

Math 9 Review Package

(Key @ end)

1. Rational Numbers and Square Roots

Intended Learning Outcomes:

A3 demonstrate an understanding of rational numbers by:- comparing and ordering rational numbers- solving problems that involve arithmetic operations on rational numbers

A4 explain and apply the order of operations, including exponents, with and without technology

A5 determine the square root of positive rational numbers that are perfect squares

A6 determine an approximate square root of positive rational numbers that are non-perfect squares

1. Which of the following are not rational numbers?

3.1, -3.225 , π , $-\frac{2}{3}$, $\frac{1.2}{7.9}$

7.23452 , $\sqrt{9}$, $-\sqrt{16}$, $\sqrt{2}$

$0.333\dots$, $-1.2525\dots$, -0.00034

Remember: Rational numbers are numbers made up of fractions, integers and decimals whose decimal stops or repeats. A number that can be written as a ratio of two integers. (The denominator cannot be zero.)

2. (t/f) Converting rational numbers to the same form, (all fractions or all decimals), is often a good when you are trying to compare them.

3. Order the following rational numbers from least to greatest:

$4, -3.6, -\frac{7}{2}, -\frac{24}{7}, -1$

_____ < _____ < _____ < _____ < +4

4. t/f A common denominator is required to add or subtract fractions.

5. Evaluate:
A) $\frac{2}{5} + \frac{1}{5} =$

B) $\frac{5}{6} - \frac{4}{6} =$

C) $\frac{1}{3} + \frac{1}{2} =$

D) $2\frac{1}{3} - 1\frac{1}{2} =$

6. (t/f) A common denominator is required to multiply or divide fractions.

7. (t/f) To multiply fractions, multiply the numerator and multiply the denominator

8. Evaluate:

A) $\frac{4}{1} \times \frac{1}{2} =$ B) $\frac{7}{1} \times \frac{1}{3} =$

C) $\frac{6}{5} \times \frac{10}{3} =$ D) $2\frac{6}{5} \times \frac{3}{4} =$

9. (t/f) When multiplying or dividing, you

need to convert mixed numbers, $\left(2\frac{1}{3}\right)$

to improper fractions first.

10. Evaluate:

A) $\frac{4}{1} \div \frac{1}{2} =$ B) $\frac{1}{2} \div 2 =$

C) $2\frac{6}{5} \div \frac{4}{3} =$

11. (t/f) Following BEDMAS is only needed some of the times.

Evaluate:

A) $\frac{20}{40} - \frac{21}{40} \times \frac{80}{7} =$ B) $\left(\frac{5}{3}\right)^2 - \frac{12}{9} =$

12. (t/f) A number is a perfect square if it is made by multiplying the same number by itself.

13. Circle any the numbers that are perfect squares:

1,2,3,4,5,6,7,8,9.

14. List the first 12 perfect squares.

_____, _____, _____, _____
_____, _____, _____, _____
_____, _____, _____, _____

15. Evaluate the following:

$\sqrt{25} =$ $\sqrt{36} =$ $\sqrt{\frac{25}{36}} =$

16. Approximate each square root to the nearest tenth.

$\sqrt{26} =$ $\sqrt{35} =$ $\sqrt{30.3} =$

17. The following formula converts degrees Fahrenheit,(F) to degrees Celsius,(C):

$C = \frac{5}{9}(F - 32)$. Convert 59 degrees

Fahrenheit to degrees Celsius.

2. Polynomials

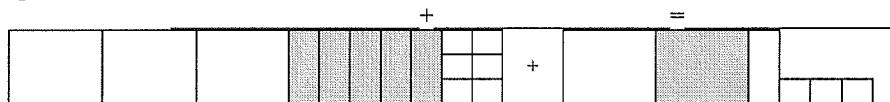
Intended Learning Outcomes:

B5 demonstrate an understanding of polynomials (limited to polynomials of degree less than or equal to 2)
 B6 model, record, and explain the operations of addition and subtraction of polynomial expressions, concretely, pictorially, and symbolically (limited to polynomials of degree less than or equal to 2)
 B7 model, record, and explain the operations of multiplication and division of polynomial expressions (limited to polynomials of degree less than or equal to 2) by monomials, concretely, pictorially, and symbolically

