

Summer Packet

Concepts in Algebra 1-2



MATH SUMMER PACKET

INSTRUCTIONS

Attached you will find a packet of exciting math problems for your enjoyment over the summer. The purpose of the summer packet is to review the topics you have already mastered in math and to make sure that you are prepared for the class you are about to enter.

The packet contains a brief summary and explanation of the topics so you don't need to worry if you don't have your math book. You will find many sample problems, which would be great practice for you before you try your own problems. The explanations are divided into sections to match the sample problems so you should be able to reference the examples easily.

This packet is optional; however, it is highly recommended that you do the problems in the packet *before* the school year starts so that you can be sure that you are ready for class when it starts. The answers are provided in the back of the packet. You will have an opportunity to show off your skills during the first week when your class reviews the problems in the packet.

This packet is to help you maximize your previous math courses and to make sure that everyone is starting off on an even playing field on the first day of school. If you feel that you need additional help on one or two topics, you may want to try math websites such as: www.mathforum.org or www.askjeeves.com. Math teachers will be available for assistance at the high school the week before school. Check the marquee or the school website for specific times, which are to be determined.

Enjoy your summer and don't forget about the packet. August will be here before you know it! If you lose your packet the OPRFHS Bookstore will carry extra copies. You will also be able to access the packets on line at the school website, www.oprfhs.org.

See you in August!

The OPRFHS Math Department

Welcome to Concepts in Algebra 1-2!

This packet contains problems covering the topics listed below which have been covered in previous math courses.

This packet is a REVIEW!

Multiplication Table	Converting a Decimal to a Fraction
Long Division	Converting a Fraction to a Percent
Rounding	Converting a Percent to a Fraction
Reducing Fractions	Converting a Decimal to a Percent
Adding/Subtracting/Multiplying/ Dividing Fractions	Converting a Percent to a Decimal
Adding/Subtracting/Multiplying/ Dividing Decimals	Squaring and Cubing numbers
Converting an Improper Fraction to a Mixed Number	Finding Factors of Numbers
Converting a Mixed Number to an Improper Fraction	Comparing numbers (greater than, less than, equal to)
Converting a Fraction to a Decimal	Finding points on a number line



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Examples

Write each decimal as a percent.

$$\Rightarrow 0.39 \rightarrow \frac{39}{100} = 39\%$$

$$\Rightarrow 0.612 \rightarrow \frac{61.2}{100} = 61.2\%$$

\Rightarrow Write $\frac{3}{8}$ as a percent.

$\frac{3}{8}$ is the same as $3 \div 8$

$$\begin{array}{r} 0.375 \\ 8 \overline{)3.000} \\ \underline{24} \\ 60 \\ \underline{56} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

$$\frac{3}{8} = 0.375 \rightarrow 37.5\%$$

\Rightarrow Write $\frac{5}{3}$ as a percent.

$\frac{5}{3}$ is the same as $5 \div 3$

$$\begin{array}{r} 1.6\bar{6} \text{ or } 1\frac{2}{3} \\ 3 \overline{)5.00} \\ \underline{3} \\ 20 \\ \underline{18} \\ 20 \\ \underline{18} \\ 2 \end{array}$$

$$\frac{5}{3} = 1.\bar{6} \text{ or } 1\frac{2}{3} \rightarrow 166\frac{2}{3}\%$$

Examples

Write each percent as a fraction in simplest form.

$$\Rightarrow 24\% \rightarrow \frac{24}{100} = \frac{6}{25}$$

$$\begin{aligned} \Rightarrow 83\frac{1}{3}\% &\rightarrow \frac{83\frac{1}{3}}{100} = 83\frac{1}{3} \div 100 \\ &= \frac{250}{3} \cdot \frac{1}{100} \\ &= \frac{250}{300} \\ &= \frac{5}{6} \end{aligned}$$

Examples

Write each percent as a decimal.

$$\Rightarrow 36\% \rightarrow \frac{36}{100} = 0.36$$

$$\begin{aligned} \Rightarrow 82.5\% &\rightarrow \frac{82.5}{100} = \frac{825}{1000} \\ &= 0.825 \end{aligned}$$

Welcome to Concepts in Algebra 1-2!

Problems

Write each decimal as a percent.

