

Summer Packet for Honors Algebra II/Trigonometry and Algebra II Students

The following problems should be completed over the summer and handed in on the first day of class. The intention of the packet is to identify areas of strength and areas for improvement, so we encourage students to NOT use any outside resources, including: internet, calculators, friends, etc. If you have significant trouble with the material and/or have general questions, please email the Head of the Mathematics Department, Michelle Gavin, at mgavin@solebury.org.

Algebra II Summer Packet

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1. Translate into an algebraic expression: seven less than half a number.
2. Translate into an algebraic equation: five more than one third of a number is six less than twice the number.
3. Use the commutative law of multiplication to write an expression equivalent to: $wxd + sn$
4. Use the associative law of addition to write an expression equivalent to: $4 + (wd + 3)$
5. Use the distributive law to write an expression equivalent to: $3(wd + s)$
6. Simplify.
 - a. $12 - 3(10 - 4(3 - 8))$
 - b. $|-3 \cdot 4 - 12 \cdot 2| - 8(-7)$
 - c. $(12 - 8)^2$
 - d. $\frac{4(18 - 8) + 7 \cdot 21}{8^2 - 9^2}$
 - e. $6[11m - 3(4m - 1)] - (7 - m)$
7. Evaluate: $\frac{2xy}{x - y}$, for $x = 6$ and $y = -3$
8. Simplify and write the final answers with positive exponents only:
 - a. $5x^0$
 - b. $(5x)^0$
 - c. 8^{-1}
 - d. $(-2)^{-4}$
 - e. $5^7 \cdot 5^2$
 - f. $(2n^2v^5)^3$
 - g. $(6ab^5c^3)(-a^2c^5)$
 - h. $\frac{6x^2y^3}{3xy^5}$
9. Identify each polynomial as a monomial, binomial, or trinomial. Indicate its degree:
 - a) $10 + 3z^4 - 9z^3$
 - b) $19x^{15}$
 - c) $100 - 5y$
10. Add. Then simplify by collecting like terms: $(11x^3 + 4x^2 - 3x - 5) + (2x^3 - 4x^2 - 6)$
11. Subtract. Then simplify by collecting like terms: $(y - 2y^3 + 7y^2) - (4y^2 - 3y + 2y^3)$

