

The American School Foundation Of Guadalajara
Advanced Algebra and Trigonometry
Summer Assignment
June 2026

Dear soon-to-be 11th grade math students,

For nearly all ASFG students, the summer months are the most anticipated time of the year as opportunities abound for travel and relaxation with family and friends. It is also the time of the year where 60-70% of students lose 20-30% of their gains in mathematics. These losses hamper teachers' abilities to meet course objectives and properly prepare students for their future mathematics and science courses.

Multiple studies have shown that solving math problems using pencil and paper improves student learning and retention. Therefore, this year's summer assignment will use an old-school format, rather than employing an online platform such as IXL or Khan Academy. Like all summer study programs, the goal is to help you practice the concepts learned in Integrated Math II so that you are prepared to study math at the next level this fall.

The Advanced Algebra and Trigonometry Summer Assignment

The following table outlines the key topics covered and offers a pacing guide so you can spread your math review more evenly over the summer. I recommend that you print out this summer assignment (double-sided) and work the problems directly on the worksheets. You should probably work out the more complex problems in a spiral bound notebook with letter-sized graph paper. Unless the instructions explicitly request it, all problems should be solved independently (no AI, friends, nor tutors) and without a calculator.

Please work in a neat and organized way and plan to turn in your assignment on the first day of class. If you are currently performing at the expected level of Integrated Mathematics II, then I would anticipate that this assignment will take you no more than a total of ten (10) hours.

Once you finish the Summer work, proceed to the Science Department Addendum and complete the exercises ONLY of your elective Science Course (notice that AP science courses are not included in this addendum, as these have their separate summer assignment)

Summer Assignment Topics and Pacing Guide

Worksheet Title - Approx time to complete (min)	To be completed by:
1. Order of Operations - 30 min	25 June
2. Add and Subtracting Fractions and Mixed Numbers - 30 min	
3. Multiplying and Dividing Fractions and Mixed Numbers - 30 min	
4. Two-Step Equations - 30 min	2 July
5. Multi-Step Equations - 30 min	
6. Two-Step Inequalities - 30 min	
7. Slope - 30 min	9 July
8. Graphing lines from equations - 30 min	
9. Writing linear equations - 60 min	
10. Solving Proportions - 30 min	16 July
11. Simplifying Square Roots - 30 min	
12. Triangle Sum and Pythagorean Theorems - 60 min	23 July
13. Properties of Exponents - 30 min	30 July
14. Polynomials, FOIL and the Distributive property - 30 min	
15. Multiplying Binomials- Special Products - 30 min	6 August
16. Factoring / GCF / Perfect Square Trinomials / Diff of Perfect Squares - 30 min	
17. Factoring by grouping & factoring x^2+bx+c - 60 min	13 August

There will be a very brief review of the summer assignment topics during the first week of class and then you will be formally evaluated on your knowledge of these topics. This exam will count toward your independent learning grade for the first quarter.

If you have any questions, attend the free tutoring the HS Math Department offers the week before school starts. Keep an eye out, for an email at the start of August regarding the location, days, and times of these tutoring sessions.

Enjoy your summer and do your best!

Sincerely,

The Math Department

Order of Operations

Date_____ Period____

Evaluate each expression.

1) $(30 - 3) \div 3$

2) $(21 - 5) \div 8$

3) $1 + 7^2$

4) $5 \times 4 - 8$

5) $8 + 6 \times 9$

6) $3 + 17 \times 5$

7) $7 + 12 \times 11$

8) $15 + 40 \div 20$

9) $20 + 16 - 15$

10) $19 - 15 - 3$

11) $9 \times (3 + 3) \div 6$

12) $(9 + 18 - 3) \div 8$

13) $9 + 6 \div (8 - 2)$

14) $4(4 \div 2 + 4)$

15) $6 + (5 + 8) \times 4$

16) $6 \times 6 - (7 + 5)$

17) $(9 \times 2) \div (2 + 1)$

18) $2 - (4 + 3 - 6)$

19) $7 \times 7 - (8 - 2)$

20) $9 - 7 - 6 \div 6$

21) $(4 - 1 + 8 \div 8) \times 5$

22) $(10 \times 2) \div (1 + 1)$

23) $7 \times 9 - 7 - 3 \times 5$

24) $8 - 1 - (18 - 2) \div 8$

Order of Operations

Evaluate each expression.

1) $(30 - 3) \div 3$

9

2) $(21 - 5) \div 8$

2

3) $1 + 7^2$

50

4) $5 \times 4 - 8$

12

5) $8 + 6 \times 9$

62

6) $3 + 17 \times 5$

88

7) $7 + 12 \times 11$

139

8) $15 + 40 \div 20$

17

9) $20 + 16 - 15$

21

10) $19 - 15 - 3$

1

11) $9 \times (3 + 3) \div 6$

9

12) $(9 + 18 - 3) \div 8$

3

13) $9 + 6 \div (8 - 2)$

10

14) $4(4 \div 2 + 4)$

24

15) $6 + (5 + 8) \times 4$

58

16) $6 \times 6 - (7 + 5)$

24

17) $(9 \times 2) \div (2 + 1)$

6

18) $2 - (4 + 3 - 6)$

1

19) $7 \times 7 - (8 - 2)$

43

20) $9 - 7 - 6 \div 6$

1

21) $(4 - 1 + 8 \div 8) \times 5$

20

22) $(10 \times 2) \div (1 + 1)$

10

23) $7 \times 9 - 7 - 3 \times 5$

41

24) $8 - 1 - (18 - 2) \div 8$

5

Add/Subtracting Fractions and Mixed Numbers

Date_____ Period____

Evaluate each expression.

1) $\frac{5}{4} - \frac{3}{4}$

2) $\frac{3}{2} - \frac{1}{2}$

3) $\frac{2}{5} + \frac{4}{5}$

4) $\frac{1}{3} - \frac{1}{3}$

5) $6 - \frac{1}{6}$

6) $\frac{1}{2} - \frac{1}{2}$

7) $\frac{1}{5} + \frac{1}{5}$

8) $\frac{7}{6} - \frac{5}{6}$

9) $\left(-\frac{4}{5}\right) - \frac{7}{8}$

10) $\frac{1}{3} - \left(-\frac{5}{3}\right)$

11) $\left(-\frac{1}{3}\right) + \frac{3}{8}$

12) $\left(-\frac{10}{7}\right) + \frac{1}{6}$

13) $\frac{9}{5} + \left(-\frac{4}{3}\right)$

14) $2 - \frac{13}{8}$

$$15) \frac{9}{5} - \frac{5}{8}$$

$$16) \left(-\frac{4}{3}\right) - \left(-\frac{3}{2}\right)$$

$$17) (-1) + \left(-2\frac{2}{5}\right)$$

$$18) \left(-3\frac{3}{5}\right) - 4\frac{2}{5}$$

$$19) 3\frac{6}{7} + \left(-1\frac{1}{7}\right)$$

$$20) 1\frac{2}{7} + \left(-3\frac{4}{7}\right)$$

$$21) 2\frac{1}{3} + \left(-1\frac{2}{3}\right)$$

$$22) \left(-1\frac{3}{4}\right) + \left(-3\frac{3}{4}\right)$$

$$23) \left(-1\frac{7}{8}\right) + \left(-3\frac{1}{2}\right)$$

$$24) \left(-2\frac{7}{8}\right) + \left(-1\frac{1}{2}\right)$$

$$25) \left(-2\frac{5}{6}\right) - \left(-1\frac{1}{4}\right)$$

$$26) \left(-3\frac{5}{8}\right) - 4\frac{2}{5}$$

$$27) 1\frac{2}{5} - \left(-3\frac{3}{4}\right)$$

$$28) 2\frac{4}{5} - \frac{5}{8}$$

Add/Subtracting Fractions and Mixed Numbers

Date _____ Period _____

Evaluate each expression.

1) $\frac{5}{4} - \frac{3}{4}$

$$\frac{1}{2}$$

2) $\frac{3}{2} - \frac{1}{2}$

$$1$$

3) $\frac{2}{5} + \frac{4}{5}$

$$\frac{6}{5}$$

4) $\frac{1}{3} - \frac{1}{3}$

$$0$$

5) $6 - \frac{1}{6}$

$$\frac{35}{6}$$

6) $\frac{1}{2} - \frac{1}{2}$

$$0$$

7) $\frac{1}{5} + \frac{1}{5}$

$$\frac{2}{5}$$

8) $\frac{7}{6} - \frac{5}{6}$

$$\frac{1}{3}$$

9) $\left(-\frac{4}{5}\right) - \frac{7}{8}$

$$-\frac{67}{40}$$

10) $\frac{1}{3} - \left(-\frac{5}{3}\right)$

$$2$$

11) $\left(-\frac{1}{3}\right) + \frac{3}{8}$

$$\frac{1}{24}$$

12) $\left(-\frac{10}{7}\right) + \frac{1}{6}$

$$-\frac{53}{42}$$

13) $\frac{9}{5} + \left(-\frac{4}{3}\right)$

$$\frac{7}{15}$$

14) $2 - \frac{13}{8}$

$$\frac{3}{8}$$

$$15) \frac{9}{5} - \frac{5}{8}$$

$$\frac{47}{40}$$

$$16) \left(-\frac{4}{3}\right) - \left(-\frac{3}{2}\right)$$

$$\frac{1}{6}$$

$$17) (-1) + \left(-2\frac{2}{5}\right)$$

$$-3\frac{2}{5}$$

$$18) \left(-3\frac{3}{5}\right) - 4\frac{2}{5}$$

$$-8$$

$$19) 3\frac{6}{7} + \left(-1\frac{1}{7}\right)$$

$$2\frac{5}{7}$$

$$20) 1\frac{2}{7} + \left(-3\frac{4}{7}\right)$$

$$-2\frac{2}{7}$$

$$21) 2\frac{1}{3} + \left(-1\frac{2}{3}\right)$$

$$\frac{2}{3}$$

$$22) \left(-1\frac{3}{4}\right) + \left(-3\frac{3}{4}\right)$$

$$-5\frac{1}{2}$$

$$23) \left(-1\frac{7}{8}\right) + \left(-3\frac{1}{2}\right)$$

$$-5\frac{3}{8}$$

$$24) \left(-2\frac{7}{8}\right) + \left(-1\frac{1}{2}\right)$$

$$-4\frac{3}{8}$$

$$25) \left(-2\frac{5}{6}\right) - \left(-1\frac{1}{4}\right)$$

$$-1\frac{7}{12}$$

$$26) \left(-3\frac{5}{8}\right) - 4\frac{2}{5}$$

$$-8\frac{1}{40}$$

$$27) 1\frac{2}{5} - \left(-3\frac{3}{4}\right)$$

$$5\frac{3}{20}$$

$$28) 2\frac{4}{5} - \frac{5}{8}$$

$$2\frac{7}{40}$$

Multiplying/Dividing Fractions and Mixed Numbers

Date _____ Period _____

Find each product.

