ST. GREGORY THE GREAT CATHOLIC SCHOOL
SUMMER 2022
READING AND MATH ENRICHMENT

## Students Entering Eighth Grade August 2022

Dear St. Gregory Parents,

Happy summer! While you are enjoying your summer, please encourage your child to read as much as possible. Reading is one of the most important skills which can impact your child's academic success and confidence!

The following pages have information regarding the math and reading activities our eighth teachers would like your child to complete during the summer. Please send the completed activities with your child on the second day of school.

Eighth Grade Summer Reading

- Incoming eighth grade students will read *Unbroken (**The Young Adult Adaptation**): An Olympian's Journey from Airman to Castaway to Captive* by Laura Hillenbrand.
- Please print the novel reflection that is to be completed after the book has been read.
- Please plan accordingly when reading because you will be required to take an AR quiz on this novel during the first week of school, which will count towards your first quarter goal. The teacher will go over the novel during the first week of school and quizzes will not be deleted.
- In addition to the mandatory book, students will read at least two more books of their choosing. At least one of the books needs to be nonfiction.
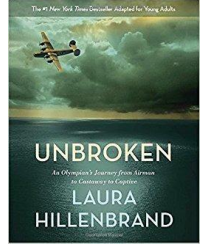
Eighth Grade Math Readiness

- Included in this packet is a math readiness packet. Please print the packet and complete all pages. All work and steps are to be shown for each problem or the packet will be considered incomplete.
- The packet will be due to your child's teacher on the second day of school.
- The packet has been paced for you so that students have a break during the summer yet also review skills that they learned during seventh grade.

  - Week of July 11 – Operations with Integers
  - Week of July 18 – Operations with Rational Numbers
  - Week of July 25 – Solving Equations
  - Week of August 1 – Proportions and Percent
  - Week of August 8 – Geometry

Do not use calculators!

Incoming 8ᵗʰ Grade Summer Reading

Incoming 8ᵗʰ graders are required to read one (1) novel and are encouraged to read more.

Mandatory: *Unbroken (The Young Adult Adaptation): An Olympian's Journey from Airman to Castaway to Captive* by Laura Hillenbrand (ISBN-13: 978-0385742528)
***There are two similar versions of the novel, please choose the one listed.**

Please complete the story reflection for *Unbroken* and turn into Mrs. Peugh on Thursday, August 18, 2022.

Students will take an AR test on *Unbroken* upon returning to school. Students do not have to take an AR test on the other two novels read. Please note that NO AR quizzes will be deleted. Please be prepared and plan accordingly.

***Unbroken* Novel Reflection - You may write (in cursive and blue ink) or type your responses on a google document.**

Novel: *Unbroken*   **Author: Laura Hillenbrand**

1. Who was your favorite main character in this story? What are the actions and personality traits of the character that you found to be most likable or appealing?

2. What is the author's purpose for the story? Use text evidence to support your claim?

3. What is a theme (idea or message) embedded within the story that stands out to you? Quote a passage from the book that sticks to memory and explain why that idea or message impressed you so much.

4. What is the greatest conflict or hardship experienced by your favorite main character? How did their hardship affect your emotions while reading the novel? Did you feel anxiousness, sadness, compassion, or empathy for the character? Describe the emotion you experienced during this point of the story and explain why you felt this way.

5. Summarize the climax of the story. How does the climax affect your favorite main character? Does the climax create greater happiness for them? Does it allow him to accomplish his goal(s) within the story? Please explain.

6. If you were your favorite character, what would you have done differently to avoid encountering his/her problem? Think about a decision that this character made at some point in the story which you did not quite agree with. How would you have made this decision differently? Explain why.

I read *Unbroken*. I know I will be taking the AR quiz on *Unbroken* upon returning to school.

