

Summer Work for students entering Advanced Math Topics

Name _____

In order to be ready for AMT, students need to have a solid math foundation. This packet will be due the first day of school. There will be an assessment of these topics during the first week of school.

All work should be shown, use separate paper if needed, and should be your own. You are welcome to use notes, books or online resources if necessary. Khan Academy is a very useful site.

You should be able to complete the questions **without** a calculator although a graphing calculator will be required for this course!



"I find if you put that slash through the equal sign,
the number of possible answers vastly increases."

Advanced Mathematical Topics (AMT) Summer Work 2017

Here are the topics/concepts that you are expected to know coming into AMT this fall. Use the internet if needed to review any that you need help with. Remember that many times you can check your answers (using a calculator, substituting values back into the original equation, making a table, ...).

Order of Operations & Evaluate Expressions and Functions

- Do these problems without a calculator. Use your calculator to check your answers only.

Solve linear equations

- You must show your work and be able to check your answer.

Equations of Lines

- To find the slope first: $m = \frac{y_2 - y_1}{x_2 - x_1}$
- Find the point-slope equation of a line: $y - y_1 = m(x - x_1)$
- Find the slope-intercept of a line: $y = mx + b$
- Graph using the slope-intercept form – find the y -intercept $(0, b)$ and then use the slope (m) to plot more points. You may need to rewrite equations by solving for y .

Systems of Equations

- The solution to a system of equations is the point (or points) that work in both equations. You can check by substituting the (x, y) back into both equations.
- Solve by graphing – graph each line and find the point of intersection.
- Solve by substitution – substitute the expression for one of the variables into the other equation. Be sure to find both variables.
- Solve by elimination – add the equations together to eliminate one of the variables. You may need to multiply one (or both) of the equations to be sure that one of the variables has opposite coefficients. Be sure to find both variables.

Multiply Binomials

- Use the distributive property to multiply all terms. Don't forget FOIL! Be sure to combine like terms to completely simplify.

Exponent Rules

- Expand each problem if needed.

Factor

- Look for a greatest common factor (GCF) first.
- Continue to factor if possible.

Advanced Math Topics

Summer Work 2017 _____

Evaluate each expression. No calculator! Don't forget Order of Operations. Show your steps.

1) $3 \cdot (-9 \cdot 2) \div -3$

2) $-4 + 3 \cdot -3 - -4$

3) $(-9 - 3) \cdot 2 - 4 + 1$

4) $5(5 - 6 - -5)$

5) $(5 + 6 - 3) \div ((-1) + 3)$

6) $(-1) + (-2) + (-4) - 1 - 6$

Evaluate each using the values given. No calculator. Be sure to use Order of Operations! Show your steps.

7) $8x + 1 - z$; use $x = -3$, and $z = -6$

8) $3p^2 - 5r$; use $p = 2$, and $r = -4$

9) $x^2 + 8x - y + 3$; use $x = -5$, and $y = -2$

10) $-m^2 - 6m + 1$; use $m = -4$

Evaluate each function.

11) $g(x) = 4x + 5$; Find $g(7)$

12) $p(n) = 3n^2 - 2$; Find $p(3)$

13) $h(x) = x - 2$; Find $h(-10)$

14) $p(x) = -3x^2 - 1$; Find $p(1)$

Solve each equation. Show your work clearly.

15) $-3k - 9k = -12$

16) $3x + 6x = -9$

17) $-34 - 5v = 2(v - 3)$

18) $4(1 + n) = 24 + 8n$

19) $3(-8x + 4) - 8x = -19 - x$

20) $-2(-8n - 3) = 6 + 4n$

Find the slope of the line through each pair of points.

21) $(19, 6), (5, 8)$

22) $(1, -13), (14, -6)$

23) $(-3, -15), (0, 19)$

24) $(-8, -16), (20, 12)$

25) $(-10, 1), (-5, 17)$

26) $(16, -16), (2, 12)$

Write the point-slope form of the equation of the line through the given point with the given slope.