1) $-\frac{5}{4} \cdot \frac{1}{3}$

2) $\frac{8}{7} \cdot \frac{7}{10}$

3) $\frac{4}{9} \cdot \frac{7}{4}$

4) $-\frac{2}{3} \cdot \frac{5}{4}$

5) $-2 \cdot \frac{3}{7}$

6) $-2\frac{2}{3} \cdot 4\frac{1}{10}$

7) $-2\frac{1}{5} \cdot -1\frac{3}{4}$

8) $-1\frac{1}{4} \cdot 9$

9) $-1\frac{5}{7} \cdot -2\frac{1}{2}$

10) $-2\frac{3}{8} \cdot 2\frac{1}{2}$

Find each quotient.

11) $\frac{-1}{5} \div \frac{7}{4}$

12) $\frac{-1}{2} \div \frac{5}{4}$

13) $\frac{-3}{2} \div \frac{-10}{7}$

14) $\frac{1}{2} \div \frac{8}{7}$

15) $\frac{-9}{5} \div 2$

16) $-3\frac{5}{9} \div 3$

17) $-2 \div -3\frac{4}{5}$

18) $\frac{1}{9} \div -1\frac{1}{3}$

19) $1\frac{6}{7} \div 5\frac{3}{4}$

20) $-3\frac{7}{10} \div 2\frac{1}{4}$

Multiplying/Dividing Fractions and Mixed Numbers

Date _____ Period _____

Find each product.

1) $-\frac{5}{4} \cdot \frac{1}{3}$

$$-\frac{5}{12}$$

2) $\frac{8}{7} \cdot \frac{7}{10}$

$$\frac{4}{5}$$

3) $\frac{4}{9} \cdot \frac{7}{4}$

$$\frac{7}{9}$$

4) $-\frac{2}{3} \cdot \frac{5}{4}$

$$-\frac{5}{6}$$

5) $-2 \cdot \frac{3}{7}$

$$-\frac{6}{7}$$

6) $-2\frac{2}{3} \cdot 4\frac{1}{10}$

$$-10\frac{14}{15}$$

7) $-2\frac{1}{5} \cdot -1\frac{3}{4}$

$$3\frac{17}{20}$$

8) $-1\frac{1}{4} \cdot 9$

$$-11\frac{1}{4}$$

9) $-1\frac{5}{7} \cdot -2\frac{1}{2}$

$$4\frac{2}{7}$$

10) $-2\frac{3}{8} \cdot 2\frac{1}{2}$

$$-5\frac{15}{16}$$

Find each quotient.

$$11) \frac{-1}{5} \div \frac{7}{4}$$

$$-\frac{4}{35}$$

$$12) \frac{-1}{2} \div \frac{5}{4}$$

$$-\frac{2}{5}$$

$$13) \frac{-3}{2} \div \frac{-10}{7}$$

$$\frac{21}{20}$$

$$14) \frac{1}{2} \div \frac{8}{7}$$

$$\frac{7}{16}$$

$$15) \frac{-9}{5} \div 2$$

$$-\frac{9}{10}$$

$$16) -3\frac{5}{9} \div 3$$

$$-1\frac{5}{27}$$

$$17) -2 \div -3\frac{4}{5}$$

$$\frac{10}{19}$$

$$18) \frac{1}{9} \div -1\frac{1}{3}$$

$$-\frac{1}{12}$$

$$19) 1\frac{6}{7} \div 5\frac{3}{4}$$

$$\frac{52}{161}$$

$$20) -3\frac{7}{10} \div 2\frac{1}{4}$$

$$-1\frac{29}{45}$$

Two-Step Equations

Date_____ Period____

Solve each equation.

1) $6 = \frac{a}{4} + 2$

2) $-6 + \frac{x}{4} = -5$

3) $9x - 7 = -7$

4) $0 = 4 + \frac{n}{5}$

5) $-4 = \frac{r}{20} - 5$

6) $-1 = \frac{5 + x}{6}$

7) $\frac{v + 9}{3} = 8$

8) $2(n + 5) = -2$

9) $-9x + 1 = -80$

10) $-6 = \frac{n}{2} - 10$

11) $-2 = 2 + \frac{v}{4}$

12) $144 = -12(x + 5)$

$$13) -15 = -4m + 5$$

$$14) 10 - 6v = -104$$

$$15) 8n + 7 = 31$$

$$16) -9x - 13 = -103$$

$$17) \frac{n+5}{-16} = -1$$

$$18) -10 = -10 + 7m$$

$$19) -10 = 10(k - 9)$$

$$20) \frac{m}{9} - 1 = -2$$

$$21) 9 + 9n = 9$$

$$22) 7(9 + k) = 84$$

$$23) 8 + \frac{b}{-4} = 5$$

$$24) -243 = -9(10 + x)$$

Two-Step Equations

Date_____ Period____

Solve each equation.

1) $6 = \frac{a}{4} + 2$

 $\{16\}$

2) $-6 + \frac{x}{4} = -5$

 $\{4\}$

3) $9x - 7 = -7$

 $\{0\}$

4) $0 = 4 + \frac{n}{5}$

 $\{-20\}$

5) $-4 = \frac{r}{20} - 5$

 $\{20\}$

6) $-1 = \frac{5 + x}{6}$

 $\{-11\}$

7) $\frac{v + 9}{3} = 8$

 $\{15\}$

8) $2(n + 5) = -2$

 $\{-6\}$

9) $-9x + 1 = -80$

 $\{9\}$

10) $-6 = \frac{n}{2} - 10$

 $\{8\}$

11) $-2 = 2 + \frac{v}{4}$

 $\{-16\}$

12) $144 = -12(x + 5)$

 $\{-17\}$

$$13) -15 = -4m + 5$$

$\{5\}$

$$14) 10 - 6v = -104$$

$\{19\}$

$$15) 8n + 7 = 31$$

$\{3\}$

$$16) -9x - 13 = -103$$

$\{10\}$

$$17) \frac{n+5}{-16} = -1$$

$\{11\}$

$$18) -10 = -10 + 7m$$

$\{0\}$

$$19) -10 = 10(k - 9)$$

$\{8\}$

$$20) \frac{m}{9} - 1 = -2$$

$\{-9\}$

$$21) 9 + 9n = 9$$

$\{0\}$

$$22) 7(9 + k) = 84$$

$\{3\}$

$$23) 8 + \frac{b}{-4} = 5$$

$\{12\}$

$$24) -243 = -9(10 + x)$$

$\{17\}$

Multi-Step Equations

Solve each equation.

1) $-20 = -4x - 6x$

2) $6 = 1 - 2n + 5$

3) $8x - 2 = -9 + 7x$

4) $a + 5 = -5a + 5$

5) $4m - 4 = 4m$

6) $p - 1 = 5p + 3p - 8$

7) $5p - 14 = 8p + 4$

8) $p - 4 = -9 + p$

9) $-8 = -(x + 4)$

10) $12 = -4(-6x - 3)$

11) $14 = -(p - 8)$

12) $-(7 - 4x) = 9$

13) $-18 - 6k = 6(1 + 3k)$

14) $5n + 34 = -2(1 - 7n)$

15) $2(4x - 3) - 8 = 4 + 2x$

16) $3n - 5 = -8(6 + 5n)$

17) $-(1 + 7x) - 6(-7 - x) = 36$

18) $-3(4x + 3) + 4(6x + 1) = 43$

19) $24a - 22 = -4(1 - 6a)$

20) $-5(1 - 5x) + 5(-8x - 2) = -4x - 8x$

Multi-Step Equations

Solve each equation.

1) $-20 = -4x - 6x$

 $\{2\}$

2) $6 = 1 - 2n + 5$

 $\{0\}$

3) $8x - 2 = -9 + 7x$

 $\{-7\}$

4) $a + 5 = -5a + 5$

 $\{0\}$

5) $4m - 4 = 4m$

No solution.

6) $p - 1 = 5p + 3p - 8$

 $\{1\}$

7) $5p - 14 = 8p + 4$

 $\{-6\}$

8) $p - 4 = -9 + p$

No solution.

9) $-8 = -(x + 4)$

 $\{4\}$

10) $12 = -4(-6x - 3)$

 $\{0\}$

11) $14 = -(p - 8)$

 $\{-6\}$

12) $-(7 - 4x) = 9$

 $\{4\}$

13) $-18 - 6k = 6(1 + 3k)$

 $\{-1\}$

14) $5n + 34 = -2(1 - 7n)$

 $\{4\}$

15) $2(4x - 3) - 8 = 4 + 2x$

 $\{3\}$

16) $3n - 5 = -8(6 + 5n)$

 $\{-1\}$

17) $-(1 + 7x) - 6(-7 - x) = 36$

 $\{5\}$

18) $-3(4x + 3) + 4(6x + 1) = 43$

 $\{4\}$

19) $24a - 22 = -4(1 - 6a)$

No solution.

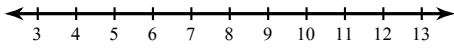
20) $-5(1 - 5x) + 5(-8x - 2) = -4x - 8x$

 $\{-5\}$

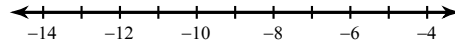
Two-Step Inequalities

Solve each inequality and graph its solution.