_____   _____

Student Signature   Parent Signature

Operations with Integers

Adding Integers

- <u>Negative + Negative</u>: Add the absolute values of the two numbers and make the answer negative.

    ex: $-5 + (-9)$ $\longrightarrow$ $5 + 9 = 14$ $\longrightarrow$ answer: (-14)

- <u>Negative + Positive (or Positive + Negative)</u>: Subtract the absolute values of the two numbers (larger minus smaller) and take the sign of the number with the greater absolute value.

    ex: $-7 + 12$ $\longrightarrow$ $12 - 7 = 5$ $\longrightarrow$ $12 > 7$, so answer is positive $\longrightarrow$ answer: (5)

    ex: $6 + (-9)$ $\longrightarrow$ $9 - 6 = 3$ $\longrightarrow$ $9 > 6$, so answer is negative $\longrightarrow$ answer: (-3)

Subtracting Integers

- Keep the first number the same, change the subtraction sign to an addition sign, and change the sign of the second number. Then use the integer addition rules.

    ex: $-3 - 9$ $\longrightarrow$ $-3 + (-9) = (-12)$

    ex: $15 - (-8)$ $\longrightarrow$ $15 + 8 = (23)$

    ex: $-6 - (-4)$ $\longrightarrow$ $-6 + 4 = (-2)$

Multiplying & Dividing Integers

Ignore the signs and multiply or divide as usual. Then determine the sign of the answer using the following rules:

- Negative · or ÷ Negative = Positive
- Negative · or ÷ Positive (or Positive · or ÷ Negative) = Negative

    ex: $-3 \cdot (-5)$ $\longrightarrow$ $3 \cdot 5 = 15$ $\longrightarrow$ neg · neg = pos $\longrightarrow$ answer: (15)

    ex: $48 \div (-6)$ $\longrightarrow$ $48 \div 6 = 8$ $\longrightarrow$ pos ÷ neg = neg $\longrightarrow$ answer: (-8)

Order of Operations

Parentheses
Exponents
Multiplication & Division (left to right)
Addition & Subtraction (left to right)

Find the sum or difference.

1. -80 + 77   2. 77 + 160   3. -64 + (-33)   4. 104 - (-92)

5. -105 - (-122)   6. 185 - (-154)   7. -53 - (-59)   8. -6 + (-35)

9. 15 - (-26) - (-39)   10. -93 + 191 + (-179)   11. 18 + (-34) + 52   12. -50 - (-93) + (-17)

Find the product or quotient.

13. 60 ÷ 12   14. -194 ÷ (-2)   15. 88 · (-2)   16. -12 · 10

17. -10 · (-11)   18. 90 ÷ (-6)   19. 3 · (-59)   20. -7 · (-2)

21. -28 · (-22) ÷ (-88)   22. -56 · 140 ÷ (-80)   23. 108 ÷ (-12) · (-12)   24. -84 · (-17) ÷ 42

Evaluate the numerical expression. (Be sure to use the order of operations!)

25. -78 + (-2) · (-56)   26. -65 + 6 ÷ (-3) + 40   27. -94 - (84 - 10)   28. 43 + (-23) - (-57)

29. -15 - (-11) + 5 · (-4)   30. -26 - (-64) + (-93)   31. -84 ÷ 4 + (-20)   32. -56 + (-50) + (-10) · (-9)

Operations with Rational Numbers

Adding & Subtracting Rational Numbers

Determine whether you should add or subtract using integer rules. Then add or subtract.

- **Decimals:** Line up the decimal points. Then add or subtract and bring the decimal point down. Use integer rules to determine the sign of the answer.

  ex: $-9.8 + 6.24 \longrightarrow$ neg + pos: subtract $\longrightarrow$ $\begin{array}{r} 9.80 \\ -\ 6.24 \\ \hline 3.56 \end{array}$ $\longrightarrow$ answer: $\boxed{-3.56}$

- **Fractions/Mixed Numbers:** Find a common denominator and then add or subtract. Borrow or convert an improper fraction answer, if necessary. Use integer rules to determine the sign of the answer.

  ex: $5\frac{3}{4} - \left(-3\frac{7}{8}\right) \longrightarrow 5\frac{3}{4} + 3\frac{7}{8} \longrightarrow$ pos + pos: add $\longrightarrow$ $\begin{array}{r} 5\frac{3}{4} = \frac{6}{8} \\ +\ 3\frac{7}{8} = \frac{7}{8} \\ \hline 8 \quad \frac{13}{8} \end{array}$ $\longrightarrow$ answer: $\boxed{9\frac{5}{8}}$

Multiplying & Dividing Rational Numbers

Determine the sign of the answer using integer rules. Then multiply or divide.

