from your first exam. Exercises with a \blacksquare icon mean you are allowed to use a calculator. For all other exercises, assume that on the exam no calculator would be available. All the answers are printed at the end.

1. Subtract the following.

a.
$$-7 - (-1)$$

b. -12 - (-12)

c.
$$-4 - 4$$

2. Evaluate the following. a. $(-3)^2$

b.
$$-3^2$$

Simplify without using a calculator.
23-5.42

4. Multiply: $\frac{14}{3} \cdot \frac{11}{10}$

5. Divide: $\frac{9}{11} \div (-12)$

6. Add:
$$\frac{7}{12} + \frac{5}{8}$$

7. Evaluate the following. $\sqrt{100}$

a.
$$\sqrt{\frac{100}{49}}$$

b.
$$\sqrt{-\frac{4}{81}}$$

- 8. Evaluate the following. 5(9-3)
- 9. Evaluate the following. 2+5(4)
- **10.** Evaluate the following. $20 3|19 + (3 6)^3|$

11. Evaluate the following. $3\sqrt{100} - \sqrt{9+16}$

12. Write the decimal number 0.24 as a fraction.

13. Which of the following are rational numbers? Circle all the correct answers.

- A. 31
- B. -10450
- C. -12.312
- D. -2.345
- E. $\sqrt{11}$
- F. 0.10203040506070809010011012...

14. Use the > symbol to arrange the following numbers in order from greatest to least. For example, your answer might look like 4>3>2>1>0.

$$2 \quad \frac{13}{3} \quad -4 \quad -\frac{11}{4} \quad \pi$$

15. Evaluate 2x + 13 for x = -6.

16. Evaluate the expression $-6t^2 + 20t + 273$ when t = -5.

17. Evaluate each algebraic expression for the given values:

 $\frac{\sqrt{m}}{p} - \frac{p}{m}$, for m = 36 and p = 12

18. Find the perimeter and area of the triangle.



19. Find the perimeter and area of this polygon.



20. Simplify each expression, if possible, by combining like terms.

a. -4x + 12x

- b. $5x^2 + 3x$
- c. 9s 8t
- d. $5q^2 3q^2$

21. Decide whether each value is a solution to the given inequality. -3x + 14 > 2

a. x = -4b. x = 0c. x = 4d. x = 8 **22.** A rectangular frame's perimeter is 15 feet. If its width is 2.4 feet, suppose we want to find how tall it is. A rectangle's perimeter formula is

$$P = 2(w+h)$$

where P stands for perimeter, w for width and w for height. We can solve this problem using the equation:

$$15 = 2(2.4 + h)$$

Check whether 5.1 is a solution for h of this equation.

- **23.** Solve the equation. 5+x=-3
- 24. Solve the equation. $\frac{10}{7} + Q = \frac{2}{3}$
- 25. Solve the equation. $\frac{1}{5}x = 9$
- 26. Solve the equation. 12t = -8
- **27.** Evaluate the following.

a. $\frac{-12}{-3}$	d. $\frac{-102}{-102}$
b. $\frac{21}{-1}$	e. $\frac{3}{0}$
c. $\frac{17}{-17}$	f. $\frac{0}{3}$

28. Solve this inequality. Express the solution set using interval notation.

9 > x + 4

29. Solve this inequality. Express the solution set using interval notation.

$$-\frac{1}{8}x \le 3$$

2

30. Change the following percentages into decimals:

7%

53%

31. The price of a restaurant bill, including an 21% gratuity charge, was \$47.00. What was the price of the bill before gratuity was added?

Assume the bill without gratuity is *b* dollars. Write an equation to model this scenario. *There is no need to solve it.*

32. An Amazon shipping box has a rectangular base that is 15 inches by 18 inches. What is the height of box if it contains 3000 cubic inches of volume?

Assume *h* inches is the height of the box. Write an equation to model this scenario. *There is no need to solve it.*

33. Translate the following phrase or sentence into a math expression or equation (whichever is appropriate).

The product of five and a number, subtracted from seven, is sixty-three.