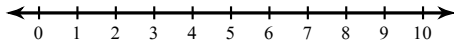
1) $2x + 4 \geq 24$



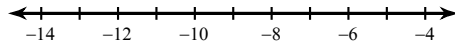
2) $\frac{m}{3} - 3 \leq -6$



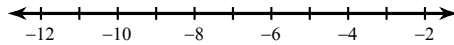
3) $-3(p + 1) \leq -18$



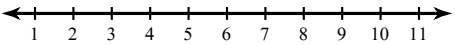
4) $-4(-4 + x) > 56$



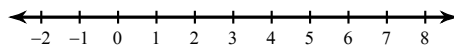
5) $-b - 2 > 8$



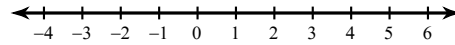
6) $-4(3 + n) > -32$



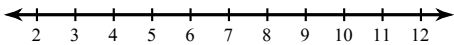
7) $4 + \frac{n}{3} < 6$



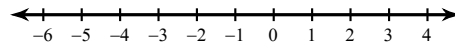
8) $-3(r - 4) \geq 0$



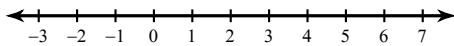
9) $-7x + 7 \leq -56$



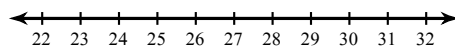
10) $-3(p - 7) \geq 21$



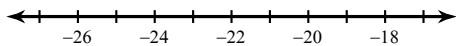
11) $-11x - 4 > -15$



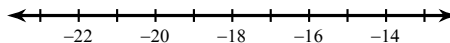
12) $\frac{-9 + a}{15} > 1$



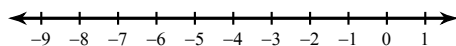
$$13) -1 \leq \frac{v-2}{21}$$



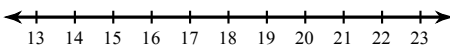
$$14) -132 > 12(n+9)$$



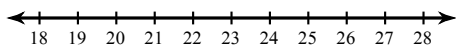
$$15) \frac{-11+n}{15} < -1$$



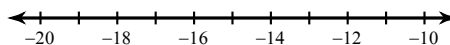
$$16) -90 \geq -5(k-3)$$



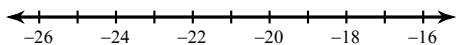
$$17) 4 < 1 + \frac{n}{7}$$



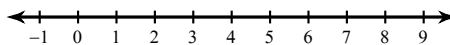
$$18) -1 > \frac{12+x}{4}$$



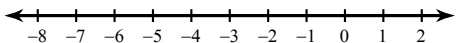
$$19) 7n - 1 > -169$$



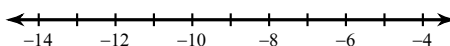
$$20) -4b - 5 > -25$$



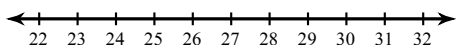
$$21) 84 \geq -7(v-9)$$



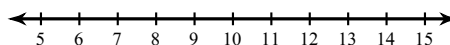
$$22) \frac{-8+r}{2} > -8$$



$$23) \frac{x}{-6} - 8 \leq -12$$



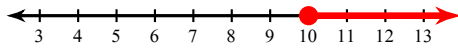
$$24) \frac{m-3}{2} \leq 5$$



Two-Step Inequalities

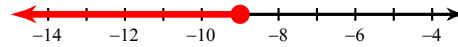
Solve each inequality and graph its solution.

1) $2x + 4 \geq 24$



$x \geq 10$

2) $\frac{m}{3} - 3 \leq -6$



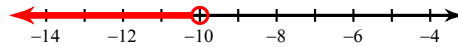
$m \leq -9$

3) $-3(p + 1) \leq -18$



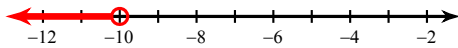
$p \geq 5$

4) $-4(-4 + x) > 56$



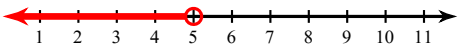
$x < -10$

5) $-b - 2 > 8$



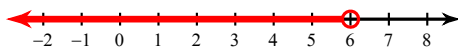
$b < -10$

6) $-4(3 + n) > -32$



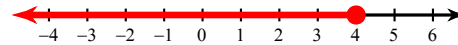
$n < 5$

7) $4 + \frac{n}{3} < 6$



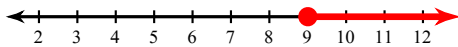
$n < 6$

8) $-3(r - 4) \geq 0$



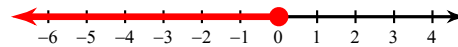
$r \leq 4$

9) $-7x + 7 \leq -56$



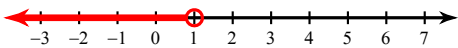
$x \geq 9$

10) $-3(p - 7) \geq 21$



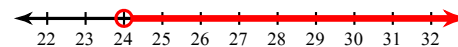
$p \leq 0$

11) $-11x - 4 > -15$



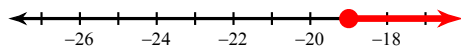
$x < 1$

12) $\frac{-9 + a}{15} > 1$



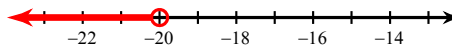
$a > 24$

$$13) -1 \leq \frac{v-2}{21}$$



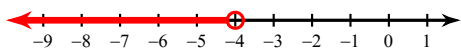
$$v \geq -19$$

$$14) -132 > 12(n+9)$$



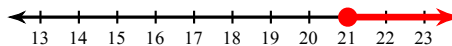
$$n < -20$$

$$15) \frac{-11+n}{15} < -1$$



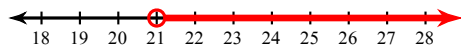
$$n < -4$$

$$16) -90 \geq -5(k-3)$$



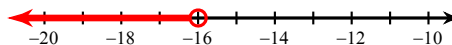
$$k \geq 21$$

$$17) 4 < 1 + \frac{n}{7}$$



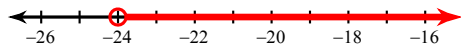
$$n > 21$$

$$18) -1 > \frac{12+x}{4}$$



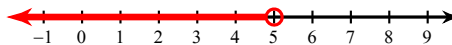
$$x < -16$$

$$19) 7n - 1 > -169$$



$$n > -24$$

$$20) -4b - 5 > -25$$



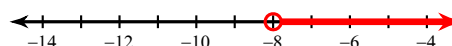
$$b < 5$$

$$21) 84 \geq -7(v-9)$$



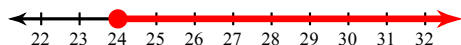
$$v \geq -3$$

$$22) \frac{-8+r}{2} > -8$$



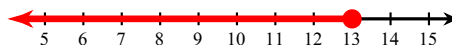
$$r > -8$$

$$23) \frac{x}{-6} - 8 \leq -12$$



$$x \geq 24$$

$$24) \frac{m-3}{2} \leq 5$$

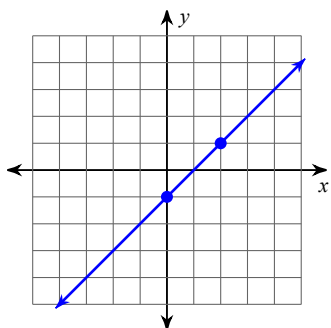


$$m \leq 13$$

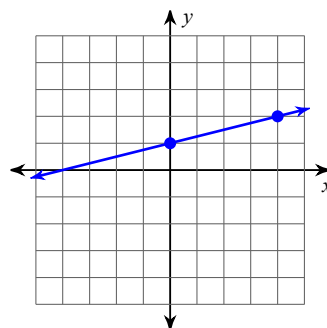
Slope

Find the slope of each line.

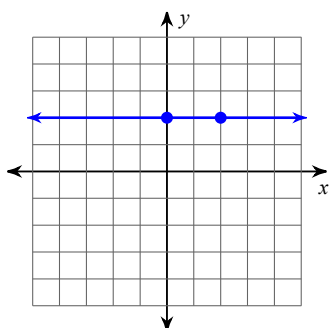
1)



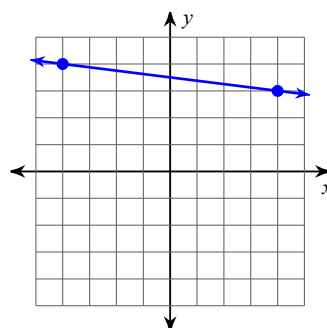
2)



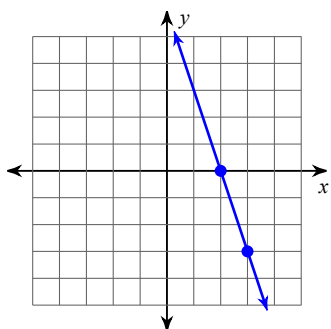
3)



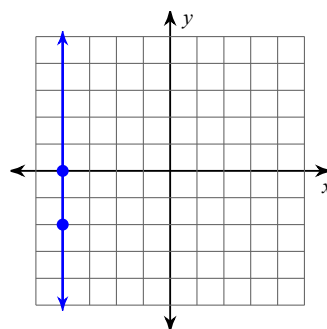
4)



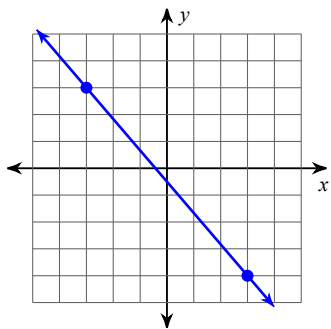
5)



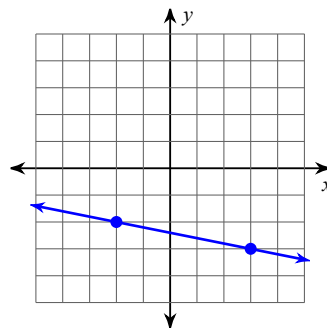
6)



7)



8)



Find the slope of the line through each pair of points. Be sure to use the slope formula. DO NOT graph the points!

9) $(10, -5), (10, -13)$

10) $(-13, 8), (-12, 12)$

11) $(19, 5), (4, -19)$

12) $(-6, 16), (9, 0)$

13) $(8, -12), (5, 4)$

14) $(20, 2), (-11, -5)$

15) $(8, -12), (12, 19)$

16) $(16, -7), (2, -7)$

Find the slope of each line.

17) $y = -\frac{5}{3}x - 2$

18) $y = -x - 3$

19) $y = 4x + 3$

20) $8x - y = 4$

21) $5x - y = -2$

22) $x + 2y = 0$

23) $4y = 4 + x$

24) $-5 = -y - 2x$

25) $-3y - 3 = -2x$

Answers to Slope

1) 1

2) $\frac{1}{4}$

3) 0

4) $-\frac{1}{8}$

5) -3

6) Undefined

7) $-\frac{7}{6}$

8) $-\frac{1}{5}$

9) Undefined

10) 4

11) $\frac{8}{5}$

12) $-\frac{16}{15}$

13) $-\frac{16}{3}$

14) $\frac{7}{31}$

15) $\frac{31}{4}$

16) 0

17) $-\frac{5}{3}$

18) -1

19) 4

20) 8

21) 5

22) $-\frac{1}{2}$

23) $\frac{1}{4}$

24) -2

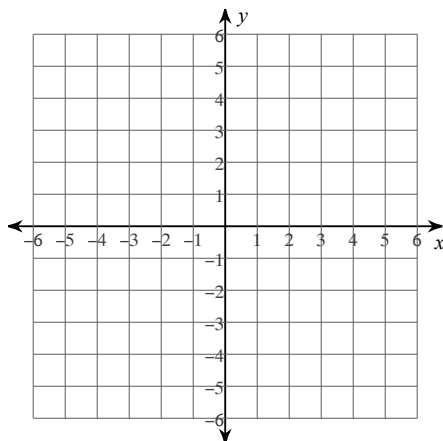
25) $\frac{2}{3}$

Graphing lines from equations

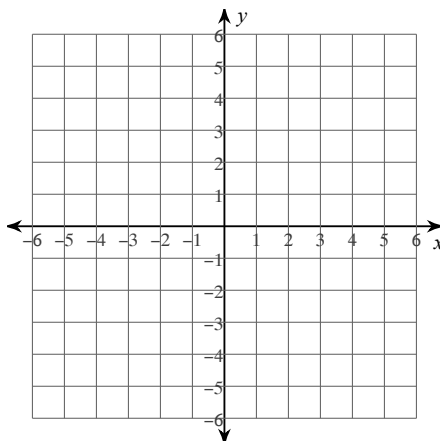
Date _____ Period _____

Sketch the graph of each line.

