Pre-Algebra
Semester Exam
Specification Sheet

1	Order of Operations
2	Solving Equations and Inequalities
3	Solving Equations with Rational Numbers
4	Simplifying Variable Expressions
5	Solving Proportions
1	Order of Operations
2	Ordering Integers
3	Exponentials
4	Integer Operations
5	Integer Operations
6	Evaluate Expressions
7	Locate Points on a Coordinate Plane
8	Locate Points on a Coordinate Plane
9	Properties of Real Numbers
10	Properties of Real Numbers
11	Properties of Real Numbers
12	Properties of Real Numbers
13	Operations with Rational Numbers
14	Absolute Value
15	Solve 1-step Equation
16	Solve 1-step Equation
17	Solve 2-step Equation
18	Solve 2-step Equation
19	Solving and Graphing Equations Involving Absolute Value
20	Solving and Graphing Equations Involving Absolute Value
21	Solve Multi-step Equations
22	Solve Equations with the Variable on Both Sides
23	Solve and Graph Inequalities on the Number Line
24	Write and Solve 2-step Equations on a Number Line
25	Solve 2-step Equations
26	Use Concept of Number Theory – Factors, Primes, Composites
27	Use Concept of Number Theory – Factors, Primes, Composites
28	Use Concept of Number Theory – Factors, Primes, Composites
29	Use Concept of Number Theory – Factors, Primes, Composites
30	Prime Factorization
31	Use Concept of Number Theory – Factors, Primes, Composites
32	GCF
33	LCM
34	Scientific Notation

35	Rational/Irrational Numbers
36	Equivalent Expressions (Fractions and Decimals)
37	Equivalent Expressions (Fractions and Decimals)
38	Ordering Rational Numbers
39	Operations with Rational Numbers
40	Operations with Rational Numbers
41	Operations with Rational Numbers
42	Solving Multi-step Equations (Rational Numbers)
43	Solving Multi-step Equations
44	Solving Multi-step Equations
45	Converting Units of Measurements
46	Unit Rate
47	Ratio and Proportion
48	Similar Figures
49	Similar Figures
50	Similar Figures

Free Response
Pre-Algebra
Practice Semester Exam

1. The following expressions were entered into a scientific calculator.

$14 + 42 \div 7$ $(14 + 42) \div 7$

Explain whether or not the calculator would obtain the same answer for each expression. Justify your answer.

2. Describe how to solve the inequality $3(x - 2) > -12$. Use mathematical terms in your answer.

3. Explain two different methods for solving equations involving decimals. Include an example to illustrate your answer.

4. A friend was absent from school when it was explained how to simplify an expression including variables. Using the problem $\frac{5x}{3} - \frac{x}{6}$, explain how you would show your friend to simplify the expression.

5. List two different methods to solve proportions. For each of the following proportions tell which method you would use and why. Then solve the proportion.

A) $\frac{1}{4} = \frac{x}{12}$ B) $\frac{1.6}{y} = \frac{8}{25}$

1. What is the first step to complete in simplifying the expression below?

$$8[(40 - 15) \div 5] + 3$$

A. Add 5 and 3.

B. Divide 15 by 5.

C. Multiply 8 by 40.

D. Subtract 15 from 40.

2. The table shows the yardage gained and lost on the first 8 plays of a football game.

Yards Gained and Lost

Play	Yardage
1	+7
2	−3
3	+1
4	−8
5	+5
6	+6
7	−4
8	+2

What is the order of the yardage from least to greatest?