12. Multiply. Then simplify by collecting like terms:

a) $-3x^2(5x^3 - 2x^2 + x - 7)$

b) $(8y + 1)(2y - 7)$

c) $(6x - 7)^2$

d) $(4a^2 + 5)(a^3 - 5a + 1)$

13. Divide. Then simplify by collecting like terms. $\frac{12xy^6 + 24x^5y^9 - 4xy^3}{4xy^3}$

14. Simplify. $\frac{4x+1}{2} \cdot \frac{3}{x} \div \frac{1}{4x}$

15. Simplify. $\frac{6x+12}{8x-4} \cdot \frac{3x-9}{12x+6} \div \frac{3x^2-12}{8x^2-2}$

16. Simplify. $\frac{x+7}{x-1} - \frac{x+2}{x+3}$

17. Convert to decimal notation: 7.6×10^3

18. Convert to scientific notation: 0.000596

19. Convert to scientific notation: 103,000,000,000

20. Simplify and write your answer in scientific notation: $(1.75 \times 10^{-3})(4.20 \times 10^{-5})$

21. Factor completely:

a. $4a^4 - 64a^2$

f. $5x^2 - 23x - 10$

b. $x^2 - x - 12$

g. $x^2 - 64$

c. $x^2 + 7x + 10$

h. $8y^2 + 8$

d. $x^2 - 10x + 9$

e. $2y^2 + 4y - 48$

22. Solve for the variable indicated:

a. $A = \frac{1}{2}bh$, for b

b. $Q = \frac{p-q}{2}$, for p

c. $Ax + By = C$, for y

23. Solve the following equations for x and simplify, if possible:

a. $4 - 8x = 2x + \frac{1}{2}$

b. $3(x + 1) = 8$

c. $5x^2 + 12x - 20 = -3x$

d. $\frac{-5}{9} = \frac{16}{x}$

e. $\frac{9}{t-3} = \frac{t-4}{t-3}$

f. $x(x + 4) - 10 = 0$

g. $x^2 = 36$

h. $x^2 - 7x - 2 = 0$

hint for h: use quadratic formula

24. Solve and graph on the real number line.

a. $5(x + 3) - 2x \geq -21$

b. $x - 6 + 2(x + 1) < 5 + x$

25. Solve and graph on the x - y axis. $2x - y > 3$

26. Find the slope and y -intercept of the following linear equation: $5x + 3y = -6$

27. Find an equation of a vertical line containing the point $(-4, 5)$, and find its slope.

28. Find the slope of the following linear equation, and graph the line: $y = 3$

29. Find the x and y - intercepts of the following linear equation, and graph the line:

$$3x - 2y = -12$$

30. Find an equation for the line containing the point $(-1, -3)$ and having slope $m = -4$.

31. Find an equation for the line containing the points $(4, 2)$ and $(-2, -7)$

32. Find an equation of a line perpendicular to, $y = 5x - 1$, that passes through the point $(-1, 2)$.

33. Solve the following system by (a) graphing, (b) elimination and (c) substitution:

$$2x + y = 5$$

$$x - 3y = 6$$

34. Simplify each of the following square roots.

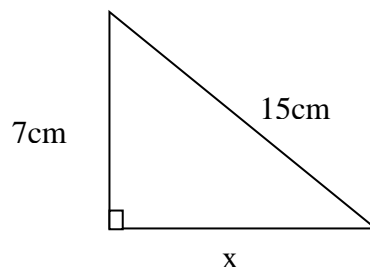
a. $\sqrt{300}$

b. $3\sqrt{45}\sqrt{6}$

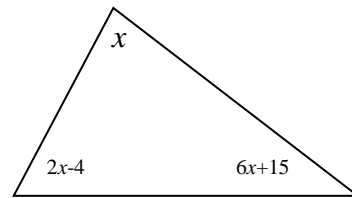
c. $-\sqrt{900x^2}$

35. Find the area of a square if the length of one side is 6cm.

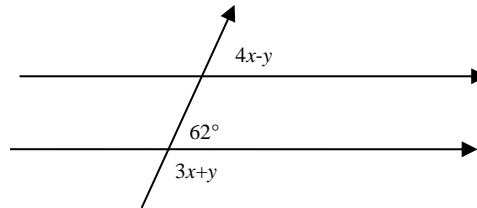
36. Find x .



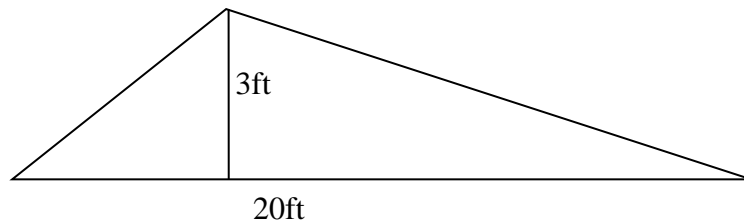
37. Find the measure of each angle in the following:



38. Lines are parallel, find x and y

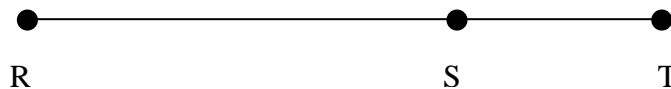


39. Find the area of the triangle below.



40. Find the area of a circle with a diameter of 12cm .

41. If $\overline{RS} = 9$ and $\overline{RT} = 15$, find \overline{ST}



Word Problem Section:

1. Economy Rent-A-Car rents compact cars at a rate of \$35 plus 15 cents per mile. Draw a graph that can be used to predict the cost of renting a car. Let the horizontal axis represent the number of miles driven and the vertical axis the total cost. Write an equation of the line that represents this situation and use the equation to predict the number of miles that can be driven for a total cost of \$100.
2. At a restaurant, Jessica wants to leave at least a 15% tip for the waitress that served her. If the bill was \$13, what is the minimum amount Jessica should leave for the tip?
3. On a test of 64 items, a student got 56 correct. What percent were correct?

4. A tax-exempt charity received a bill of \$197.39 for a printer. The bill incorrectly included a sales tax of 5%. How much should the charity pay?
5. The price of a computer was reduced to a sale price of \$1,572.50. This was a 15% reduction. What was the original price?
6. The sum of three consecutive integers is -87. What are the integers?
7. While traveling, you notice that you traveled 65 miles in 55 minutes. If your speed does not change, how long will it take you to travel 250 miles?
8. There were 200 tickets sold for a volleyball game. Tickets for students were \$2 each and for adults were \$3 each. The total amount collected was \$530. How many of each type of ticket was sold?
9. Two cars leave Houston at the same time. One car is traveling north and the other car is traveling south. If the one traveling North is traveling 15 miles per hour faster than the one traveling South and they are 345 miles apart after 2 hours, how fast is each car traveling?
10. A telephone pole is 10 m high. The telephone company needs to attach a wire to the top of the pole that runs down to the ground, in order to keep the pole in place. If the wire must end at a point that is 7 m from the base of the pole, how long must the wire be?
11. Find the total area of the shaded rectangles:

