Math Summer Enrichment Packet for Algebra II CP and Honors

Purpose: The purpose of our summer math enrichment program is to ensure that the skills, knowledge, and content mastered over the course of the year are retained over the summer. This will help students to be better prepared and ready to succeed in their next math course.

Grading: Completion of all the assigned pages/problems will be counted as your first test/project grade of the year. You will be graded upon completion of all the work.

What portions of the math packet do I need to complete?
On the chart below (a copy of this packet is also available on the SJP website), teachers have identified specific portions of the math packet for you to complete. You only need to complete the problems assigned for your course level – i.e. CP or Honors. Any unused portions of the packet will be used as a supplementary resource during the course of the upcoming school year.

Where do I complete the assignments?
All problems should be completed on lined paper. Neatness is important in math, so take your time and use a pencil. Show all of your work and clearly number all of the problems. Circle your answers.

Due Dates: The assignment will be due to your teacher on Friday, September 6th.

What if I struggle with the work?
Parents/guardians and students, please be aware that the math packet does not come with additional examples and/or instructions. Sections of this packet may be challenging for you at times. We suggest that if you run into difficulty with certain concepts and/or problems that you seek out advice from family and friends, previous math tutors, or utilize resources such as Khan Academy. Also, the back of the packet has answers to every odd numbered problem. You may use the answers to check your work. The key is to give the assignment your best effort and to only use the solutions at the back of the packet as an aid.

Have a great summer!
We look forward to working with all of you next year.

Best wishes,
Your Math Department

Math Summer Enrichment Packet for Algebra II CP and Honors

Directions: On the chart below, you'll find a list of the problems you are expected to complete over the summer. You'll notice that your summer enrichment is divided into 8 separate assignments, each covering a selection of pages from the packet. Ideally, you should plan to spread your work out over the course of the summer, and complete 1 – 2 assignments per week. You'll also notice that students in CP and Honors level courses have differing requirements. Take careful note of which pages your math level is expected to complete.

Assignment	Page Numbers	College Prep Problem Set	Honors Problem Set
Quick Check	N/A	#1-23	#1-23
Lesson 0.1	p. 7	#1-12	#1-12
Lesson 0.2	p. 9	#1-14	#1-18
Lesson 0.3	p. 15	#1-6, 10-12, 19-21	#7-24
Lesson 0.7	p. 45-46	#1-9	#1-12
Lesson 0.8	p. 51-52	#1-11	#1-17
Lesson 1.1	p. 71	#1-6, 11-13	#3-8, 10-16
Lesson 1.3	p. 104	#1-2, 9-14	#1-2, 9-20

Note: The answers to the odd problems are found at the end of the packet/file.

Have a great summer,
Your Math Department

Quick Check

Simplify.

1. $15.7 + (-3.45)$
2. $-18.54 - (-32.05)$
3. $-9.8 \cdot 6.75$
4. $4 \div (-0.5)$
5. $3\frac{2}{3} + \left(-1\frac{4}{5}\right)$
6. $\frac{54}{7} - \frac{26}{6}$
7. $\left(\frac{6}{5}\right)\left(-\frac{10}{9}\right)$
8. $-3 \div \frac{7}{8}$
9. **CRAFTS** Felisa needs $\frac{7}{8}$ yard of one type of material to make a quilt. How much of this material will she need to make 12 quilts?

Evaluate each power.

10. 6^3
11. $(-4)^3$
12. $-(0.6)^3$
13. $-(-2.5)^3$
14. $\left(\frac{4}{5}\right)^2$
15. $\left(\frac{7}{3}\right)^4$
16. $\left(-\frac{7}{10}\right)^2$
17. $-\left(\frac{15}{2}\right)^3$
18. **FOOD** Nate's Deli offers 3 types of bread, 3 types of meat, and 3 types of cheese. How many different sandwiches can be made with 1 type each of bread, meat, and cheese?

Identify each statement as true or false.

19. $-6 > -7$
20. $8 > -5$
21. $\frac{1}{7} \leq \frac{1}{9}$
22. $\frac{5}{6} \leq \frac{25}{30}$
23. MEASUREMENT Christy has a board that is 0.6 yard long. Marissa has a board that is $\frac{2}{3}$ yard long. Marissa states that $\frac{2}{3} > 0.6$. Is she correct?

Selected Answers and Step-by-Step Solutions

Exercises

State the domain and range of each relation. Then determine whether each relation is a function. Write *yes* or *no*.