A. $-8, -4, -3, +1, +2, +5, +6, +7$

B. $-8, +7, +6, +5, -4, -3, +2, +1$

C. $+1, +2, -3, -4, +5, +6, +7, -8$

D. $+7, -3, +1, -8, +5, +6, -4, +2$

3. Which of the expressions below is equivalent to 5^3?

A. $5 + 5 + 5 = 15$

B. $5 \cdot 5 \cdot 5 = 125$

C. $\frac{1}{5} + \frac{1}{5} + \frac{1}{5} = \frac{3}{5}$

D. $\frac{1}{5} \cdot \frac{1}{5} \cdot \frac{1}{5} = \frac{1}{125}$

4. What is the value of $-25 - 32$?

A. -57

B. -7

C. 7

D. 57

5. What is $-4(23)$?

A. -92

B. -27

C. 27

D. 92

6. Evaluate $\frac{9x - 2y}{xy}$ when $x = 4$ and $y = -2$.

A. -5

B. -4

C. 5

D. 7

7. Which quadrant contains the point $(6, -1)$?

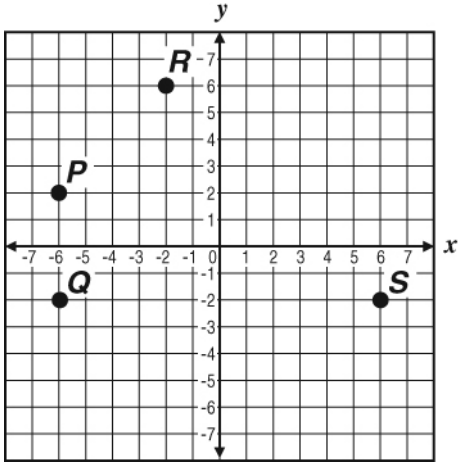
A. Quadrant I

B. Quadrant II

C. Quadrant III

D. Quadrant IV

8. On the coordinate plane below, which point represents the coordinate $(-6, 2)$?



A. P

B. Q

C. R

D. S

9. Which equation illustrates the commutative property of multiplication?

A. $(2 \cdot 5) \cdot 3 = 2 \cdot (5 \cdot 3)$

B. $4(3 + 2) = 4(2 + 3)$

C. $2 \cdot 2 = 2 + 2$

D. $6 \cdot 3 = 3 \cdot 6$

10. Which expression is equivalent to $-5(n - 9)$?

A. $-5n - 9$

B. $-5n + 9$

C. $-5n - 45$

D. $-5n + 45$

11. The mathematics teacher wrote this procedure on the board.

Step 1: $75 + 8$
Step 2: $= (70 + 5) + (5 + 3)$
Step 3: $= 70 + (5 + 5) + 3$
Step 4: $= 70 + 10 + 3$
Step 5: $= 80 + 3$
Step 6: $= 83$

Which property justifies Step 3?

A. distributive

B. commutative

C. associative

D. additive identity

12. What is the result when the additive identity is added to 8?

A. 0

B. 8

C. 9

D. 16

13. What is the value of $3.115 - 7$?

A. -3.885

B. -3.108

C. 3.108

D. 3.885

14. $|21 - 23| =$

A. -44

B. -2

C. 2

D. 44

15. **Solve for x: $7 + x = -14$.**

A. -21

B. -2

C. 7

D. 21

16. **Find the value of d in the equation $\frac{d}{13} = 52$.**

A. 4

B. 39

C. 208

D. 676

17. **What is the first step in solving for z in the equation $5z - 4 = 26$?**

A. Add 4 to both sides of the equation.

B. Subtract 4 from both sides of the equation.

C. Multiply both sides of the equation times 5.

D. Divide both sides of the equation by 5.

18. **What is x if $-3x + 6 = 39$?**

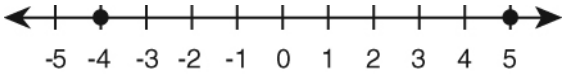
A. -19

B. -15

C. -11

D. -7

19. **Which number line represents $|2x + 1| = 9$?**

A.