34. Evaluate the following.

a. 1¹⁸

- b. $(-1)^{12}$
- c. $(-1)^{91}$
- d. 0¹⁴

35. Use the properties of exponents to simplify the expression.

 $(4q^{22}) \cdot (5q^8)$

36. Use the properties of exponents to simplify the expression.

a.
$$(-7x^4)^2$$

b. $-(4x^3)^2$

37. Use the distributive property to simplify 8 + 10(3 + 7x) completely.

38. Use the distributive property to simplify $\frac{5}{7}(-14+7c)$ completely.

- **39.** Simplify the following expression. $(-3x^7)(-5x^2) - (x^4)(-3x^5)$
- **40.** Fully simplify 5(2x+13) 4(3x+20).

41. A cylinder's base's diameter is 10 ft, and its height is 8 ft.

- a. What is this cylinder's volume, in terms of π ?
- b. What is this cylinder's volume, rounded to the hundredths place?

42. Enrique is paying a dinner bill of \$42.00. Enrique plans to pay 22% in tips. How much tip will Enrique pay?

43. Last year, a small town's population was 709. This year, the population decreased to 672. What is the percentage decrease?

- 44. Solve the equation. y+4 = -2
- **45.** Solve the equation. 35 = -5y
- **46.** Solve the equation. 3r + 5 = 20
- 47. Solve the equation. -27 = 10n + 3

48. Solve the equation.

-4p+5=29

49. Solve the equation.

13 = -p + 6

50. Your cell phone company charges a \$28 monthly fee, plus \$0.14 per minute of talk time. One month your cell phone bill was \$85.40. How many minutes did you spend talking on the phone that month?

51. Benjamin has \$73 in his piggy bank. He plans to purchase some Pokemon cards, which costs \$1.15 each. He plans to save \$66.10 to purchase another toy. At most how many Pokemon cards can he purchase?

- **52.** Solve the equation. -3t + 4 = -t 14
- **53.** Solve the equation.

10p+4 = 7p+3

54. Use a linear equation to solve the word problem.

Massage Heaven and Massage You are competitors. Massage Heaven has 7800 registered customers, and it gets approximately 500 newly registered customers every month. Massage You has 13800 registered customers, and it gets approximately 200 newly registered customers every month. How many months would it take Massage Heaven to catch up with Massage You in the number of registered customers?

55. Use a linear equation to solve the word problem.

Maria has \$75.00 in her piggy bank, and she spends \$2.00 every day.

Kylie has \$20.00 in her piggy bank, and she saves \$3.50 every day.

If they continue to spend and save money this way, how many days later would they have the same amount of money in their piggy banks?

- **56.** Solve the equation. 4A + 10 + 3 = 29
- 57. Solve the equation. 4r + 2 - 8r = 18
- **58.** Solve the equation. 102 = -10x - 8 - x
- **59.** Solve the equation. 3 6C 8 = -5
- **60.** Solve the equation. -7c + 4c = 10 - 8c - 45
- 61. Solve the equation. -3+7 = 5x - 8 - 2x + 5 - 4x

62. Teresa and Grant collect stamps. Grant collected 15 fewer than three times the number of Teresa's stamps. Altogether, they collected 477 stamps. How many stamps did Teresa and Grant collect?

63. After a 35% increase, a town has 135 people. What was the population before the increase?

- **64.** Solve the equation. 2(B-4) = -18
- **65.** Solve the equation. 60 = -4(c-6)
- **66.** Solve the equation. -6 = -(2 A)
- **67.** Solve the equation. 38 = -2(9 4t)

- **68.** Solve the equation. 4 - 7(r+2) = -10
- **69.** Solve the equation. 2 - 9(A - 8) = 65
- **70.** Solve the equation. 4 - (c + 10) = -3
- 71. Solve the equation. 4(c+7) - 7(c-6) = 46
- 72. Solve the equation. 10(C-4) - C = -88 - 3(8+5C)
- 73. Solve the equation. 38 + 6(5 - 3b) = -6(b - 11) + 2

74. A rectangle's perimeter is 138 cm. Its length is 2 times as long as its width. Use an equation to find the rectangle's length and width.