27) through: $(-4, 1)$, slope = 3

28) through: $(-1, 4)$, slope = $-\frac{1}{2}$

Write the point-slope form of the equation of the line through the given points.

29) through: $(-5, 3)$ and $(0, 2)$

30) through: $(-2, 1)$ and $(-5, -4)$

Write the slope-intercept form of the equation of the line through the given point with the given slope.

31) through: $(4, 0)$, slope = $-\frac{1}{4}$

32) through: $(2, 3)$, slope = 1

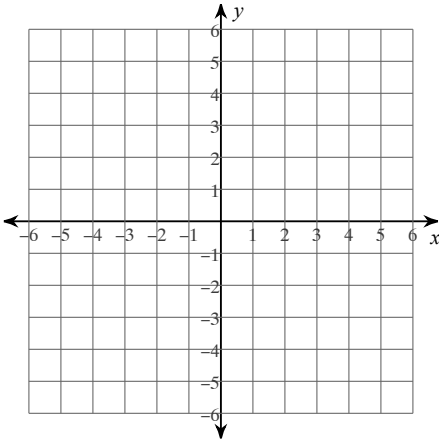
Write the slope-intercept form of the equation of the line through the given points.

33) through: $(3, 9)$ and $(6, 11)$

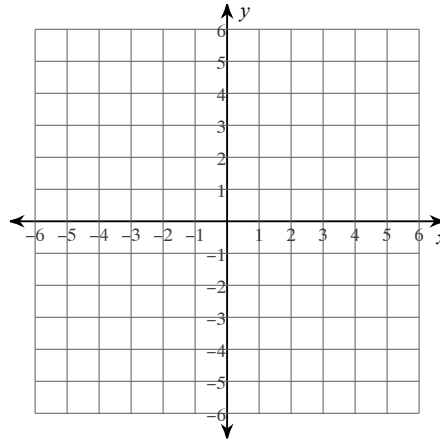
34) through: $(3, -5)$ and $(-1, 7)$

Sketch the graph of each line using the slope and the y-intercept. Re-write if necessary.