- **Multiplying Decimals:** Ignore the decimal points. Multiply the numbers. Then count the decimal places in the problem to determine the location of the decimal point in the answer.

  ex: $-9.23 \cdot (-1.1) \longrightarrow$ neg · neg = pos $\longrightarrow$ $\begin{array}{r} 9.23 \\ \times\ 1.1 \\ \hline 923 \\ 9230 \\ \hline 10153 \end{array}$ $\longrightarrow$ answer: $\boxed{10.153}$

- **Dividing Decimals:** Move the decimal in the divisor to the end of the number. Move the decimal in the dividend the same number of places and then bring it straight up in quotient.

  ex: $-5.2 \div 0.2 \longrightarrow$ neg ÷ pos = neg $\longrightarrow$ $02\overline{)52.}^{\,26.}$ $\longrightarrow$ answer: $\boxed{-26}$

- **Multiplying Fractions:** Convert mixed numbers to improper fractions. Then cross-simplify. Multiply the numerators and multiply the denominators. Simplify if necessary.

  ex: $-1\frac{3}{4} \cdot \frac{6}{14} \longrightarrow$ neg · pos = neg $\longrightarrow$ $\frac{\overset{1}{7}}{\underset{2}{4}} \cdot \frac{\overset{3}{6}}{\underset{2}{14}} = \frac{3}{4} \longrightarrow$ answer: $\boxed{-\frac{3}{4}}$

- **Dividing Fractions:** Convert mixed numbers to improper fractions. Then flip the second fraction to its reciprocal and multiply the two fractions. Simplify if necessary.

  ex: $-\frac{1}{2} \div \left(-\frac{3}{8}\right) \longrightarrow$ neg ÷ neg = pos $\longrightarrow$ $\frac{1}{\underset{1}{2}} \cdot \frac{\overset{4}{8}}{3} = \frac{4}{3} \longrightarrow$ answer: $\boxed{1\frac{1}{3}}$

Find the sum, difference, product, or quotient.

33. $38.61 + 36.841$

34. $1.755 - 1.23$

35. $0.71 \cdot 9.2$

36. $13.12 \div 0.1$

37. $3.651 - (-12.63)$

38. $-3.9 + (-7.6)$

39. $17.6 \cdot 4.3$

40. $6 \cdot (-16.7)$

41. $26.474 - 14.527$

42. $-2.1 + 3.78$

43. $-6.15 \div (-8.2)$

44. $-12.8 \cdot (-4.88)$

Find the sum, difference, product, or quotient.

45. $15 \frac{1}{2} + 15 \frac{1}{4}$

46. $18 \frac{11}{20} - 17 \frac{1}{2}$

47. $2 \frac{1}{4} \cdot 1 \frac{4}{5}$

48. $3 \frac{1}{2} \div 1 \frac{3}{7}$

49. $3 \frac{1}{3} - 5 \frac{1}{9}$

50. $5 \cdot (-1 \frac{2}{5})$

51. $-4 \frac{2}{3} + (-1 \frac{3}{4})$

52. $-\frac{5}{6} \div (-2 \frac{1}{6})$

53. $9 \div (-4 \frac{1}{2})$

54. $-18 + 3 \frac{4}{5}$

55. $-5 \frac{2}{3} \cdot (-2 \frac{5}{6})$

56. $-5 \frac{3}{4} - (-3 \frac{7}{8})$

Solving Equations

Solving One-Step Equations

- Cancel out the number on the same side of the equation as the variable by using the inverse operation. (Addition/Subtraction; Multiplication/Division). Be sure to do the same thing to both sides of the equation!

ex: $6x = -18$ $\longrightarrow$ $\dfrac{6x}{6} = \dfrac{-18}{6}$ $\longrightarrow$ answer: $\left(x = -3\right)$

ex: $y + 23 = -9$ $\longrightarrow$ $\begin{array}{c} y + 23 = -9 \\ -23 \quad -23 \end{array}$ $\longrightarrow$ answer: $\left(y = -32\right)$

ex: $\dfrac{h}{3} = 4$ $\longrightarrow$ $3 \cdot \dfrac{h}{3} = 4 \cdot 3$ $\longrightarrow$ answer: $\left(h = 12\right)$

ex: $w - 13 = -5$ $\longrightarrow$ $\begin{array}{c} w - 13 = -5 \\ +13 \quad +13 \end{array}$ $\longrightarrow$ answer: $\left(w = 8\right)$

Solving Two-Step Equations

- Undo operations using inverse operations one at a time using the order of operations in reverse. (i.e.: undo addition/subtraction before undoing multiplication/division)

ex: $7x - 4 = -32$ $\longrightarrow$ $\begin{array}{c} 7x - 4 = -32 \\ +4 \qquad +4 \end{array}$ $\longrightarrow$ $\dfrac{7x}{7} = \dfrac{-28}{7}$ $\longrightarrow$ answer: $\left(x = -4\right)$

ex: $\dfrac{J}{5} + 13 = 15$ $\longrightarrow$ $\begin{array}{c} \dfrac{J}{5} + 13 = 15 \\ -13 \quad -13 \end{array}$ $\longrightarrow$ $5 \cdot \dfrac{J}{5} = 2 \cdot 5$ $\longrightarrow$ answer: $\left(J = 10\right)$

ex: $\dfrac{b + 7}{3} = -2$ $\longrightarrow$ $3 \cdot \dfrac{b + 7}{3} = -2 \cdot 3$ $\longrightarrow$ $\begin{array}{c} b + 7 = -6 \\ -7 \quad -7 \end{array}$ $\longrightarrow$ answer: $\left(b = -13\right)$

Solve the one-step equation.

57. $19 + j = -34$

58. $m - 26 = 13$

59. $\dfrac{x}{5} = -3$

60. $12f = 216$

61. $g - (-31) = -7$

62. $\dfrac{h}{9} = 13$

63. $b + (-3) = -9$

64. $-4w = -280$

Solve the two-step equation.

65. $5m - 3 = 27$

66. $7 + \dfrac{y}{2} = -3$

67. $4 + 3r = -8$

68. $\frac{1}{2}p - 4 = 7$

69. $\dfrac{k + 8}{3} = -2$

70. $\dfrac{f}{5} - (-13) = 12$

71. $-15 - \dfrac{g}{3} = -5$

72. $-8 + 4m = 2$

73. $-18 - \frac{3}{4}v = 3$

74. $\dfrac{-5 + n}{4} = -1$

75. $3.5m + 0.75 = -6.25$

76. $2y + 3 = 19$

Proportions and Percent

Solving Proportions

- Set cross-products equal to each other and then solve the one-step equation for the given variable.

ex: $\frac{5}{b} = \frac{4}{10}$ $\longrightarrow$ $5 \cdot 10 = 4b$ $\longrightarrow$ $\frac{50}{4} = \frac{4b}{4}$ $\longrightarrow$ answer: $b = 12.5$

Solving Percent Problems with Proportions

- Set up and solve a proportion as follows: $\frac{\%}{100} = \frac{part}{whole}$

ex: 25 is what percent of 500? $\longrightarrow$ $\frac{x}{100} = \frac{25}{500}$ $\longrightarrow$ answer: $x = 5\%$

ex: What is 15% of 88? $\longrightarrow$ $\frac{15}{100} = \frac{x}{88}$ $\longrightarrow$ answer: $x = 13.2$

ex: 18 is 30% of what number? $\longrightarrow$ $\frac{30}{100} = \frac{18}{x}$ $\longrightarrow$ answer: $x = 60$

Solving Percent Problems with Equations

- Translate the question to an equation and then solve. (Be sure to convert percents to decimals or fractions.)

ex: 20 is 40% of what number? $\longrightarrow$ $20 = 0.4x$ $\longrightarrow$ answer: $x = 50$

ex: 8 is what percent of 32? $\longrightarrow$ $8 = 32x$ $\longrightarrow$ $x = 0.25$ $\longrightarrow$ answer: 25%

ex: What is 25% of 88? $\longrightarrow$ $x = 0.25 \cdot 88$ $\longrightarrow$ answer: $x = 22$

Real-World Percent Problems

(This is just one way of many to solve real-world percent problems)

- Tax: Find the amount of tax using a proportion or equation. Then add the tax to the original amount to find the total cost.