1. {(2, 7), (3, 10), (1, 6)}

2. {(−6, 0), (5, 5), (9, −2), (−2, −9)}

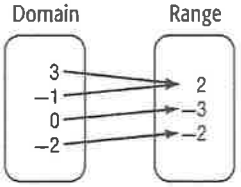
3.

x	y
1	5
2	7
1	9

4.

x	y
−12	0
−10	1
−8	2
−6	4

5.



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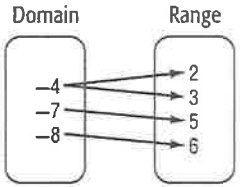

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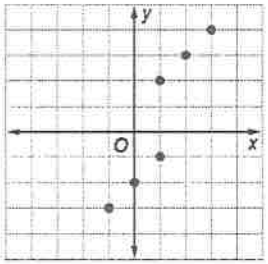

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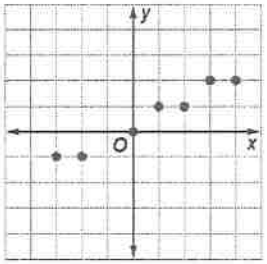


Name the quadrant in which each point is located.

9. (5, 3) **10.** (8, −6) **11.** (2, 0) **12.** (−7, −1)

Selected Answers and Step-by-Step Solutions

Exercises

Find each product.

1. $(a + 2)(a + 4)$
2. $(v - 7)(v - 1)$
3. $(h + 4)(h - 4)$
4. $(d - 1)(d + 1)$
5. $(b + 4)(b - 3)$
6. $(t - 9)(t + 11)$
7. $(r + 3)(r - 8)$
8. $(k - 2)(k + 5)$
9. $(p + 8)(p + 8)$
10. $(x - 15)(x - 15)$
11. $(2c + 1)(c - 5)$
12. $(7n - 2)(n + 3)$
13. $(3m + 4)(2m - 5)$
14. $(5g + 1)(6g + 9)$
15. $(2q - 17)(q + 2)$
16. $(4t - 7)(3t - 12)$

17. NUMBERS I am thinking of two integers. One is 7 less than a number, and the other is 2 greater than the same number.
    a. Write expressions for the two numbers.
    b. Write a polynomial expression for the product of the numbers.

18. OFFICE SPACE Monica's current office is square. Her office in the company's new building will be 3 feet wider and 5 feet longer.
    a. Write expressions for the dimensions of Monica's new office.
    b. Write a polynomial expression for the area of Monica's new office.
    c. Suppose Monica's current office is 7 feet by 7 feet. How much larger will her new office be?

Selected Answers and Step-by-Step Solutions

Exercises

Factor each polynomial.

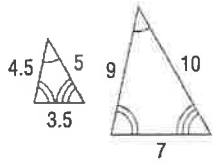
1. $12x^2 + 4x$
2. $6x^2y + 2x$
3. $8ab^2 - 12ab$
4. $x^2 + 5x + 4$
5. $y^2 + 12y + 27$
6. $x^2 + 6x + 8$
7. $3y^2 + 13y + 4$
8. $7x^2 + 51x + 14$
9. $3x^2 + 28x + 32$
10. $x^2 - 5x + 6$
11. $y^2 - 5y + 4$
12. $6x^2 - 13x + 5$
13. $6a^2 - 50ab + 16b^2$
14. $11x^2 - 78x + 7$
15. $18x^2 - 31xy + 6y^2$
16. $x^2 + 4xy + 4y^2$
17. $9x^2 - 24x + 16$
18. $4a^2 + 12ab + 9b^2$
19. $x^2 - 144$
20. $4c^2 - 9$
21. $16y^2 - 1$
22. $25x^2 - 4y^2$
23. $36y^2 - 16$
24. $9a^2 - 49b^2$

Selected Answers and Step-by-Step Solutions

Exercises

Determine whether each pair of figures is *similar*, *congruent*, or *neither*.

1.



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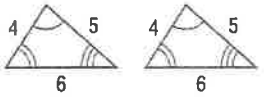

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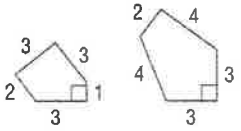

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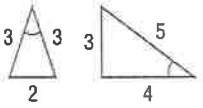

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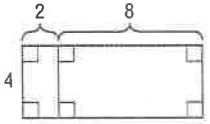

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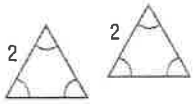
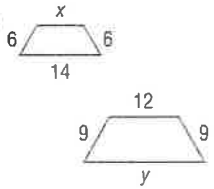


Each pair of polygons is similar. Find the values of x and y.