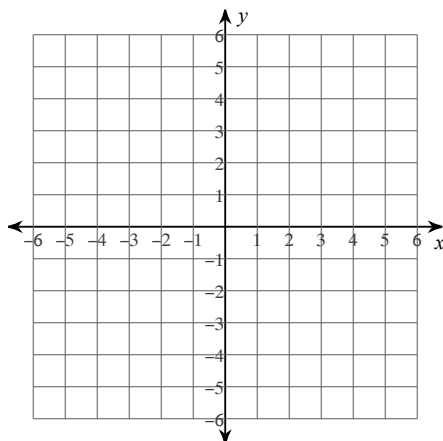
1) x -intercept = 2, y -intercept = 3



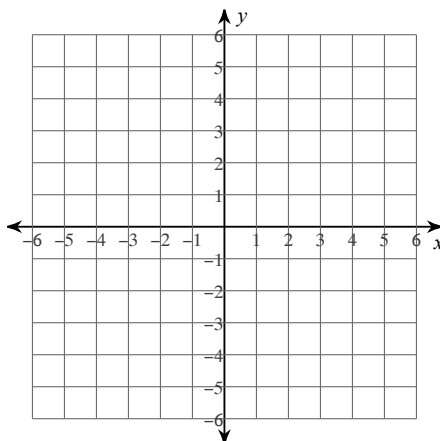
2) x -intercept = -4, y -intercept = -4



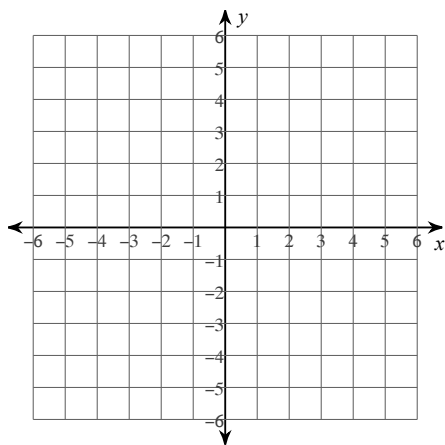
3) $y = 3x + 4$



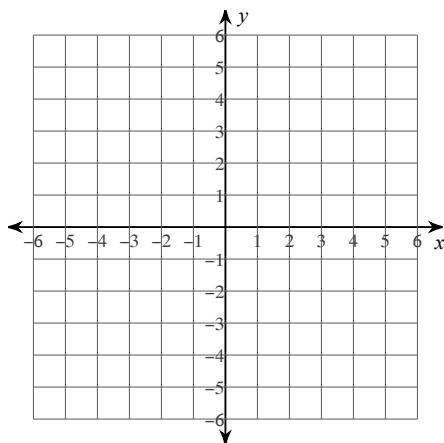
4) $y = x - 5$



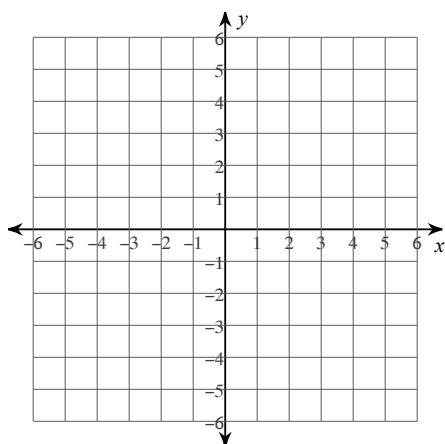
5) $y = 2x - 2$



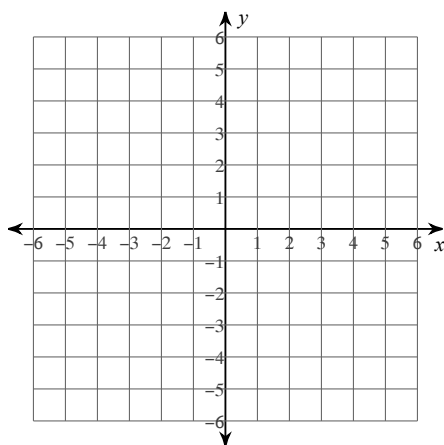
6) $y = \frac{3}{5}x$



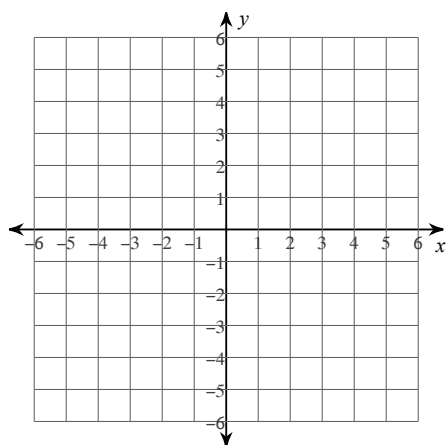
7) $y = -3x + 3$



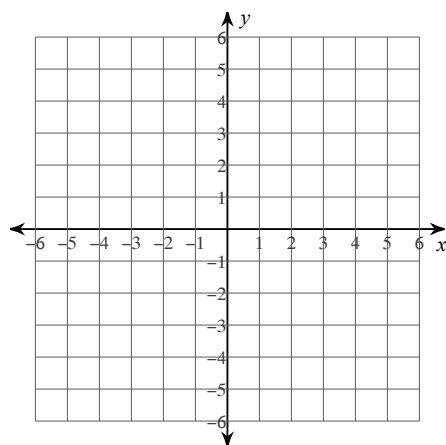
8) $y = -\frac{5}{3}x + 5$



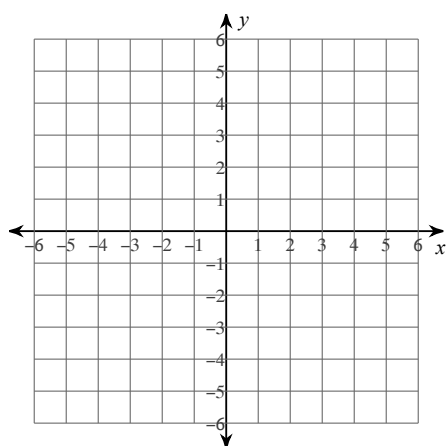
9) $y = 5$



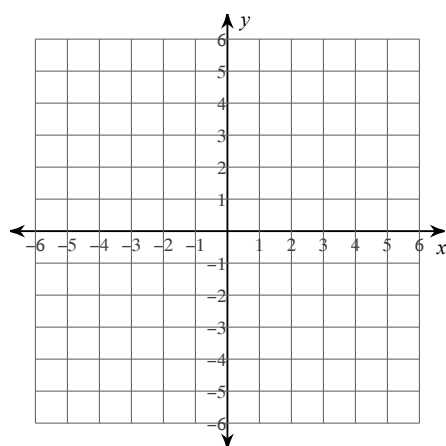
10) $y = -\frac{7}{3}x - 5$



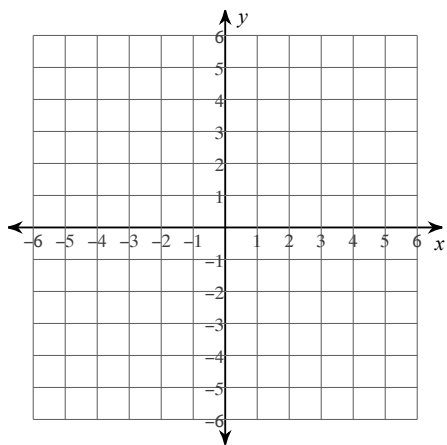
11) $x + 3y = -12$



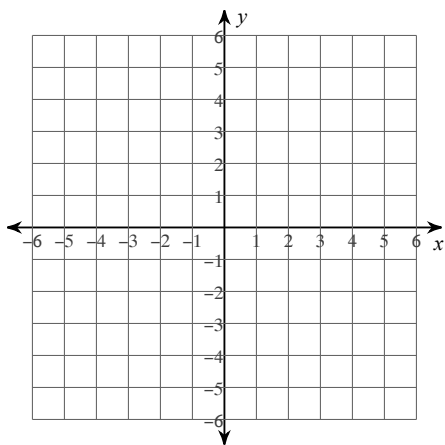
12) $x = 1$



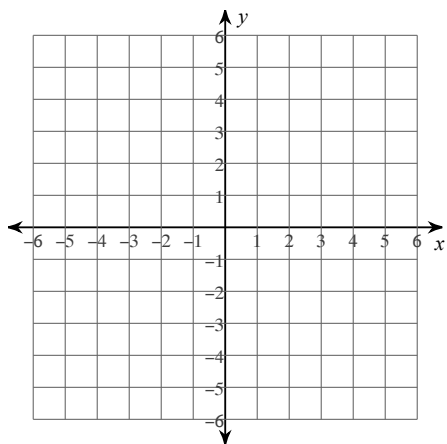
13) $8x - 5y = 25$



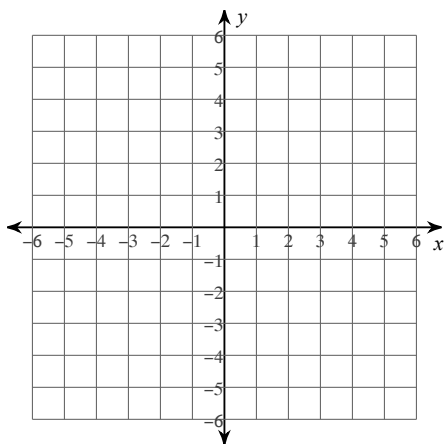
14) $x + 5y = 15$



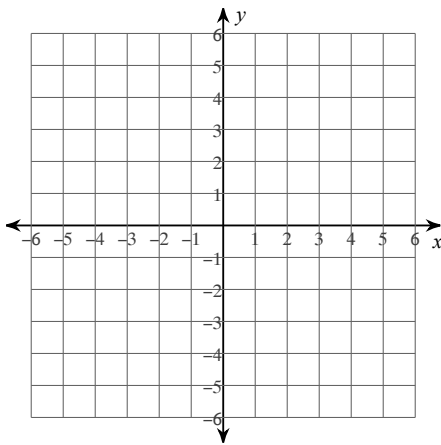
15) $x - 2y = -4$



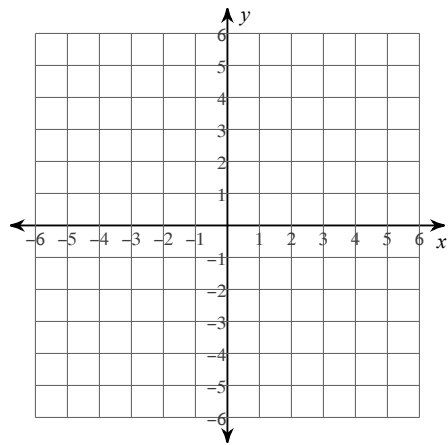
16) $2x - 3y = 0$



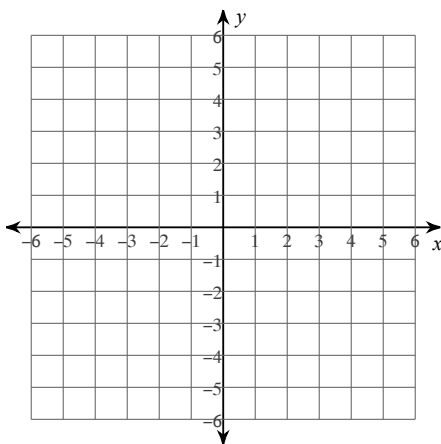
17) $2x + 3y = -12$



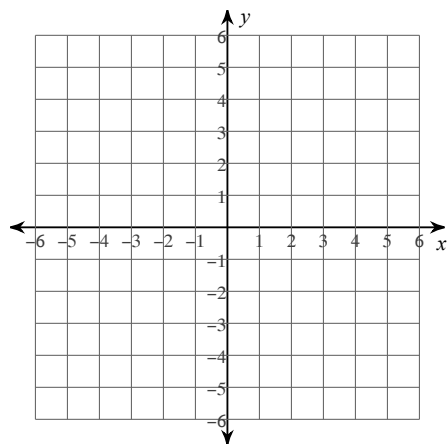
18) $x - 2y = 4$



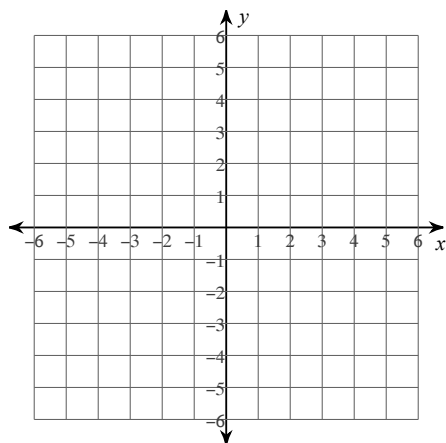
19) $0 = -3 + y - x$



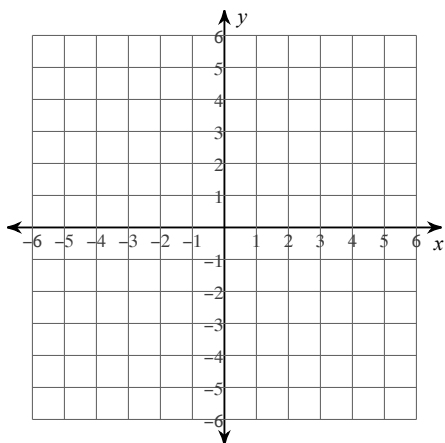
20) $x = 3y - 3$



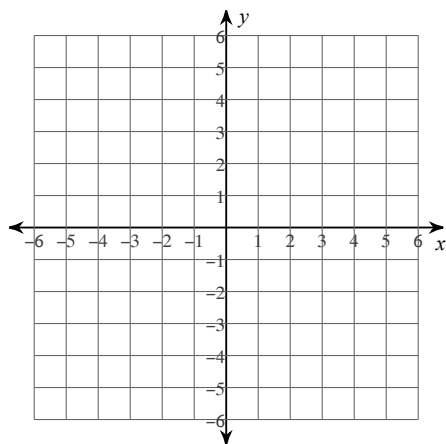
$$21) 5y + 25 = 9x$$



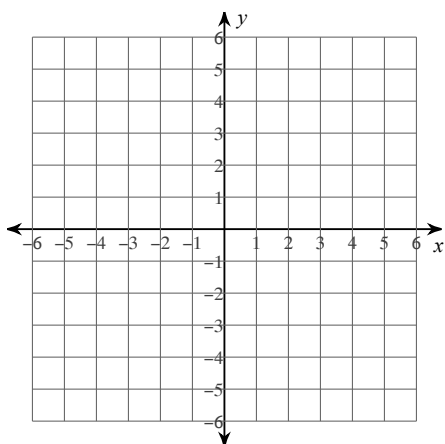
$$22) x = y + 2$$



$$23) -x = 1$$

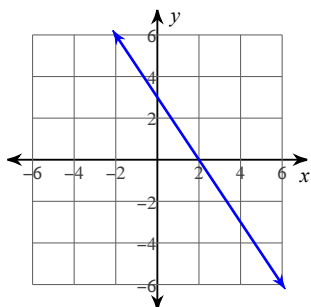


$$24) -3x = -3 - \frac{3}{2}y$$

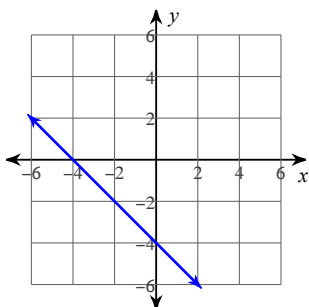


Answers to Graphing lines from equations

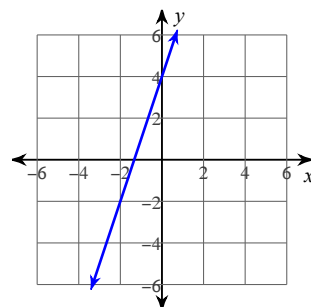
1)



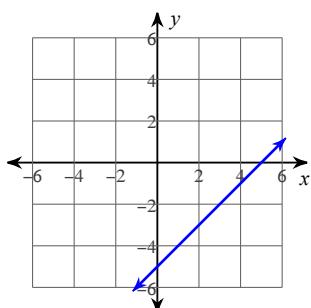
2)



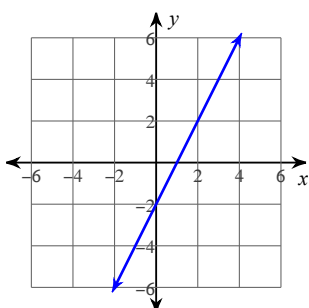
3)



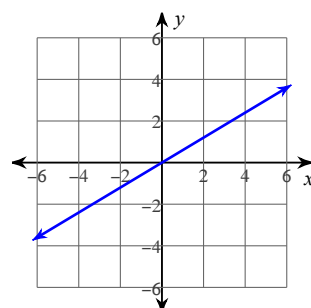
4)



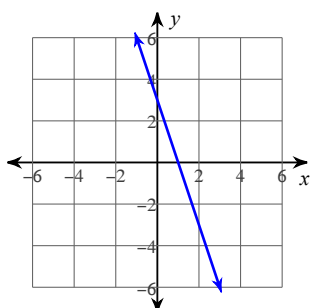
5)



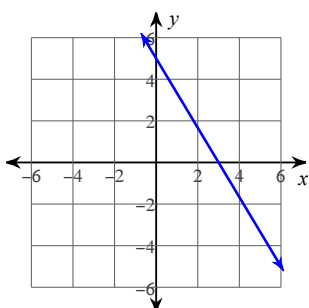
6)



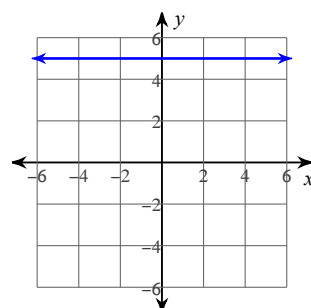
7)



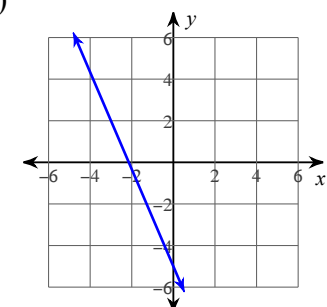
8)



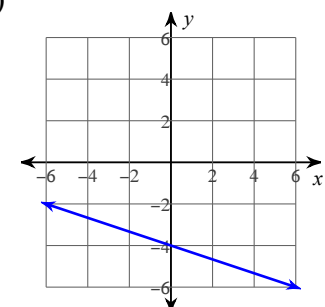
9)



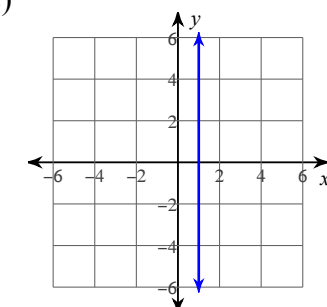
10)



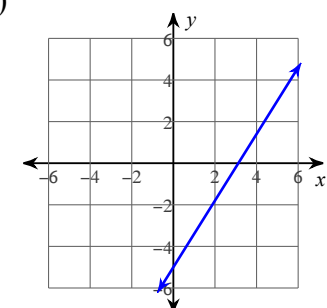
11)



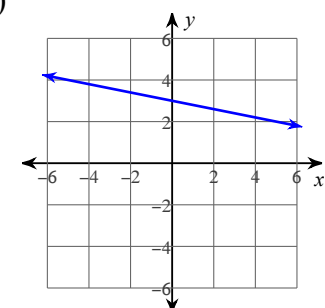
12)



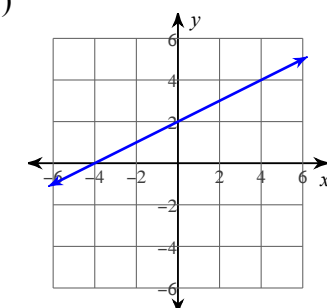
13)



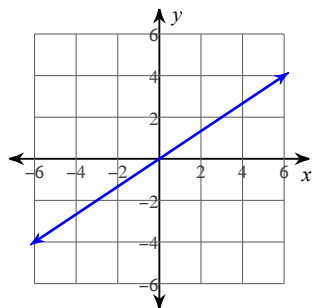
14)



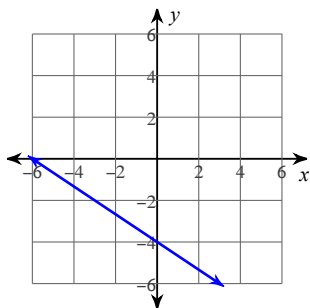
15)



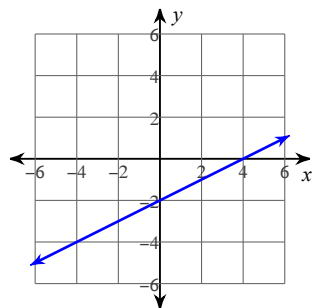
16)



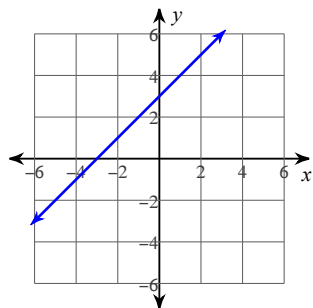
17)



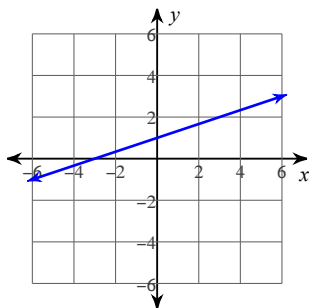
18)



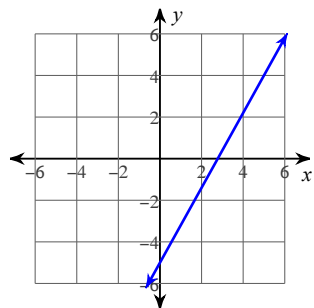
19)



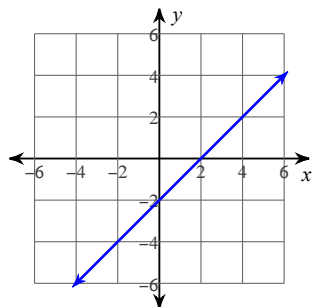
20)



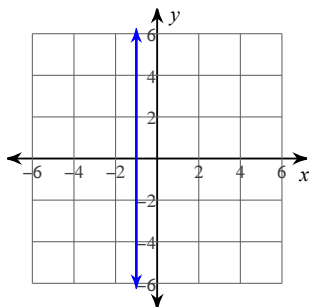
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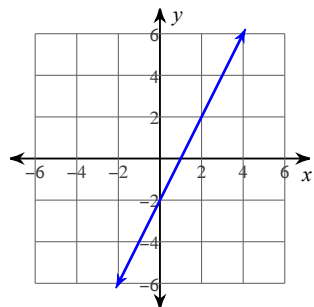
22)



23)



24)

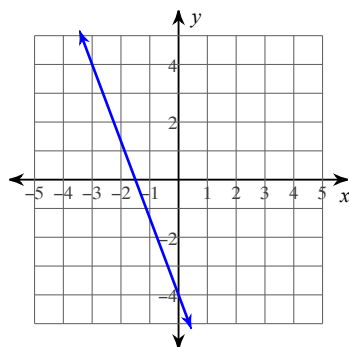


Writing linear equations

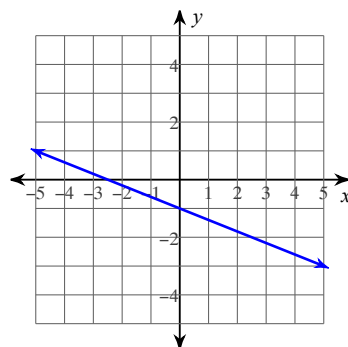
Date _____ Period _____

Write the slope-intercept form of the equation of each line.

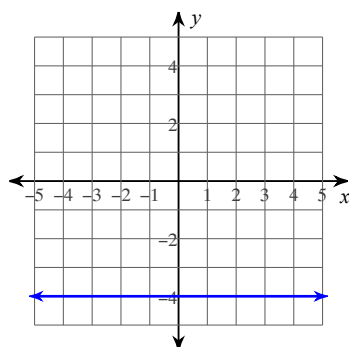
1)



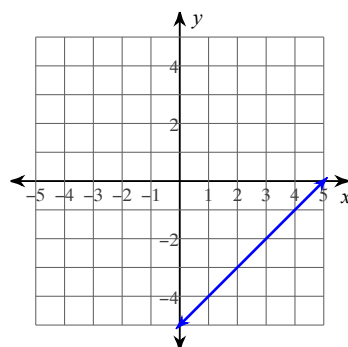
2)



3)



4)



5) $x = -4$

6) $7x + 5y = -6$

7) $y = 2$

8) $11x + 3y = -73$

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

9) through: $(1, -2)$, slope $= -3$

10) through: $(4, -1)$, slope $= \frac{1}{6}$

11) through: $(-5, -3)$, slope $= \frac{1}{6}$

12) through: $(1, 1)$, slope $= 4$

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

13) through: $(-2, -2)$ and $(-4, 3)$

14) through: $(5, 4)$ and $(1, 3)$

15) through: $(5, -3)$ and $(0, -4)$

16) through: $(1, 2)$ and $(-3, -2)$

Write the slope-intercept form of the equation of the line described.

17) through: $(-2, 4)$, parallel to $y = -\frac{1}{5}x - 4$

18) through: $(1, -5)$, parallel to $y = -3x + 5$

19) through: $(-1, -5)$, parallel to $y = 3x + 2$

20) through: $(-3, 4)$, parallel to $y = -\frac{7}{3}x - 5$

21) through: $(-5, 2)$, perp. to $y = -3$

22) through: $(-5, 2)$, perp. to $y = \frac{5}{6}x - 4$

23) through: $(1, -4)$, perp. to $y = -x + 1$

24) through: $(-1, 1)$, perp. to $y = \frac{1}{3}x - 2$

Answers to Writing linear equations

1) $y = -\frac{8}{3}x - 4$

5) $x = -4$

9) $y = -3x + 1$

13) $y = -\frac{5}{2}x - 7$

17) $y = -\frac{1}{5}x + \frac{18}{5}$

21) $x = -5$

2) $y = -\frac{2}{5}x - 1$

6) $y = -\frac{7}{5}x - \frac{6}{5}$

10) $y = \frac{1}{6}x - \frac{5}{3}$

14) $y = \frac{1}{4}x + \frac{11}{4}$

18) $y = -3x - 2$

22) $y = -\frac{6}{5}x - 4$

3) $y = -4$

7) $y = 2$

11) $y = \frac{1}{6}x - \frac{13}{6}$

15) $y = \frac{1}{5}x - 4$

19) $y = 3x - 2$

23) $y = x - 5$

4) $y = x - 5$

8) $y = -\frac{11}{3}x - \frac{73}{3}$

12) $y = 4x - 3$

16) $y = x + 1$

20) $y = -\frac{7}{3}x - 3$

24) $y = -3x - 2$

Solving Proportions

Date_____ Period____

Solve each proportion.

1) $\frac{10}{8} = \frac{n}{10}$

2) $\frac{7}{5} = \frac{x}{3}$

3) $\frac{9}{6} = \frac{x}{10}$

4) $\frac{7}{n} = \frac{8}{7}$

5) $\frac{4}{3} = \frac{8}{x}$

6) $\frac{7}{b+5} = \frac{10}{5}$

7) $\frac{6}{b-1} = \frac{9}{7}$

8) $\frac{4}{m-8} = \frac{8}{2}$

9) $\frac{5}{6} = \frac{7n+9}{9}$

10) $\frac{4}{9} = \frac{r-3}{6}$

$$11) \frac{7}{9} = \frac{b}{b-10}$$

$$12) \frac{9}{k-7} = \frac{6}{k}$$

$$13) \frac{4}{n+2} = \frac{7}{n}$$

$$14) \frac{n}{n-3} = \frac{2}{3}$$

$$15) \frac{x-3}{x} = \frac{9}{10}$$

$$16) \frac{5}{r-9} = \frac{8}{r+5}$$

$$17) \frac{p+10}{p-7} = \frac{8}{9}$$

$$18) \frac{2}{8} = \frac{n+4}{n-4}$$

$$19) \frac{n-5}{n+8} = \frac{2}{7}$$

$$20) \frac{n-6}{n-7} = \frac{9}{2}$$

Solving Proportions

Date_____ Period____

Solve each proportion.

1) $\frac{10}{8} = \frac{n}{10}$

{12.5}

2) $\frac{7}{5} = \frac{x}{3}$

{4.2}

3) $\frac{9}{6} = \frac{x}{10}$

{15}

4) $\frac{7}{n} = \frac{8}{7}$

{6.13}

5) $\frac{4}{3} = \frac{8}{x}$

{6}

6) $\frac{7}{b+5} = \frac{10}{5}$

{-1.5}

7) $\frac{6}{b-1} = \frac{9}{7}$

{5.67}

8) $\frac{4}{m-8} = \frac{8}{2}$

{9}

9) $\frac{5}{6} = \frac{7n+9}{9}$

{-0.21}

10) $\frac{4}{9} = \frac{r-3}{6}$

{5.67}

$$11) \frac{7}{9} = \frac{b}{b-10}$$

$$\{-35\}$$

$$12) \frac{9}{k-7} = \frac{6}{k}$$

$$\{-14\}$$

$$13) \frac{4}{n+2} = \frac{7}{n}$$

$$\{-4.67\}$$

$$14) \frac{n}{n-3} = \frac{2}{3}$$

$$\{-6\}$$

$$15) \frac{x-3}{x} = \frac{9}{10}$$

$$\{30\}$$

$$16) \frac{5}{r-9} = \frac{8}{r+5}$$

$$\{32.33\}$$

$$17) \frac{p+10}{p-7} = \frac{8}{9}$$

$$\{-146\}$$

$$18) \frac{2}{8} = \frac{n+4}{n-4}$$

$$\{-6.67\}$$

$$19) \frac{n-5}{n+8} = \frac{2}{7}$$

$$\{10.2\}$$

$$20) \frac{n-6}{n-7} = \frac{9}{2}$$

$$\{7.29\}$$

Simplifying Square Roots

Date _____ Period _____

Simplify.