<p>18. Given the following sequence of numbers, determine the 100th term and write an expression to represent any term</p> <p>A. 2,3,4,5,... _____ (100th term), B. Expression: $y =$ _____ C. 2,4,6,8,... _____ (100th term), D. Expression: $y =$ _____ E. 3,5,7,9,... _____ (100th term), F. Expression: $y =$ _____</p>	<p>Match the letter to the appropriate number.</p> <p>19. _____ What is the 3 called in $3x^4 + 5$ 20. _____ What is the x called in $3x^4 + 5$ 21. _____ What is the 5 called in $3x^4 + 5$ 22. _____ What is $3x^4$ called in $3x^4 + 5$ 23. _____ $3x^2$, $4y^2$, $7y$ and $2x(x+2)$ all have the same? 24. _____ $2y$ is an example. 25. _____ $3x^4 + 5$ is an example. 26. _____ $x + y + z$ is an example 27. _____ $3x^4 + 5$ & $x + y + z$ are examples.</p> <p>A. Variable: An unknown quantity represented by a letter. B. Term: A product of letters and/or numbers including single variables or constants. C. Binomial: An expression with two terms D. Monomial: An expression with one term E. Constant: A number on its own that does not change F. Trinomial: An expression with three terms G. Polynomial: An expression made up of any number of terms. H. Coefficient: A number in front of a variable that does not change I. Degree: The highest sum of the exponents in a single term</p>
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28. Write a polynomial expression and simplify each polynomial.

Expression:



29. Simplify $(-8x^2 + 7x + 9) - (6x^2 - 5x + 2)$

30. Which of the following can be represented by the same set of algebra tiles?

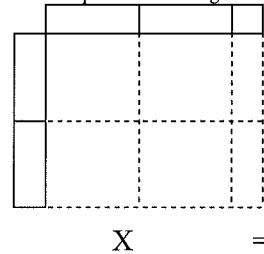
$$\begin{aligned} 7x - 4 + 3x^2 \\ -7x + 4 + 3x^2 \\ 3x^2 + 4 - 7x \\ 3x^2 - 7x + 4 \end{aligned}$$

True or false.

31. (t/f) $3x + 4x^2 = 7x^3$
 32. (t/f) $3x - 8x - 2x^2 + 4x^3 = -5x + 2x^3$

33. (t/f) Like terms have the same variable and the same exponents.

34. What multiplication is being modeled?

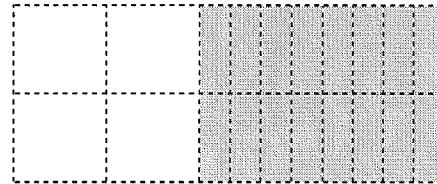


35. Expand:

A) $3(2x + 3) =$

B) $-2x(-4x + 2 - 11z) =$

36. Use the tiles to simplify $\frac{4x^2 - 16x}{2x} =$



37. Simplify: $\frac{5x^2 + 10xy - 25x}{5x}$

3. Linear Equations

Intended Learning Outcomes:

B3 model and solve problems using linear equations of the form:

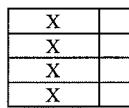
$$ax = b, \frac{x}{a} = b, ax + b = c, \frac{x+b}{a} = c, a(x+b) = c, ax + b = cx + d, a(bx+c) = d(ex+f), \frac{a}{x} = b$$

B4 explain and illustrate strategies to solve single variable linear inequalities with rational coefficients within a problem-solving context.

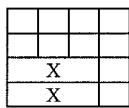
Write an equation and solve it by rearranging the algebra tiles.

Let $\boxed{+x}$, $\boxed{-x}$, $\boxed{+}$, $\boxed{-}$

38.

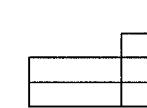


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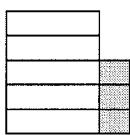


Solve for x.

39.

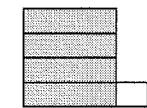


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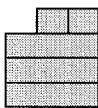


Solve for x.

40.



=



Solve for x.

Given: $5m+7=2m-3$

Are you allowed to:

41. (Y/N) Add 10 to both sides?

42. (Y/N) Minus 3 from both sides?

43. (Y/N) Divide both sides by 5?

44. (Y/N) Add 5m to both sides?

45. (y/n) Are any of the above helpful to solving the equation?

46. Solve. $4m+3=31$

47. Solve. $4(m+3)=40$

48. Solve. $6m+3=2m+15$

49. Solve. $\frac{2}{5}m - 5 = 3$

50. (T/F) To eliminate fractions, multiply both sides by the lowest common denominator.

51. Solve $\frac{m}{3} + \frac{2m}{5} - \frac{1}{2} = 2$

52. Write an inequality to represent each of the following: Circle the correct symbol:



$$x(\geq)(>)(\leq)(<)(=)(\neq)1$$



$$x(\geq)(>)(\leq)(<)(=)(\neq)3$$



$$x(\geq)(>)(\leq)(<)(=)(\neq)-1$$

53. (t/f) When an inequality is multiplied or divided by a negative number, the direction of the inequality changes.

54. Solve: $5m - 10 > +20$

55. Solve: $-5m - 3 \leq 7$

4. Linear Relations

Intended Learning Outcomes:

B1 generalize a pattern arising from a problem-solving context using linear equations and verify by substitution.
 B2 graph linear relations, analyze the graph, and interpolate or extrapolate to solve problems

Describe a written pattern in a table of values, a graph and an equation.

Study the Pattern

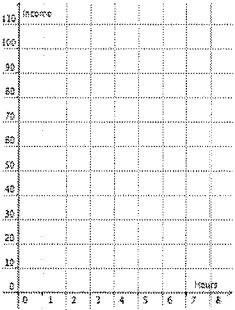
Jason cuts lawns as his summer job. He charges a travelling fee of \$10 plus \$20/hour for his time.

56. Fill out the table of values.

Let $x = \text{Hours}$ & $y = \text{Income}$

x	y
1	
2	
3	
4	
5	
6	

57. Plot as many points as will fit.



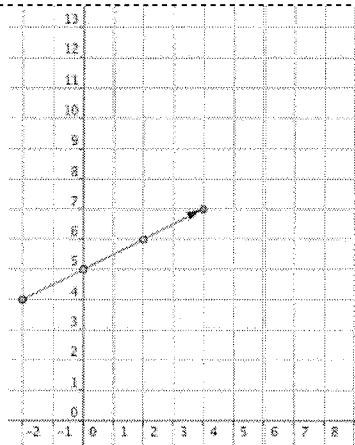
Answer the questions.

58. Rate of change: How is the y changing?

59. Write an equation to represent this pattern.

$Y = \underline{\hspace{2cm}}$

How can you ensure that your equation is correct



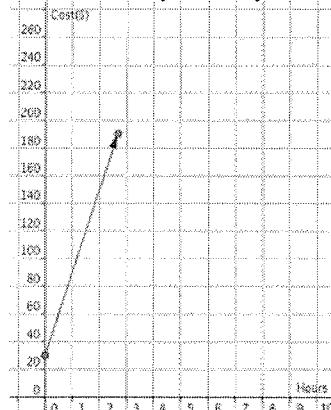
Answer each question and state whether you are interpolating or extrapolating.

60. Estimate y if $x=1$

61. Predict y if $x=8$.

62. Predict x if $y=3$.

The graph represents how much it costs to hire Jordy the handy man.



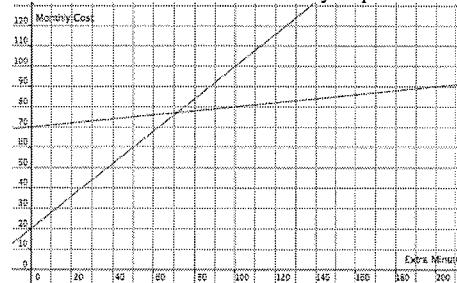
63. Interpolate: Estimate how much it will cost to hire Jordy for 1.5 hours.