- Discount: Find the amount of the discount using a proportion or equation. Then subtract the amount of discount from the original price to find the sale price.

Solve the proportion.

77. $\dfrac{h}{6} = \dfrac{20}{24}$

78. $\dfrac{5}{7} = \dfrac{c}{14}$

79. $\dfrac{6}{8} = \dfrac{21}{b}$

80. $\dfrac{30}{J} = \dfrac{26}{39}$

81. $\dfrac{5}{k} = \dfrac{15}{20}$

82. $\dfrac{32}{112} = \dfrac{a}{14}$

83. $\dfrac{16}{7} = \dfrac{18}{g}$

84. $\dfrac{w}{60} = \dfrac{15}{200}$

Solve the percent problem.

85. Find 15% of 85.

86. 6 is 75% of what number?

87. 40 is what percent of 320?

88. What is 20% of 45?

89. 70 is what percent of 350?

90. Find $33.\overline{3}$% of 81.

91. A $58 camera is on sale for 20% off. Find the sale price.

92. Find the total price of a $14.00 shirt including the 7% sales tax.

Geometry

Geometry Basics

- Perimeter is the distance around a polygon

- Circumference is the distance around a circle

- Area is the space inside a figure

- Volume is the capacity of a 3-dimensional figure

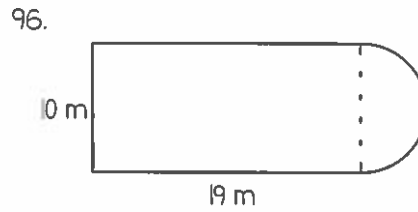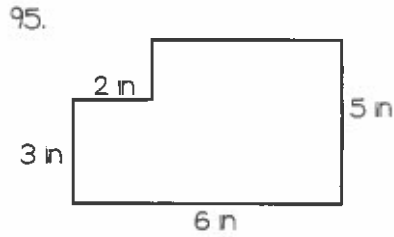- Surface Area is the sum of the areas of all the faces on a 3-dimensional figure
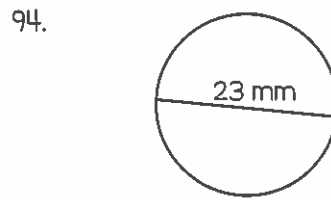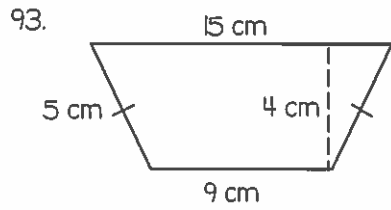
2-Dimensional Geometry Formulas

- Perimeter of Any Figure: sum of side lengths

- Circumference = $\pi \cdot$ diameter

- Area of Parallelogram = base $\cdot$ height

- Area of Triangle = $\frac{1}{2} \cdot$ base $\cdot$ height

- Area of Trapezoid = $\frac{1}{2} \cdot$ height(base$_1$ + base$_2$)

- Area of Circle = $\pi \cdot$ radius^2

3-Dimesional Geometry Formulas

- Volume of Rectangular Prism = length $\cdot$ width $\cdot$ height

- Volume of Cylinder = $\pi \cdot$ radius$^2 \cdot$ height

- Surface Area of Rectangular Prism = 2 $\cdot$ length $\cdot$ width + 2 $\cdot$ length $\cdot$ height + 2 $\cdot$ height $\cdot$ width

- Surface Area of Cylinder = 2 $\cdot \pi \cdot$ radius^2 + 2 $\cdot \pi \cdot$ radius $\cdot$ height

Find the perimeter (or circumference) and area. Use 3.14 for pi.

93.

15 cm

5 cm   4 cm

9 cm

94.

23 mm

95.

2 in

5 in

3 in

6 in

96.

10 m

19 m

Find the surface area and volume.

97.

8 cm

8 cm

8 cm

8 cm

98.

3 in

12 in

2 in

99.

7 cm

3 cm

100.

9 mm

13 mm