1) $\sqrt{96}$

2) $\sqrt{216}$

3) $\sqrt{98}$

4) $\sqrt{18}$

5) $\sqrt{72}$

6) $\sqrt{144}$

7) $\sqrt{45}$

8) $\sqrt{175}$

9) $\sqrt{343}$

10) $\sqrt{12}$

11) $10\sqrt{96}$

12) $9\sqrt{245}$

13) $7\sqrt{600}$

14) $5\sqrt{45}$

15) $5\sqrt{180}$

16) $3\sqrt{405}$

17) $2\sqrt{36}$

18) $9\sqrt{125}$

19) $8\sqrt{27}$

20) $12\sqrt{1764}$

21) $3\sqrt{900}$

22) $7\sqrt{2535}$

23) $11\sqrt{1215}$

24) $2\sqrt{200}$

Simplifying Square Roots

Date _____ Period _____

Simplify.

$$1) \sqrt{96}$$
$$4\sqrt{6}$$

$$2) \sqrt{216}$$
$$6\sqrt{6}$$

$$3) \sqrt{98}$$
$$7\sqrt{2}$$

$$4) \sqrt{18}$$
$$3\sqrt{2}$$

$$5) \sqrt{72}$$
$$6\sqrt{2}$$

$$6) \sqrt{144}$$
$$12$$

$$7) \sqrt{45}$$
$$3\sqrt{5}$$

$$8) \sqrt{175}$$
$$5\sqrt{7}$$

$$9) \sqrt{343}$$
$$7\sqrt{7}$$

$$10) \sqrt{12}$$
$$2\sqrt{3}$$

$$11) 10\sqrt{96}$$
$$40\sqrt{6}$$

$$12) 9\sqrt{245}$$
$$63\sqrt{5}$$

$$13) 7\sqrt{600}$$
$$70\sqrt{6}$$

$$14) 5\sqrt{45}$$
$$15\sqrt{5}$$

$$15) 5\sqrt{180}$$
$$30\sqrt{5}$$

$$16) 3\sqrt{405}$$
$$27\sqrt{5}$$

$$17) 2\sqrt{36}$$
$$12$$

$$18) 9\sqrt{125}$$
$$45\sqrt{5}$$

$$19) 8\sqrt{27}$$
$$24\sqrt{3}$$

$$20) 12\sqrt{1764}$$
$$504$$

$$21) 3\sqrt{900}$$
$$90$$

$$22) 7\sqrt{2535}$$
$$91\sqrt{15}$$

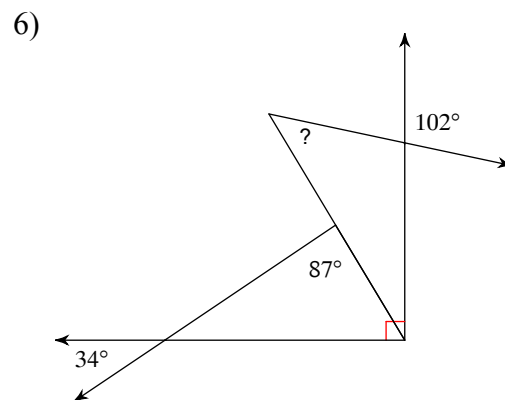
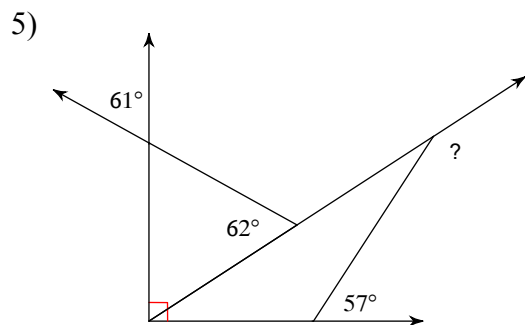
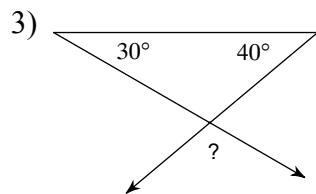
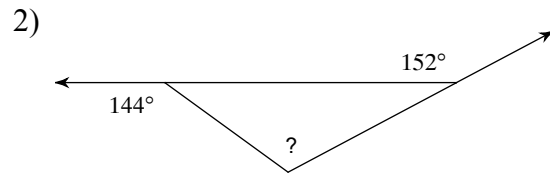
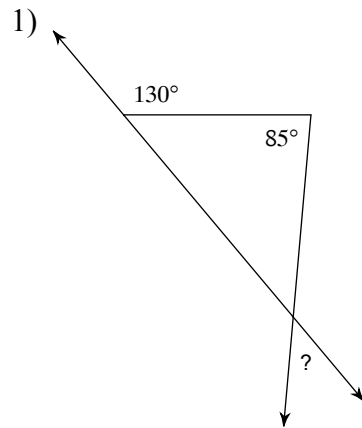
$$23) 11\sqrt{1215}$$
$$99\sqrt{15}$$

$$24) 2\sqrt{200}$$
$$20\sqrt{2}$$

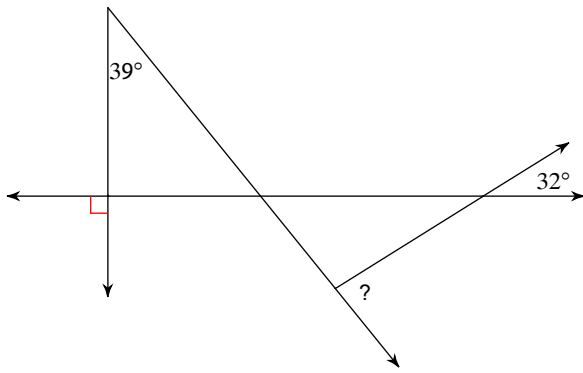
Triangle Sum & Pythagorean Theorems

Date _____ Period _____

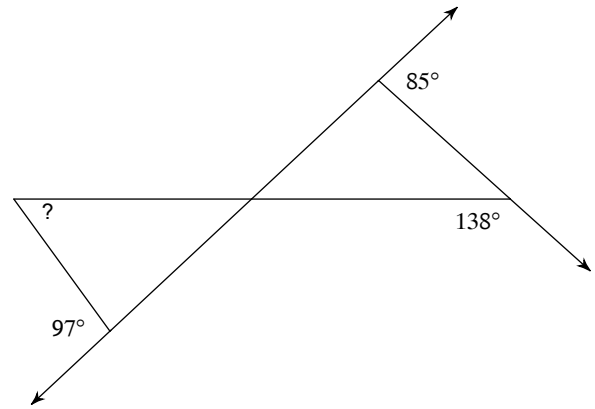
Find the measure of each angle indicated.



7)

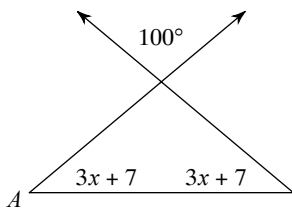


8)

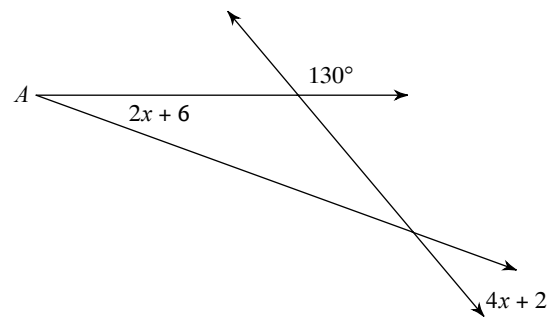


Find the measure of angle A.

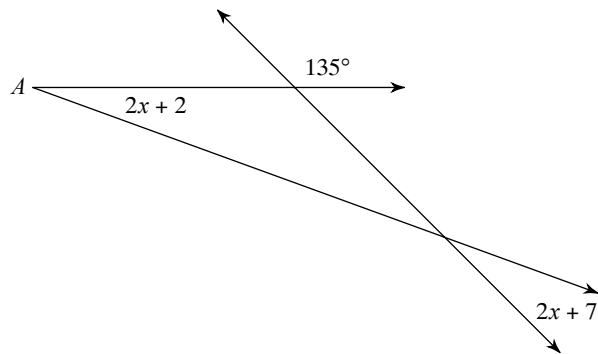
9)



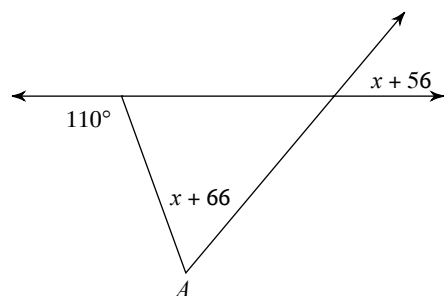
10)



11)

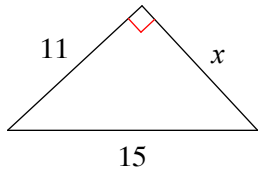


12)

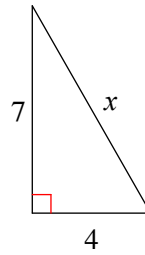


Find the missing side of each triangle. Leave your answers in simplest radical form.

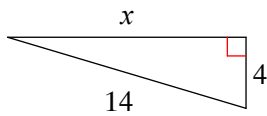
13)



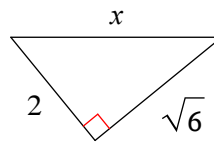
14)



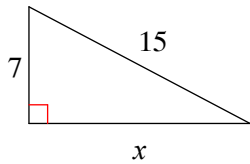
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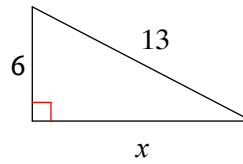
16)



17)



18)



Find the missing side of each right triangle. Side c is the hypotenuse. Sides a and b are the legs. Leave your answers in simplest radical form.