64. Extrapolate: Estimate how much it will cost to hire Jordy for 4 hours?

Tok Alut, is trying to decide between two phone plans. His options include:

Chatzilla Economy Plan: \$20/ month and \$0.80 for every minute above 300 minutes.
 Chatzilla Premium Plan: \$70/ month and \$0.10 for every minute above 300 minutes.*

Label each linear relation economy or premium.



65. If he thinks he will use 110 extra minutes per month, which phone plan should he choose and approximately how much will he save?

66. Tok has budgeted \$90 per month for his phone. Which option should he choose and why?

Math 9 Review. Answer Key

Rational Numbers and Square Roots

- $\pi, \frac{12}{7}, \sqrt{2}$
- \mathbb{Z}
- $-3.6 < \frac{-7}{2} < \frac{-24}{7} < -1 < 4$
- \mathbb{Z}
- $\frac{5}{6}, \frac{1}{2}, \frac{5}{3}, \frac{3}{2}$
- \mathbb{R}
- \mathbb{Z}
- $2, \frac{7}{2}, 4, \frac{22}{5}$
- \mathbb{Z}
- $8, \frac{1}{4}, \frac{12}{5}$
- $\mathbb{Z}, -\frac{11}{2}, \frac{12}{9}$
- \mathbb{Z}
- 1, 4, 9
- 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144
- $5, 6, \frac{1}{4}, 3, 0.3, 0.4$
- 5, 1, 5, 9, 5, 5
- 15°C

Polynomials

- $101, t + 1; 200, 2t; 201, 2t + 1$
- H
- A
- B
- B
- Z
- D
- C
- E
- G
- $(3x^2 - 5x + 6) + (x + 3) = 3x^2 - 4x + 9$
- $-14x^2 + 12x + 7$
- All but the first.
- F
- T
- T
- $(2x)(2x + 1) = 4x^2 + 2x$
- $6x + 9, 8x^2 - 4x + 22xz$

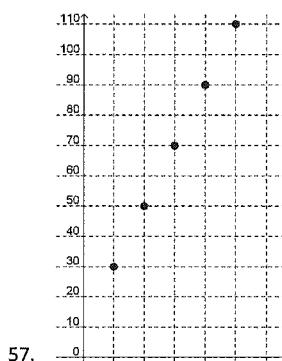
- $2x - 8$
- $x + 2y - 5$

Linear Equations

- $4x + 4 = 2x + 10; x = 3$
- $2x + 3 = 5x - 3; x = 2$
- $-4x + 1 = -3x - 2; x = 3$
- \mathbb{V}
- \mathbb{V}
- \mathbb{V}
- \mathbb{V}
- N
- $m = 7$
- $m = 7$
- $m = 3$
- $m = 20$
- \mathbb{P}
- $m = \frac{15}{22}$
- $x < 1, x \geq 3, x \neq -1$
- \mathbb{P}
- $m > 6$
- $m \geq -2$

Linear Relations

- 30, 50, 70, 90, 110, 130



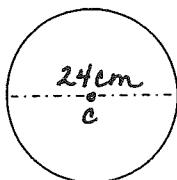
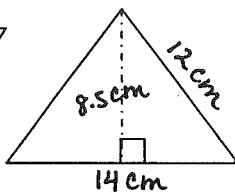
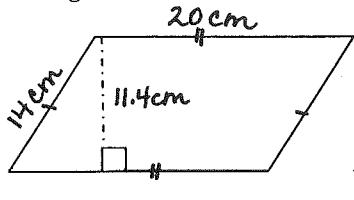
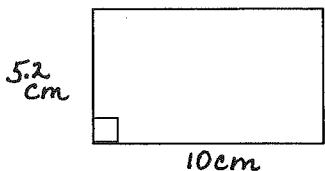
- 20
- $y = 20x + 10$
- $y = 5.5$, Interpolating
- $y = 9$, Extrapolating
- $x = -4$, Extrapolating
- \$120
- \$270