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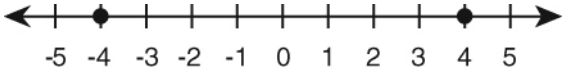

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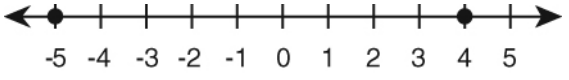

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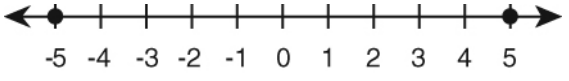


20. **If 6 more than 4 times a number is 14, what is the number?**

A. 5

B. 2

C. -2

D. -5

21. **What is the value of x in the equation below?**

$$3x - 4(2x - 5) = 5$$

A. -5

B. -3

C. 3

D. 5

22. **What value of y makes the equation $15 - (y + 1) = 2 + y$ true?**

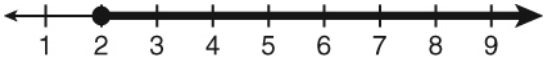
A. 0

B. 6

C. 8

D. 12

23. Which number line represents the solution of $\frac{1}{2}b \geq 4$?

A.


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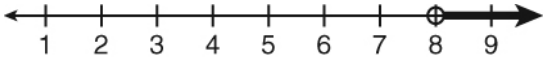
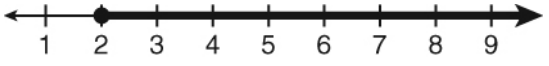


C.


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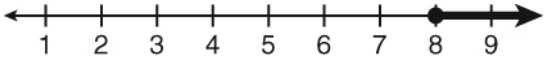
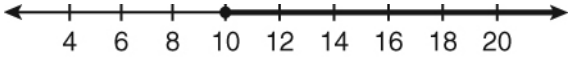
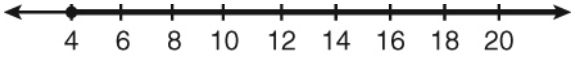
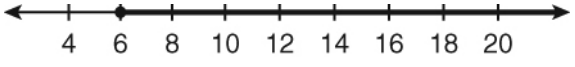


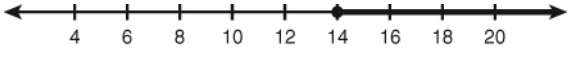
24. Which of the following number lines represents the solution to the inequality below?

$$40 + 10x \geq 100$$

A.


B.


C.


D.


25. What is x if $-\frac{x}{12} + 13 < 15$?

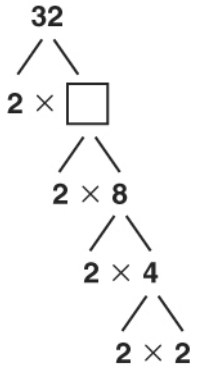
A. $x < -24$

B. $x > -24$

C. $x < -336$

D. $x > -336$

26. Which number goes in the box to complete the factor tree?



A. 10

B. 16

C. 18

D. 22

27. Which pair of numbers is relatively prime?

A. 4 and 15

B. 6 and 15

C. 6 and 16

D. 8 and 20

28. Which set contains only composite numbers?

A. $\{15, 18, 19, 21\}$

B. $\{22, 27, 33, 39\}$

C. $\{41, 45, 46, 49\}$

D. $\{51, 53, 55, 57\}$

29. **All of the digits in Roberto's phone number are prime numbers. Which phone number could be Roberto's?**

A. 5 5 5 – 3 1 2 9

B. 5 5 5 – 2 6 3 7

C. 5 5 5 – 7 3 2 3

D. 5 5 5 – 9 3 3 5

30. **What is the prime factorization of 36?**

A. $2^2 \times 3$

B. $2^2 \times 3^2$

C. $2^3 \times 3$

D. $2^3 \times 2^3$

31. **What number is a factor of 36?**

A. 5

B. 7

C. 9

D. 11

32. **What is the greatest common factor (GCF) of $8xy^2z^3$ and $12x^3y^2z$?**

A. $4xy^2z$

B. $8xy^2z^3$

C. $12x^3y^2z$

D. $24x^3y^2z^3$

33. **What is the least common multiple of $3ab^2$ and $6ab$?**

A. $3ab^2$

B. $3a^2b^2$

C. $6ab^2$

D. $6a^2b^2$

34. **Guillermo measured a microbe to be 0.0000067 meters across. What is 0.0000067 written in scientific notation?**

A. 6.7×10^{-5}

B. 6.7×10^{5}

C. 6.7×10^{-6}

D. 6.7×10^{6}

35. **Terri is playing a math card game and has dealt each player four math cards as listed below.**

Lisa: $2, \sqrt{2}, -5, \frac{1}{2}$

Ben: $0.\overline{435}, 0.5, \sqrt{25}, 0$

Kari: $\pi, 2, 6, -2$

Terri: $\sqrt{200}, \pi, \sqrt{50}, 1.43256744376665...$

Which person's hand contains all rational numbers?

A. Lisa

B. Ben

C. Kari

D. Terri

36. What fraction is equivalent to 0.56?

A. $\frac{14}{25}$

B. $\frac{56}{99}$

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

D. $\frac{28}{5}$

37. Which decimal is equivalent to $\frac{22}{9}$?

A. 0.409

B. $0.4\overline{09}$

C. 2.4

D. $2.\overline{4}$

38. Students were asked to measure the width of a room and compare their measurements. The measures, in feet, are listed below.

$$25\frac{2}{3},\ 25.75,\ 25\frac{7}{12},\ 25\frac{5}{6},\ 25.5$$

Since each student recorded a different measurement, they decided to order them from least to greatest. What is the correct order?

A. $25\frac{7}{12},\ 25\frac{2}{3},\ 25\frac{5}{6},\ 25.5,\ 25.75$

B. $25.5,\ 25.75,\ 25\frac{2}{3},\ 25\frac{5}{6},\ 25\frac{7}{12}$

C. $25.5,\ 25\frac{7}{12},\ 25\frac{2}{3},\ 25.75,\ 25\frac{5}{6}$

D. $25.5,\ 25\frac{2}{3},\ 25\frac{5}{6},\ 25\frac{7}{12},\ 25.75$

39. Beth had $3\frac{1}{2}$ cups of milk. She used $1\frac{3}{4}$ cups of the milk to bake a cake. How many cups of milk does Beth have left?

A. $1\frac{3}{4}$ cups

B. $2\frac{1}{4}$ cups

C. $2\frac{3}{4}$ cups

D. $5\frac{1}{4}$ cups

40. What is the value of $\left(2\frac{1}{2}\right)\left(2\frac{1}{2}\right)$?

A. $4\frac{1}{4}$

B. 5

C. $5\frac{1}{2}$

D. $6\frac{1}{4}$

41. Ms. Kirkland is baking muffins. Each batch of muffins uses $\frac{3}{4}$ of a pound of flour. How many batches of muffins can she bake with 5 pounds of flour?

A. $3\frac{3}{4}$ batches

B. $4\frac{1}{4}$ batches

C. $5\frac{3}{4}$ batches

D. $6\frac{2}{3}$ batches

42. Which process was used to obtain the equation shown in Step 2?

Step 1: $\frac{y}{3} - \frac{1}{4} = 5$

Step 2: $4y - 3 = 60$

A. added $\frac{1}{4}$ to both sides of the equation

B. added 5 to both sides of the equation

C. multiplied both sides of the equation by 12

D. divided both sides of the equation by 12

43. What value of x makes the equation $-4 + \frac{1}{2}x = 8$ true?

A. 6

B. 8

C. 12

D. 24

44. What is the value of x in the equation below?

$$\frac{2(3x - 7)}{5} = 6x$$

A. $-\frac{7}{12}$

B. $-\frac{7}{24}$

C. $\frac{7}{36}$

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

45. Which of the following expressions shows how to convert 55 miles per hour to the equivalent value in feet per second?

A. $\frac{1 \text{ hour}}{55 \text{ mi}} \cdot \frac{1 \text{ hour}}{60 \text{ min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}}$

B. $\frac{1 \text{ hour}}{55 \text{ mi}} \cdot \frac{60 \text{ min}}{1 \text{ hour}} \cdot \frac{60 \text{ sec}}{1 \text{ min}} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}}$

C. $\frac{55 \text{ mi}}{1 \text{ hour}} \cdot \frac{1 \text{ hour}}{60 \text{ min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}}$

D. $\frac{55 \text{ mi}}{1 \text{ hour}} \cdot \frac{1 \text{ hour}}{60 \text{ min}} \cdot \frac{1 \text{ min}}{60 \text{ sec}} \cdot \frac{5280 \text{ ft}}{1 \text{ mi}}$

46. There are two sizes of milk to choose from at the grocery store. A 3-quart carton costs \$2.78, while a 4-quart carton costs \$3.87. Which is the more economical buy and why?

A. the 3-quart, because it's priced at 93 cents a quart

B. the 3-quart, because it's priced at 96 cents a quart

C. the 4-quart, because it's priced at 97 cents a quart

D. the 4-quart, because it's priced at 92 cents a quart

47. If Donna earns \$54 for 6 hours of work, how much does she earn for 20 hours of work at the same rate?

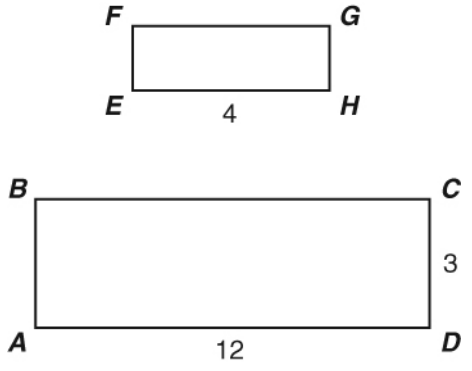
A. \$81.00

B. \$91.80

C. \$180.00

D. \$400.00

48. **Rectangle *ABCD* is similar to Rectangle *EFGH* as shown below.**



What is the length of $\overline{GH}$?

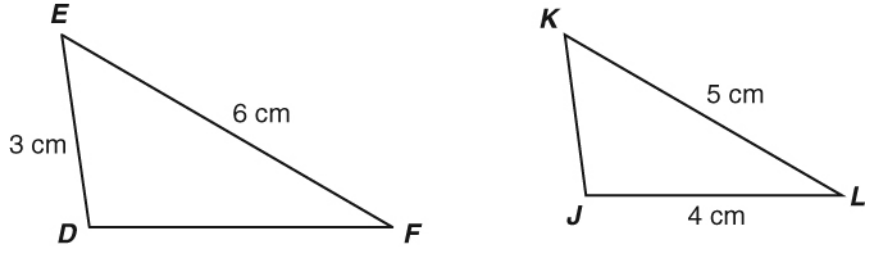
A. 1

B. 2

C. 7

D. 9

49. **The triangles shown below are similar.**



Which proportion can be used to find the missing side length of triangle *JKL*?

A. $\frac{4}{3} = \frac{6}{JK}$

B. $\frac{3}{5} = \frac{JK}{6}$

C. $\frac{6}{3} = \frac{JK}{5}$

D. $\frac{6}{5} = \frac{3}{JK}$

50. **Serena is $5\frac{1}{2}$ feet tall and casts a shadow that is 8 feet long. A nearby tree casts a shadow that is 32 feet long at the same time. How tall is the tree?**

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

B. 22 ft

C. $37\frac{1}{2}$ ft

D. 46 ft

Pre-Algebra Practice Semester Exam

1	D	26	B
2	A	27	A
3	B	28	B
4	A	29	C
5	B	30	B
6	A	31	C
7	D	32	A
8	A	33	C
9	D	34	C
10	D	35	B
11	C	36	A
12	B	37	D
13	A	38	C
14	C	39	A
15	A	40	D
16	D	41	D
17	A	42	C
18	C	43	D
19	C	44	A
20	B	45	D
21	C	46	A
22	B	47	C
23	D	48	A
24	C	49	D
25	B	50	B