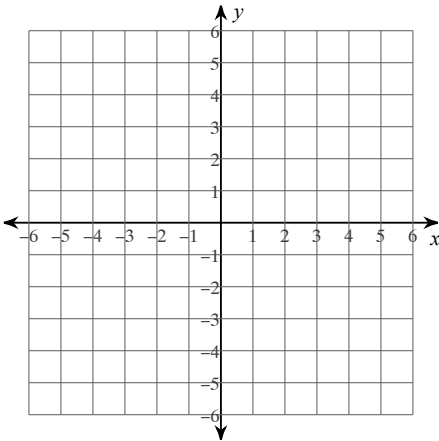
35) $y = \frac{1}{3}x + 1$



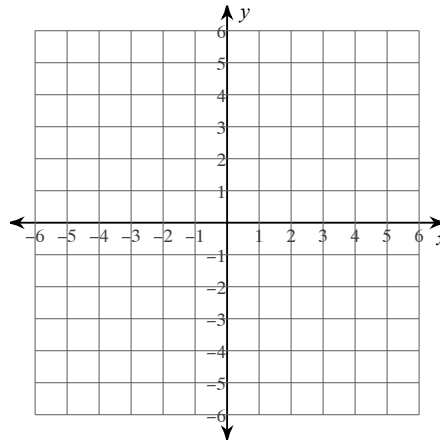
36) $y = -\frac{4}{5}x - 3$



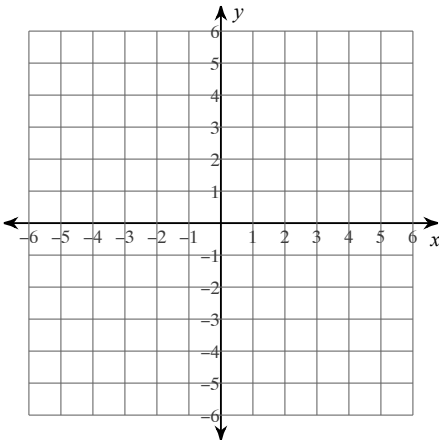
37) $7x + 4y = 8$



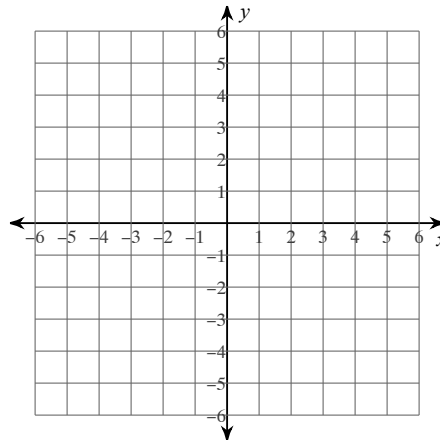
38) $7x - 2y = -10$



39) $4x + 3y = 6$



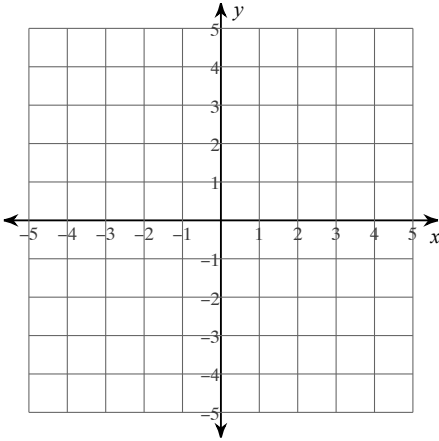
40) $x - 2y = 0$



Solve each system by graphing. Give your answer as (x, y).

41) $y = 2x + 3$

$$y = -\frac{1}{2}x - 2$$



Solve each system by substitution. Show all work. Give your answer as (x, y).

42) $y = 6x - 20$
 $-3x - 5y = 1$

43) $y = 2x + 13$
 $2x + 2y = -16$

44) $8x - 4y = 20$
 $x = 4y + 20$

45) $y = -5x + 15$
 $y = 2x - 6$

Solve each system by elimination. Show all work clearly. Give your answer as (x, y).

$$\begin{aligned} 46) \quad & -2x - 2y = 0 \\ & 2x - 5y = 28 \end{aligned}$$

$$\begin{aligned} 47) \quad & -9x - 9y = -9 \\ & 4x + 3y = 10 \end{aligned}$$

Find each product. Don't forget FOIL!

$$48) (n + 2)(n + 7)$$

$$49) (x - 2)(x + 5)$$

$$50) (3n + 5)(7n - 2)$$

$$51) (7b - 5)(7b + 5)$$

$$52) (k + 4)^2$$

$$53) (8v - 3)^2$$

Simplify.

$$54) 2x^4 \cdot 4x^5$$

$$55) 3x^3 \cdot x$$

$$56) (3a^3)^2$$

$$57) (2k)^4$$

Simplify. Your answer should contain only positive exponents.

$$58) \frac{8x^6}{4x^2}$$

$$59) \frac{8x^6 \cdot y^2}{12x^3 \cdot y^6}$$

Factor each completely.

$$60) m^2 + 14m + 40$$

$$61) k^2 - 4k + 3$$

$$62) n^2 - n - 90$$

$$63) x^2 + 9x$$

$$64) n^2 + 8n + 7$$

$$65) m^2 + 2m + 1$$

$$66) 2x^2 - 17x - 30$$

$$67) 3m^2 - 10m$$

$$68) 3a^2 + 33a + 90$$

$$69) 6v^2 + 66v + 168$$

$$70) 4b^3 + 20b^2 - 56b$$

$$71) 2x^2 - 2x - 84$$