65. premium will save him \$0.7
 66. premium: \$12.5 extra min

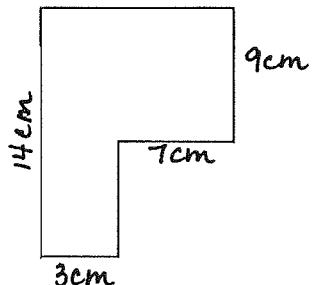
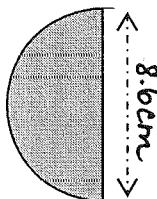
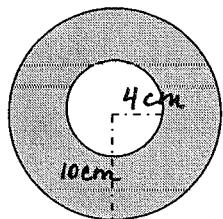
Final Exam Review #6

Name: _____

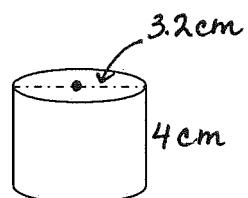
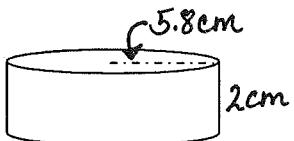
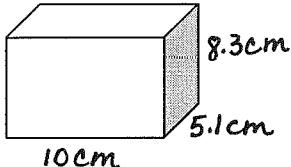
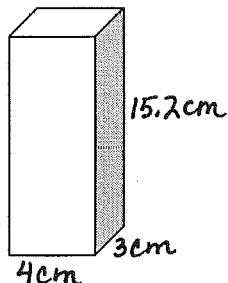
1. Calculate the area for each figure.



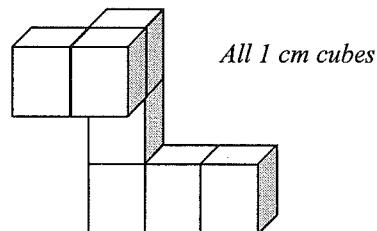
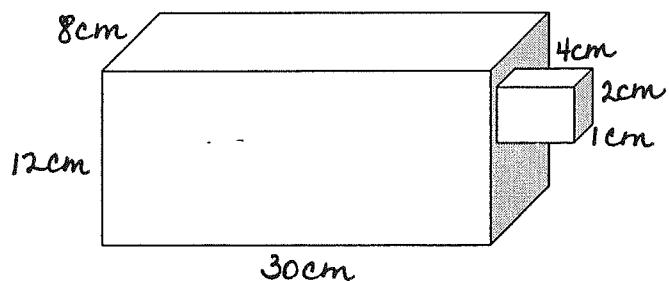
2. Calculate the area for each composite figure.



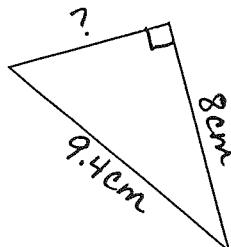
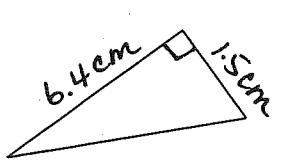
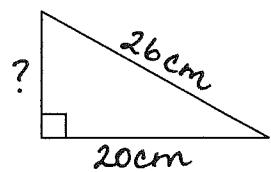
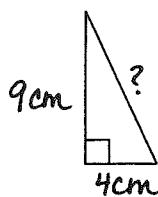
3. Calculate the surface area for the following objects:



4. Calculate the surface area for the following composite objects:



5. Find the length of the missing side of the right triangle (using $a^2 + b^2 = c^2$)



Answers: 52 cm^2 , 228 cm^2 , 59.5 cm^2 , 452.16 cm^2 , 263.76 cm^2 , 29.03 cm^2 , 105 cm^2 , 236.8 cm^2 , 364.28 cm^2 , 284.11 cm^2 , 56.27 cm^2 , 1356 cm^2 , 30 cm^2 , $\sqrt{97} \approx 9.85 \text{ cm}$, $\sqrt{276} \approx 16.61 \text{ cm}$, $\sqrt{43.21} \approx 6.57 \text{ cm}$, $\sqrt{24.36} \approx 4.94 \text{ cm}$