7.



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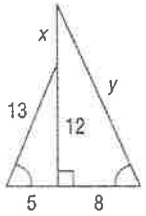

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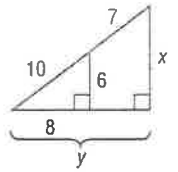
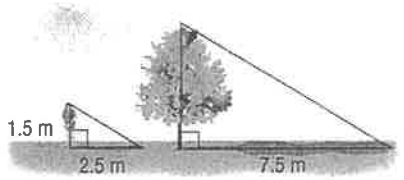


10. **SHADOWS** On a sunny day, Jason measures the length of his shadow and the length of a tree's shadow. Use the figures to find the height of the tree.



11. **PHOTOGRAPHY** A photo that is 4 inches wide by 6 inches long must be reduced to fit in a space 3 inches wide. How long will the reduced photo be?

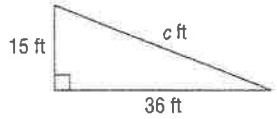
12. **SURVEYING** Surveyors use instruments to measure objects that are too large or too far away to measure by hand. They can use the shadows that objects cast to find the height of the objects without measuring them. A surveyor finds that a telephone pole that is 25 feet tall is casting a shadow 20 feet long. A nearby building is casting a shadow 52 feet long. What is the height of the building?

Selected Answers and Step-by-Step Solutions

Exercises

Find each missing measure. Round to the nearest tenth, if necessary.

1.



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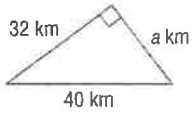

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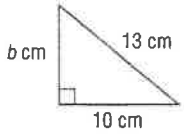


4. $a = 3, b = 4, c = ?$

5. $a = ?, b = 12, c = 13$

6. $a = 14, b = ?, c = 50$

7. $a = 2, b = 9, c = ?$

8. $a = 6, b = ?, c = 13$

9. $a = ?, b = 7, c = 11$

The lengths of three sides of a triangle are given. Determine whether each triangle is a right triangle.

10. 5 in., 7 in., 8 in.

11. 9 m, 12 m, 15 m

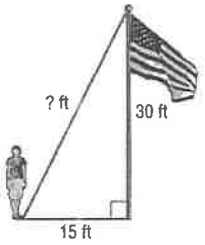
12. 6 cm, 7 cm, 12 cm

13. 11 ft, 12 ft, 16 ft

14. 10 yd, 24 yd, 26 yd

15. 11 km, 60 km, 61 km

16. **FLAGPOLES** If a flagpole is 30 feet tall and Mai-Lin is standing a distance of 15 feet from the flagpole, what is the distance from her feet to the top of the flagpole?



17. **CONSTRUCTION** The walls of a recreation center are being covered with paneling. A doorway is 0.9 meter wide and 2.5 meters high. What is the length of the widest rectangular panel that can be taken through this doorway?

18. **OPEN ENDED** Create an application problem involving right triangles and the Pythagorean Theorem. Then solve your problem, drawing diagrams if necessary.

Selected Answers and Step-by-Step Solutions

Check Your Understanding

Evaluate each expression if $a = -2$, $b = 3$, and $c = 4$ 2. (Examples 1–2)

1. $a - 2b + 3c$
2. $2a + (b + 3)^2$
3. $a + 3[b^2 - (a + c)]$
4. $5c - 2[(b - a) + c]$
5. $4(2a + 3b) - 2c$
6. $\frac{a^2 + 4c}{3b + 2a}$
7. $\frac{b^3 + ac}{ab + 2bc}$
8. $\frac{3b + 2a}{5 - c}$
9. $\frac{3a - 2c}{4ab}$

10. VOLLEYBALL A player's attack percentage A is calculated using the formula $A = \frac{k - e}{t}$, where k represents the number of kills, e represents the number of attack errors including blocks, and t represents the total attacks attempted. Find the attack percentage given each set of values. (Example 3)

    a. $k = 22$, $e = 11$, $t = 35$

    b. $k = 33$, $e = 9$, $t = 50$

Practice and Problem Solving

Evaluate each expression if $w = -3$, $x = 4$, $y = 2.6$, and $z = \frac{1}{3}$. (Example 1)

11. $y + x - z$
12. $w - 2x + y \div 2$
13. $4(x - w)$
14. $6(y + x)$
15. $9z - 4y + 2w$
16. $3y - 4z + x$

Selected Answers and Step-by-Step Solutions

Check Your Understanding

Write an algebraic expression to represent each verbal expression. (Example 1)

1. the product of 12 and the sum of a number and negative 3
2. the difference between the product of 4 and a number and the square of the number

Write a verbal sentence to represent each equation. (Example 2)

3. $5x + 7 = 18$
4. $x^2 - 9 = 27$
5. $5y - y^3 = 12$
6. $\frac{x}{4} + 8 = -16$

Name the property illustrated by each statement. (Example 3)

7. $(8x - 3) + 12 = (8x - 3) + 12$
8. If $a = -3$ and $-3 = d$, then $a = d$.

CCSS | PRECISION Solve each equation. Check your solution. (Examples 4–5)

9. $z - 19 = 34$
10. $x + 13 = 7$
11. $-y = 8$
12. $-6x = 42$
13. $5x - 3 = -33$
14. $-6y - 8 = 16$
15. $3(2a + 3) - 4(3a - 6) = 15$
16. $5(c - 8) - 3(2c + 12) = -84$
17. $-3(-2x + 20) + 8(x + 12) = 92$
18. $-4(3m - 10) - 6(-7m - 6) = -74$

Solve each equation or formula for the specified variable. (Example 6)

19. $8r - 5q = 3$, for q
20. $Pv = nrt$, for n

Select Solutions

Get Ready

1. 12.25 **3.** −66.15 **5.** $1\frac{13}{15}$ **7.** $-1\frac{1}{3}$ **9.** $10\frac{1}{2}$ yd
11. −64 **13.** 15.625 **15.** $\frac{2401}{81}$ **17.** $-\frac{3375}{8}$ **19.** true
21. false **23.** yes

Lesson 0.1

1. D = {1, 2, 3}, R = {6, 7, 10}; yes **3.** D = {1, 2}, R = {5, 7, 9}; no **5.** D = {−2, −1, 0, 3}, R = {−3, −2, 2}; yes **7.** D = {−1, 0, 1, 2, 3}, R = {−3, −2, −1, 2, 3, 4}; no
9. I **11.** none

Lesson 0.2

1. $a^2 + 6a + 8$ **3.** $h^2 - 16$ **5.** $b^2 + b - 12$
7. $r^2 - 5r - 24$ **9.** $p^2 + 16p + 64$ **11.** $2c^2 - 9c - 5$
13. $6m^2 - 7m - 20$ **15.** $2q^2 - 13q - 34$ **17a.** $n - 7$, $n + 2$ **17b.** $n^2 - 5n - 14$

Lesson 0.3

1. $4x(3x + 1)$ **3.** $4ab(2b - 3)$ **5.** $(y + 3)(y + 9)$
7. $(3y + 1)(y + 4)$ **9.** $(3x + 4)(x + 8)$ **11.** $(y - 4)(y - 1)$
13. $2(3a - b)(a - 8b)$ **15.** $(2x - 3y)(9x - 2y)$
17. $(3x - 4)^2$ **19.** $(x + 12)(x - 12)$ **21.** $(4y + 1)(4y - 1)$
23. $4(3y + 2)(3y - 2)$

Lesson 0.7

1. similar **3.** neither **5.** similar **7.** 8; 21 **9.** 10.2; 13.6
11. $4\frac{1}{2}$ in.

Lesson 0.8

1. 39 ft **3.** 8.3 cm **5.** 5 **7.** 9.2 **9.** 8.5 **11.** yes **13.** no
15. yes **17.** about 2.66 m

Lesson 1.1

1. 4.6 **3.** 18.4 **5.** 11.6 **7.** 0.96875 **9.** 0.6 **11.** $6\frac{4}{15}$
13. 28 **15.** −13.4 **17a.** 1524.6 mi **17b.** 720 mi **19.** 20

Lesson 1.3

1. $12[x + (-3)]$ **3.** The sum of five times a number and 7 equals 18. **5.** The difference between five times a number and the cube of that number is 12.
7. Reflexive Property **9.** 53 **11.** −8 **13.** −6 **15.** 3
17. 4 **19.** $q = \frac{8r - 3}{5}$ **21.** B **23.** $8x^2$ **25.** $\frac{x}{4} + 5$