1. 0.33

2. 0.04

3. 0.2

4. 0.015

Write each percent as a decimal.

5. 98%

6. 2%

7. 90%

8. 13.5%

Write each fraction as a percent.

9. $\frac{17}{100}$

10. $\frac{6}{10}$

11. $\frac{44}{100}$

12. $\frac{1}{10}$

Write each percent as a fraction in lowest terms.

13. 23%

14. 20%

15. 2%

16. 75%

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Examples

Solve each equation.

➔ $d = 12.5 + 13.7$

$$d = 26.2 \quad \begin{array}{r} 12.5 \\ + 13.7 \\ \hline 26.2 \end{array}$$

*Align decimal points and place-value positions.
Add as with whole numbers.*

➔ $f = 119 - 105.7$

$$f = 13.3 \quad \begin{array}{r} 119.0 \\ - 105.7 \\ \hline 13.3 \end{array}$$

*Place the decimal point and annex a zero.
Then, align the decimal points and subtract.*

Examples

Solve each equation.

➔ $y = (2.3)(3.5)$

$$\begin{array}{r} 2.3 \\ \times 3.5 \\ \hline 115 \\ 69 \\ \hline 805 \end{array}$$

*There is 1 place after the decimal point.
There is 1 place after the decimal point.*

$y = 8.05$
Estimate: $2 \cdot 4 = 8$

$1 + 1 = 2$ *There are two places after the decimal point.*

➔ $(0.105)(0.03) = k$

$$\begin{array}{r} 0.105 \\ \times 0.03 \\ \hline 0.00315 \end{array}$$

*There are 3 places after the decimal point.
There are 2 places after the decimal point.*

$0.00315 = k$
Estimate: $0.1 \cdot 0.03 = 0.003$.

There are 5 places needed. Annex 2 zeros.

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Examples

Divide.

➔ $50 \div 2.5$

$$2.5 \overline{)50}$$

$$2.5 \cdot 10 \overline{)50 \cdot 10}$$

Multiply both 2.5 and 50 by 10 to get a whole number divisor.

$$2.5 \overline{)50.0}$$

Another way to multiply by 10 is to move the decimal point 1 place to the right.

$$\begin{array}{r} 20 \\ 25 \overline{)500} \end{array}$$

The quotient is 20.

➔ $0.0078 \div 0.003$

$$0.003 \overline{)0.0078}$$

$$0.003 \overline{)0.0078}$$

Multiply 0.003 and 0.0078 by 1000 to get a whole number divisor.

$$\begin{array}{r} 2.6 \\ 3 \overline{)7.8} \end{array}$$

The quotient is 2.6.

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Problems

Simplify

17. $8.3 + 4.5$

18. $3.4625 + 70.39$

19. $8.35 - 4.08$

20. $0.68 - 0.455$

21. $47 - 6.38$

22. 0.6×0.6

23. 0.5×0.08

24. 11×6.66

25. $3 \overline{)528}$

26. $47 \overline{)1316}$

27. $0.4 \overline{)1.52}$

28. $0.008 \overline{)0.62}$

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Examples

$$\text{Solve } x = \frac{5}{9} \cdot \frac{8}{15}$$

Method 1

$$x = \frac{5}{9} \cdot \frac{8}{15}$$

$$x = \frac{5 \cdot 8}{9 \cdot 15} \quad \begin{array}{l} \text{Multiply the numerators.} \\ \text{Multiply the denominators.} \end{array}$$

$$x = \frac{40}{135} \text{ or } \frac{8}{27} \quad \text{Simplify.}$$

Method 2

$$x = \frac{5}{9} \cdot \frac{8}{15}$$

$$x = \frac{\overset{1}{\cancel{5}}}{9} \cdot \frac{8}{\underset{3}{\cancel{15}}} \quad \begin{array}{l} \text{The GCF of 5 and 15 is 5.} \\ \text{Divide 5 and 15 by 5.} \end{array}$$

$$x = \frac{1 \cdot 8}{9 \cdot 3} \text{ or } \frac{8}{27} \quad \begin{array}{l} \text{Multiply the numerators.} \\ \text{Multiply the denominators.} \end{array}$$

Examples

$$\text{Solve } a = 2\frac{1}{3} \cdot 3\frac{3}{4}$$

$$a = 2\frac{1}{3} \cdot 3\frac{3}{4} \quad \text{Rename } 2\frac{1}{3} \text{ as } \frac{7}{3}. \text{ Rename } 3\frac{3}{4} \text{ as } \frac{15}{4}.$$

$$a = \frac{7}{3} \cdot \frac{15}{4}$$

$$a = \frac{7}{\underset{1}{\cancel{3}}} \cdot \frac{\overset{5}{\cancel{15}}}{4} \quad \text{Divide 15 and 3 by 3. Why? } \mathbf{3 \text{ is the GCF of 15 and 3}}$$

$$a = \frac{7 \cdot 5}{1 \cdot 4}$$

$$a = \frac{35}{4} \text{ or } 8\frac{3}{4}$$

Problems

Multiply

29. $5 \times \frac{3}{20}$

30. $10 \times 2\frac{1}{5}$

31. $\frac{11}{2} \times \frac{4}{33}$

32. $3\frac{1}{4} \times 2\frac{2}{5}$

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Examples

Solve $y = \frac{4}{5} \div \frac{2}{3}$.

$$y = \frac{4}{5} \div \frac{2}{3}$$

$$y = \frac{4}{5} \cdot \frac{3}{2} \quad \text{Dividing by } \frac{2}{3} \text{ is the same as multiplying by } \frac{3}{2}.$$

$$y = \frac{\overset{2}{\cancel{4}}}{5} \cdot \frac{3}{\underset{2}{\cancel{2}}} \quad \text{Divide 4 and 2 by 2. Why? } \mathbf{2 \text{ is the GCF of 4 and 2.}}$$

$$y = \frac{6}{5} \text{ or } 1\frac{1}{5} \quad \text{Rename as a mixed numeral in simplest form.}$$

Examples

Solve $x = 3\frac{3}{4} \div 2\frac{11}{12}$.

$$x = \frac{15}{4} \div \frac{35}{12} \quad \text{Rename } 3\frac{3}{4} \text{ as } \frac{15}{4} \text{ and } 2\frac{11}{12} \text{ as } \frac{35}{12}.$$

$$x = \frac{15}{4} \cdot \frac{12}{35} \quad \text{Dividing by } \frac{35}{12} \text{ is the same as multiplying by } \frac{12}{35}.$$

$$x = \frac{\overset{3}{\cancel{15}}}{\underset{4}{\cancel{4}}} \cdot \frac{\overset{3}{\cancel{12}}}{\underset{7}{\cancel{35}}} \quad \text{Divide 15 and 35 by 5. Divide 12 and 4 by 4. } \clubsuit$$

$$x = \frac{9}{7} \text{ or } 1\frac{2}{7}$$

Problems

Divide

33. $4 \div \frac{1}{2}$

34. $5\frac{2}{3} \div 1\frac{2}{15}$

35. $\frac{7}{10} \div 7$

36. $\frac{1}{4} \div \frac{1}{4}$

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Examples

Solve each equation. Write each solution in simplest form.

$$a = \frac{7}{12} + \frac{8}{15} \quad \begin{array}{l} 12 = 2^2 \cdot 3 \text{ and } 15 = 3 \cdot 5 \\ \text{The LCM of 12 and 15 is } 2^2 \cdot 3 \cdot 5 \text{ or } 60. \end{array}$$

$$a = \frac{35}{60} + \frac{32}{60} \quad \frac{7 \cdot 5}{12 \cdot 5} = \frac{35}{60} \text{ and } \frac{8 \cdot 4}{15 \cdot 4} = \frac{32}{60}$$

$$a = \frac{67}{60} \text{ or } 1\frac{7}{60} \quad \text{Rename } \frac{67}{60} \text{ as } 1\frac{7}{60}$$

Examples

Solve $b = \frac{25}{12} - \frac{7}{12}$.

$$b = \frac{25}{12} - \frac{7}{12}$$

$$b = \frac{18}{12} \quad \text{Since the fractions have like denominators, subtract the numerators.}$$

$$b = 1\frac{6}{12} \text{ or } 1\frac{1}{2} \quad \text{Rename as a mixed numeral and simplify.}$$

Problems

Simplify and reduce to lowest terms.