75. Solve the equations.

a. -r+3 = 3b. -m+3 = -3c. -x-3 = 3d. -b-3 = -3

76.

a. Solve the following linear equation:

5(y-4) + 7 = 22

b. Evaluate the following expression when y = 7:

5(y-4) + 7

c. Simplify the following expression:

5(y-4) + 7

77. Write a linear equation whose solution is x = -9.

Note that you may not write an equation whose left side is just "*x*" or whose right side is just "*x*."

There are infinitely many correct answers to this problem. Be creative. After finding an equation that works, see if you can come up with a different one that also works.

78. Solve this inequality. Express the solution set using interval notation.

1 > x - 9

79. Solve this inequality. Express the solution set using interval notation.

 $12 \ge -4x$

80. An engineer is designing a cylindrical springform pan. The pan needs to be able to hold a volume of 180 cubic inches and have a diameter of 12 inches. What's the minimum height it can have? (Hint: The formula for the volume of a cylinder is $V = \pi r^2 h$).

Assume the pan's minimum height is h inches. Write an equation to model this scenario. There is no need to solve it.

81. Solve this inequality. Express the solution set using interval notation.

 $79 \ge 9x - 2$

82. Solve this inequality. Express the solution set using interval notation.

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-5x-2 < -32
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83. Solve this inequality. Express the solution set using interval notation.

-5 > 4 - x

5

84. Solve this inequality. Express the solution set using interval notation.

$$7t + 9 < 4t + 21$$

85. Solve this inequality. Express the solution set using interval notation.

a - 3 - 2a > -2 - 3a + 1

86. Solve this inequality. Express the solution set using interval notation.

68<-4(p-8)

87. Solve this inequality. Express the solution set using interval notation. $22 \le 0 = 2(-5)$

 $23 \le 9 - 2(z - 5)$

88. Solve this inequality. Express the solution set using interval notation.

4 + 7(x - 9) < -95 - (4 - 3x)

89. A car rental company offers the following two plans for renting a car:

Plan A: \$32 per day and 20 cents per mile

Plan B: \$45 per day with free unlimited mileage

How many miles must one drive in order to justify choosing Plan B?

90. Multiply: $4 \cdot \frac{4}{5}$

91. Do the following multiplications:

a.
$$20 \cdot \frac{2}{5} =$$

b. $25 \cdot \frac{2}{5} =$
c. $30 \cdot \frac{2}{5} =$

92. Solve the equation.

$$\frac{n}{6} + 7 = 13$$

93. Solve the equation.

$$-6 = 10 - \frac{4y}{5}$$

94. Solve the equation.

$$52 = \frac{6}{9}B + 2B$$

- 95. Solve the equation. $5C = \frac{4}{7}C + 2$
- 96. Solve the equation. $\frac{3}{4} - \frac{1}{4}A = 6$
- 97. Solve the equation. $\frac{6}{7} + \frac{8}{7}x = 3x$
- 98. Solve the equation. $\frac{2x}{3} + \frac{7}{6} = x$
- **99.** Solve the equation. $-\frac{9}{4}a + 42 = \frac{3a}{8}$
- 100. Solve the equation. $\frac{7c}{2} + \frac{8}{3} = \frac{1}{6}c$
- 101. Solve the equation. $\frac{5}{8} = \frac{r}{32}$
- **102.** Solve the equation. $-\frac{A}{12} = -\frac{9}{4}$
- 103. Solve the equation. $\frac{7}{8} = \frac{p+8}{32}$
- 104. Solve the equation. $\frac{C-7}{4} = \frac{C+10}{6}$
- 105. Solve the equation. $\frac{a}{7} - 2 = \frac{a}{9}$

106. Solve the equation.

$$q + \frac{3}{10} = \frac{7}{10}q + \frac{7}{10}$$

107. Solve the equation.

$$21 = \frac{y}{5} + \frac{y}{2}$$

108. Solve the equation.

 $\frac{5}{7}C + \frac{5}{6} = \frac{2}{3}C + \frac{5}{8}$

109. Alejandro is jogging in a straight line. He started at a place 30 meters from the starting line, and ran toward the starting line at the speed of 3 meters every 4 seconds. After how many seconds will Alejandro be 21 meters away from the starting line?

110. Solve this inequality. Express the solution set using interval notation.

 $\frac{x}{2} + 27 \ge 5x$

111. Solve this inequality. Express the solution set using interval notation.

 $-\frac{1}{6}t > \frac{6}{7}t - 86$

112. Solve this inequality. Express the solution set using interval notation.

$$-\frac{z}{4} < -\frac{9}{2}$$

113. Solve this inequality. Express the solution set using interval notation.

 $\frac{y-1}{8} \ge \frac{y+5}{6}$

114. Your grade in a class is determined by the average of three test scores. You scored 73 and 88 on the first two tests. To earn at least 83 for this course, how much do you have to score on the third test?

Let x be the score you will earn on the third test. Write an inequality to represent this situation. Solve this inequality. What is the minimum that you have to earn on the third test in order to earn a 83 for the course?

You cannot score over 100 on the third test. Use interval notation to represent the range of scores you can earn on the third test in order to earn at least 83 for this course.

- 115. Solve the equation. -5y-6 = -36
- **116.** Solve the equation. -9 = -3(p-4)

117.

- a. Solve this linear equation for *r*. r 3 = 5
- b. Solve this linear equation for *y*. y q = 5

118.

a. Solve this linear equation for *r*.

7r = 56

b. Solve this linear equation for *x*.

Ax = a

119.

a. Solve this linear equation for *r*.

6r + 9 = 51

b. Solve this linear equation for *t*.

bt + q = A

120.

a. Solve this linear equation for r.

r+t=a

b. Solve this linear equation for *t*.

r+t=a

121.

a. Solve this linear equation for *y*.

r = xy + c

b. Solve this linear equation for *x*.

r = xy + c

122.

a. Solve this equation for *b*:

 $6 = \frac{1}{2}b \cdot 2$

b. Solve this equation for *b*:

$$A = \frac{1}{2}b \cdot h$$

- **123.** Solve these linear equations for *t*.
 - a. $\frac{t}{4} + 3 = 7$ b. $\frac{t}{y} + 3 = c$
- **124.** Solve this linear equation for *x*.

$$\frac{x}{6} + y = b$$

125. Solve this linear equation for *y*.

$$Ax + By = C$$

126. Solve the linear equation for *y*.

$$32x - 4y = 44$$

127. Solve the linear equation for *y*.

$$5y - 4x = -75$$

128. Solve the linear equation for *y*.

$$66y - 21x = -429$$

129. Reduce the fraction $\frac{35}{42}$.

130. Reduce the fraction $\frac{420}{175}$.

131. The property taxes on a 2100-square-foot house are \$3,339.00 per year. Assuming these taxes are proportional, what are the property taxes on a 1600-square-foot house?

- **132.** Solve $\frac{30}{x} = \frac{15}{6}$ for *x*.
- **133.** Solve $\frac{x}{8} = \frac{x-6}{11}$ for *x*.
- **134.** Solve $\frac{x-4}{9} = \frac{x-6}{15}$ for *x*.
- **135.** Solve $\frac{x-4}{10} = -\frac{54}{12}$ for *x*.

136. The following two triangles are similar to each other. Find the length of the missing side.

The missing side's length is ?

8

137. Sharell makes \$162 every twelve hours she works. How much will she make if she works thirty-four hours this week?

If Sharell works thirty-four hours this week, she will make _____.

138. Connor jogs every day. Last month, he jogged 9.5 hours for a total of 35.15 miles. At this speed, how long would it take Connor to run 131.35 miles?

139. James collected a total of 1513 stamps over the past 17 years. At this rate, how many years would it take he to collect 2314 stamps?

140. To try to determine the health of the blacktailed deer population in the Jewell Meadow Wildlife Area, the Oregon Department of Fish and Wildlife caught, tagged, and released 28 black-tailed deer. A week later, they returned and observed 63 blacktailed deer, 18 of which had tags. Approximately how many black-tailed deer are in the Jewell Meadow Wildlife Area?

141. Solve the equation.

9a + 2 = 38

- **142.** Solve the equation. -4q + 9 = -q 12
- **143.** Solve the equation. 4m = 4m + 7
- **144.** Solve the equation.

5y - 6 - 6y = -11 - y + 5

145. Solve the equation.

10(B-8) = 10(B-1)

146. Solve the equation.

$$3(4-6n) - (2n-10) = 16 - 2(2+10n)$$

147. Solve this inequality. Answer using interval notation.

$$2x > 2x + 3$$

148. Solve this inequality. Answer using interval notation.

$$-3 + 4x + 13 \ge 4x + 10$$

149. Solve this inequality. Answer using interval notation.

$$-9-6z+2 > -z+10-5z$$

150. Solve this inequality. Answer using interval notation.

$$6x \le 6x + 3$$

151. Solve this inequality. Answer using interval notation.

$$2(8-8m) - (6m-8) > 20 - 2(1+11m)$$

152. Fill in the right side of the equation to create a linear equation with the properties listed.

- a. Create a linear equation with *infinitely many solutions*. 10(x+4) =
- b. Create a linear equation with the solution x = 2.

10(x+4) =

ANSWERS

(1)	(a) -6 (b) 0	(33) (34)
(2)	(c) -8 (a) 9	
(2)	(b) -9	(25)
(3)	17.38 77	(35)
(4)	15 3	(30)
(0)	$\frac{-44}{29}$	(37)
(6)	$\overline{\overline{24}}$	(38)
(7)	(a) $\frac{10}{7}$	(39)
	(b) not a real	(40)
(8)	30	(41)
(0)	30 22	
(9)		
(10) (11)	25	
(12)	$\frac{24}{100}$, reduces to $\frac{6}{27}$	(42)
(12) (13)	A. B. C. D	(43)
(14)	$\frac{13}{2} > \pi > 2 > -\frac{11}{4} > 1$	(44)
	-4	(45)
(15)	1	(46)
(16)	23	(47)
(17)	$\frac{1}{6}$	(48)
(18)	Perimeter is 48 me-	(49)
	ters. Area is 55	(50)
	square meters.	(51)
(19)	Perimeter is 46 me-	(51)
	ters. Area is 81	
	square meters.	(52)
(20)	(a) $8x$	(52)
	(b) $5x^2 + 3x$	(54)
	(c) $9s - 8t$	
(21)	(d) $2q^2$	(55)
(21)	(a) yes	(56
	(0) yes (a) no	(57
	(c) no (d) no	(58
(22)	5 1 is a solution	(59)
(22) (23)	r = -8	(60)
(23) (24)	$O = -\frac{16}{10}$	(61)
(25)	$x = 45^{21}$	(62)
(26)	$t = -\frac{2}{2}$	
(27)	(a) 4	
	(b) -21	(63
	(c) -1	(64
	(d) 1	(65)
	(e) undefined	(66)
	(f) 0	(67)
(28)	(-∞,5)	(68)
(29)	[−24,∞)	(09)
(30)	0.07, 0.53	(70)
(31)	b + 0.21b = 47	(71)
(32)	$3000 = a5 \cdot 18 \cdot h$	(12)

(33)	7 - 5x = 63	
(34)	(a) 1	
()	(h) 1	
	(c) -1	
(35)	$20a^{30}$	
(35)	$20q$ (a) $40r^8$	
(30)	(a) 49λ (b) $16x^{6}$	
(27)	$(0) -10x^{3}$	
(37)	38 + 70x	
(38)	-10+3c	
(39)	$18x^2$	
(40)	-2x - 15	
(41)	(a) 200π cubic	
	feet	
	(b) 628.32 cubic	
	feet	
(42)	\$9.24	
(43)	5.218% decrease	
(44)	y = -6	
(45)	y = -7	
(46)	r = 5	
(47)	n = -3	
(48)	p = -6	
(49)	p = -7	
(50)	You spoke for 410	
. /	minutes.	
(51)	Benjamin can pur-	
(==)	chase at most 6	
	cards	
(52)	t = 9	
(52)	$n = -\frac{1}{2}$	
(53)	$P = \frac{3}{3}$ It will take 20	
(31)	months	
(55)	It will take 10 days	
(55)	It will take 10 days. $A = A$	
(50)	A = 4	
(57)	r = -4	
(58)	x = 10	
(39)	C = 0	
(00)	c = -7	
(61)	x = -/	
(62)	Ieresa collected 123	
	and Grant collected	
	354.	
(63)	100 people	
(64)	B = -5	
(65)	c = -9	
(66)	A = -4	
(67)	t = 7	
(68)	r = 0	
(69)	A = 1	
(70)	c = -3	
(71)	c = 8	
(72)	$C = -\frac{17}{6}$	10
	-	+ V

(73) $b = 0$	[88, 100]
(74) Its width is 23 cm	(115) v = 6
and its length is 46	$(116) \ p = 7$
cm.	(117) (a) $r = 8$
(75) (a) $r = 0$	(b) $y = 5 + a$
(b) $m = 6$	(118) (a) $r = 8$
(c) $x = -6$	(b) $x = \frac{a}{4}$
(d) $b = 0$	(119) (a) $r = 7^{A}$
(76) (a) $v = 7$	(b) $t = \frac{A-q}{dt}$
(b) 22	(120) (a) $r = a - t$
(c) $5y - 13$	(b) $t = a - r$
(77) For example $2x +$	(121) (a) $y = \frac{r-c}{c}$
13 = -5.	(b) $x = \frac{r-c}{r-c}$
$(78) \ (-\infty, 10)$	(122) (a) $h = 6^{y}$
(79) [−3,∞)	(122) (a) $b = 2Ah$
$(80) 180 = \pi \cdot 6^2 \cdot h$	(123) (a) $t = 16$
(81) (-∞,9]	(123) (a) $t = (c-3)v$ or
(82) (6,∞)	t = cv - 3v
(83) (9,∞)	(124) $x = 6(h - y)$ or $x =$
$(84) (-\infty, 4)$	6b-6y
(85) (1,∞)	(125) $y = \frac{C - Ax}{2}$
$(86) (-\infty, -9)$	(126) $y = \frac{44-32x}{B}$ (or other
$(87) (-\infty, -2]$	$(120) y = _4$ (or other variations on this)
$(88) (-\infty, -10)$	(127) $v = \frac{4x-75}{2}$
(89) 65 miles	$(127) y = \frac{5}{5}$ (128) $y = \frac{21x - 429}{5}$
$(90) \frac{16}{5}$	$(128) \ y = -\frac{66}{66}$
(91) (a) 8	$(129) = \frac{12}{6}$
(b) 10	$(130) \frac{12}{5}$
(c) 12	(131) \$2,544.00
(92) $n = 36$	(132) $x = 12$
(93) $y = 20$	(133) $x = -16$
(94) $B = 18$	(134) x = 1
(95) $C = \frac{14}{31}$	(135) $x = -41$
(96) $A = -21$	(136) 5 feet (127) \$450
(97) $x = \frac{6}{13}$	(137) \$459 (128) 25.5 here
(98) $x = \frac{7}{2}$	(138) 35.5 hours
(99) $a = \tilde{1}6$	(139) 26 years (140) 08 1
(100) $c = -\frac{4}{5}$	(140) 98 deer
(101) $r = 20^{\circ}$	$(141) \ a = 4$ $(142) \ a = 7$
(102) $A = 27$	(142) $q = 7$ (143) no solution
(103) $p = 20$	(143) no solution (144) all real numbers are
(104) $C = 41$	(144) all feat numbers are
(105) $a = 63$	(145) no solution
(106) $q = \frac{4}{3}$	(145) no solution (146) no solution
(107) $y = 30$	(140) no solution (147) no solution
(108) $C = -\frac{35}{8}$	(147) no solution (148) (a_2 a_3)
(109) After 12 seconds	$(148) (-\infty,\infty)$
(110) (-∞,6]	(149) IIO SOLULION (150) $(-\infty,\infty)$
(111) (−∞,84)	$(150) (-\infty, \infty)$
(112) (18,∞)	$(151) (-\infty, \infty)$ (152) $10(r + 4) = 10r +$
(113) (-∞, -23]	(132) 10(x+4) = 10x + 40
$(114) \frac{73+88+x}{3} \ge 83$	10(r+4) - 60
$x \ge 88$	10(x+4) = 00