37. $\frac{7}{8} - \frac{1}{8}$

38. $5 + \frac{1}{4}$

39. $\frac{11}{15} + \frac{2}{5}$

40. $5\frac{5}{8} - 2\frac{3}{8}$

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Examples

Write each power as a product of the same factor.

➔ 2^4

The base is 2. The exponent 4 means 2 is a factor 4 times.

$$2^4 = 2 \cdot 2 \cdot 2 \cdot 2$$

➔ b^3

The base is b . The exponent 3 means b is a factor 3 times.

$$b^3 = b \cdot b \cdot b$$

Write each product using exponents.

➔ $6 \cdot 6$

The base is 6. Because 6 is a factor 2 times, the exponent is 2.

$$6 \cdot 6 = 6^2$$

➔ $x \cdot x \cdot x$

The base is x . Because x is a factor 3 times, the exponent is 3.

$$x \cdot x \cdot x = x^3$$

Problems

Simplify

41. 2^3

42. 3^2

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Examples

Rounding Numbers

1. Find the place-value position being rounded to.
2. Then, look at the digit to the right.
3. *Round up* if the digit to the right is 5 or greater
4. *Round down* if the digit to the right is less than 5.

➡ **Round 2.6 to the nearest whole number.**

The ones digit is 2. The digit to its right is 6.
Since 6 is greater than 5, round up.
To the nearest whole number, 2.6 is 3.

➡ **Round 9.528 to the nearest tenth.**

The digit 5 is in the tenths place. The digit to its right is 2.
Since 2 is less than 5, round down.
To the nearest tenth, 9.528 is 9.5.

➡ **Round 56.925 to the nearest hundredth.**

The digit 2 is in the hundredths place. The digit to its right is 5, so round up.
To the nearest hundredth, 56.925 is 56.93.

Problems

43. Round 125.236 to the nearest hundredth.
44. Round 12.22 to the one's place.
45. Round 2.6999 to the nearest thousandths.
46. Round 0.49 to the one's place.

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Examples

➡ Find all the whole number factors of 9.

$$9 \div 1 = 9 \text{ R}0$$

$$9 \div 2 = 4 \text{ R}1$$

$$9 \div 3 = 3 \text{ R}0$$

Stop dividing. *Why?*

The factors of 9 are 1, 3, and 9.

➡ Find all the whole number factors of 30.

$$30 \div 1 = 30 \text{ R}0$$

$$30 \div 2 = 15 \text{ R}0$$

$$30 \div 3 = 10 \text{ R}0$$

$$30 \div 4 = 7 \text{ R}2$$

$$30 \div 5 = 6 \text{ R}0$$

Stop dividing.

The factors of 30 are 1, 2, 3, 5, 6, 10, 15, and 30.

Problems

List all of the factors of the following.

47. 32

48. 36

49. 51

50. 72

Fill in the blanks with $<$, $>$, or $=$.

51. 12 _____ 11.78

52. .0123 _____ .012

53. $\frac{1}{2}$ _____ $\frac{3}{4}$

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Answers

1. 33%

2. 4%

3. 20%

4. 1.5%

5. 0.98

6. 0.02

7. 0.9

8. 0.135

9. 17%

10. 60%

11. 44%

12. 10%

13. $\frac{23}{100}$

14. $\frac{1}{5}$

15. $\frac{1}{50}$

16. $\frac{3}{4}$

17. 12.8

18. 73.8525

19. 4.27

20. 0.225

21. 40.62

22. 0.36

23. 0.04

24. 73.26

25. 176

26. 28

27. 3.8

28. 77.5

29. $\frac{3}{4}$

30. 22

31. $\frac{2}{3}$

32. $7\frac{4}{5}$ or $\frac{39}{5}$

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33. 8

34. 5

35. $\frac{1}{10}$

36. 1

37. $\frac{3}{4}$

38. $5\frac{1}{4}$ or $\frac{21}{4}$

39. $1\frac{2}{15}$ or $\frac{17}{15}$

40. $3\frac{1}{4}$ or $\frac{13}{4}$

41. 8

42. 9

43. 125.24

44. 12

45. 2.700

46. 0

47. 1, 2, 4, 8, 16, 32

48. 1, 2, 3, 4, 6, 9, 12, 18, 36

49. 1, 3, 17, 51

50. 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72

51. >

52. >

53. <