19) $b = 7$, $c = 15$

20) $a = 2$, $c = 4$

21) $a = 15$, $b = 6$

22) $a = 6$, $b = 4$

23) $b = 14$, $c = \sqrt{257}$

24) $a = 2$, $b = \sqrt{6}$

Answers to Triangle Sum & Pythagorean Theorems (ID: 1)

1) 45°

5) 156°

9) 40°

13) $2\sqrt{26}$

17) $4\sqrt{11}$

21) $3\sqrt{29}$

2) 116°

6) 47°

10) 20°

14) $\sqrt{65}$

18) $\sqrt{133}$

22) $2\sqrt{13}$

3) 110°

7) 83°

11) 20°

15) $6\sqrt{5}$

19) $4\sqrt{11}$

23) $\sqrt{61}$

4) 69°

8) 54°

12) 60°

16) $\sqrt{10}$

20) $2\sqrt{3}$

24) $\sqrt{10}$

Properties of Exponents - Basic

Date_____ Period____

Simplify. Your answer should contain only positive exponents.

1) $2m^2 \cdot 2m^3$

2) $m^4 \cdot 2m^{-3}$

3) $4r^{-3} \cdot 2r^2$

4) $4n^4 \cdot 2n^{-3}$

5) $2k^4 \cdot 4k$

6) $2x^3y^{-3} \cdot 2x^{-1}y^3$

7) $2y^2 \cdot 3x$

8) $4v^3 \cdot vu^2$

9) $4a^3b^2 \cdot 3a^{-4}b^{-3}$

10) $x^2y^{-4} \cdot x^3y^2$

11) $(x^2)^0$

12) $(2x^2)^{-4}$

13) $(4r^0)^4$

14) $(4a^3)^2$

15) $(3k^4)^4$

16) $(4xy)^{-1}$

$$17) (2b^4)^{-1}$$

$$18) (x^2y^{-1})^2$$

$$19) (2x^4y^{-3})^{-1}$$

$$20) (3m)^{-2}$$

$$21) \frac{r^2}{2r^3}$$

$$22) \frac{x^{-1}}{4x^4}$$

$$23) \frac{3n^4}{3n^3}$$

$$24) \frac{m^4}{2m^4}$$

$$25) \frac{3m^{-4}}{m^3}$$

$$26) \frac{2x^4y^{-4}z^{-3}}{3x^2y^{-3}z^4}$$

$$27) \frac{4x^0y^{-2}z^3}{4x}$$

$$28) \frac{2h^3j^{-3}k^4}{3jk}$$

$$29) \frac{4m^4n^3p^3}{3m^2n^2p^4}$$

$$30) \frac{3x^3y^{-1}z^{-1}}{x^{-4}y^0z^0}$$

Properties of Exponents

Date _____ Period _____

Simplify. Your answer should contain only positive exponents.

1) $2m^2 \cdot 2m^3$

$4m^5$

2) $m^4 \cdot 2m^{-3}$

$2m$

3) $4r^{-3} \cdot 2r^2$

$\frac{8}{r}$

4) $4n^4 \cdot 2n^{-3}$

$8n$

5) $2k^4 \cdot 4k$

$8k^5$

6) $2x^3y^{-3} \cdot 2x^{-1}y^3$

$4x^2$

7) $2y^2 \cdot 3x$

$6y^2x$

8) $4v^3 \cdot vu^2$

$4v^4u^2$

9) $4a^3b^2 \cdot 3a^{-4}b^{-3}$

$\frac{12}{ab}$

10) $x^2y^{-4} \cdot x^3y^2$

$\frac{x^5}{y^2}$

11) $(x^2)^0$

1

12) $(2x^2)^{-4}$

$\frac{1}{16x^8}$

13) $(4r^0)^4$

256

14) $(4a^3)^2$

$16a^6$

15) $(3k^4)^4$

$81k^{16}$

16) $(4xy)^{-1}$

$\frac{1}{4xy}$

$$17) (2b^4)^{-1}$$

$$\frac{1}{2b^4}$$

$$18) (x^2y^{-1})^2$$

$$\frac{x^4}{y^2}$$

$$19) (2x^4y^{-3})^{-1}$$

$$\frac{y^3}{2x^4}$$

$$20) (3m)^{-2}$$

$$\frac{1}{9m^2}$$

$$21) \frac{r^2}{2r^3}$$

$$\frac{1}{2r}$$

$$22) \frac{x^{-1}}{4x^4}$$

$$\frac{1}{4x^5}$$

$$23) \frac{3n^4}{3n^3}$$

$$n$$

$$24) \frac{m^4}{2m^4}$$

$$\frac{1}{2}$$

$$25) \frac{3m^{-4}}{m^3}$$

$$\frac{3}{m^7}$$

$$26) \frac{2x^4y^{-4}z^{-3}}{3x^2y^{-3}z^4}$$

$$\frac{2x^2}{3yz^7}$$

$$27) \frac{4x^0y^{-2}z^3}{4x}$$

$$\frac{z^3}{y^2x}$$

$$28) \frac{2h^3j^{-3}k^4}{3jk}$$

$$\frac{2h^3k^3}{3j^4}$$

$$29) \frac{4m^4n^3p^3}{3m^2n^2p^4}$$

$$\frac{4m^2n}{3p}$$

$$30) \frac{3x^3y^{-1}z^{-1}}{x^{-4}y^0z^0}$$

$$\frac{3x^7}{yz}$$

Multiplying Binomials and Polynomials: The Distributive Property and FOIL**Use the distributive property or the FOIL technique to determine the following products.**

1) $5k(3k + 3)$

2) $7(5v + 4)$

3) $4a^2(7a - 5)$

4) $3a^3(3a + 7)$

5) $(2m + 4)(7m - 4)$

6) $(6n - 5)^2$

7) $(8b + 7)^2$

8) $(3v + 3)(v - 2)$

9) $(8n - 4)(3n + 5)$

10) $(7n - 6)(8n + 3)$

11) $(2n + 1)(7n + 2)$

12) $(2n + 2)^2$

13) $(4m - 3)(4m - 5)$

14) $(7x + 8)(4x - 5)$

15) $(5n - 5)(5n^2 + 2n + 3)$

16) $(7v + 3)(5v^2 - 5v + 2)$

17) $(5b + 4)(b^2 + 8b - 2)$

18) $(7p + 6)(7p^2 + 4p - 1)$

Answers to Multiplying Binomials and Polynomials: The Distributive Property and FOIL

- | | | | |
|-----------------------------|------------------------------|-------------------------------|---------------------|
| 1) $15k^2 + 15k$ | 2) $35v + 28$ | 3) $28a^3 - 20a^2$ | 4) $9a^4 + 21a^3$ |
| 5) $14m^2 + 20m - 16$ | 6) $36n^2 - 60n + 25$ | 7) $64b^2 + 112b + 49$ | 8) $3v^2 - 3v - 6$ |
| 9) $24n^2 + 28n - 20$ | 10) $56n^2 - 27n - 18$ | 11) $14n^2 + 11n + 2$ | 12) $4n^2 + 8n + 4$ |
| 13) $16m^2 - 32m + 15$ | 14) $28x^2 - 3x - 40$ | 15) $25n^3 - 15n^2 + 5n - 15$ | |
| 16) $35v^3 - 20v^2 - v + 6$ | 17) $5b^3 + 44b^2 + 22b - 8$ | 18) $49p^3 + 70p^2 + 17p - 6$ | |

Multiplying Binomials: Special Products Shortcuts**Find each product.**

1) $(x + 5)(x - 5)$

2) $(n - 1)(n + 1)$

3) $(p - 1)^2$

4) $(x - 3)(x + 3)$

5) $(x - 4)^2$

6) $(n + 3)^2$

7) $(x - 5)(x + 5)$

8) $(n - 5)^2$

9) $(2k^2 + 1)^2$

10) $(8a^2 + 4)(8a^2 - 4)$

11) $(2 + 5n^2)^2$

12) $(3x - 7)(3x + 7)$

$$13) (3 + 7v^2)(3 - 7v^2)$$

$$14) (7v^2 - 6)(7v^2 + 6)$$

$$15) (2 + v)^2$$

$$16) (6v + 3)(6v - 3)$$

$$17) (8a^2 - 2)(8a^2 + 2)$$

$$18) (4a + 7)^2$$

$$19) (2n - 7)^2$$

$$20) (-m + 5n)(-m - 5n)$$

$$21) (7u + 4v)(7u - 4v)$$

$$22) (-y - 3x)(-y + 3x)$$

$$23) (-9x^2 - 10y)^2$$

$$24) (4u + 9v)^2$$

$$25) (7u + 6v)(7u - 6v)$$

$$26) (-6x - 7y^2)^2$$

Multiplying Binomials: Special Products Shortcuts**Find each product.**

1) $(x + 5)(x - 5)$

$x^2 - 25$

2) $(n - 1)(n + 1)$

$n^2 - 1$

3) $(p - 1)^2$

$p^2 - 2p + 1$

4) $(x - 3)(x + 3)$

$x^2 - 9$

5) $(x - 4)^2$

$x^2 - 8x + 16$

6) $(n + 3)^2$

$n^2 + 6n + 9$

7) $(x - 5)(x + 5)$

$x^2 - 25$

8) $(n - 5)^2$

$n^2 - 10n + 25$

9) $(2k^2 + 1)^2$

$4k^4 + 4k^2 + 1$

10) $(8a^2 + 4)(8a^2 - 4)$

$64a^4 - 16$

11) $(2 + 5n^2)^2$

$4 + 20n^2 + 25n^4$

12) $(3x - 7)(3x + 7)$

$9x^2 - 49$

$$13) (3 + 7v^2)(3 - 7v^2)$$

$$9 - 49v^4$$

$$14) (7v^2 - 6)(7v^2 + 6)$$

$$49v^4 - 36$$

$$15) (2 + v)^2$$

$$4 + 4v + v^2$$

$$16) (6v + 3)(6v - 3)$$

$$36v^2 - 9$$

$$17) (8a^2 - 2)(8a^2 + 2)$$

$$64a^4 - 4$$

$$18) (4a + 7)^2$$

$$16a^2 + 56a + 49$$

$$19) (2n - 7)^2$$

$$4n^2 - 28n + 49$$

$$20) (-m + 5n)(-m - 5n)$$

$$m^2 - 25n^2$$

$$21) (7u + 4v)(7u - 4v)$$

$$49u^2 - 16v^2$$

$$22) (-y - 3x)(-y + 3x)$$

$$y^2 - 9x^2$$

$$23) (-9x^2 - 10y)^2$$

$$81x^4 + 180x^2y + 100y^2$$

$$24) (4u + 9v)^2$$

$$16u^2 + 72uv + 81v^2$$

$$25) (7u + 6v)(7u - 6v)$$

$$49u^2 - 36v^2$$

$$26) (-6x - 7y^2)^2$$

$$36x^2 + 84xy^2 + 49y^4$$

Factoring I: GCF / Perfect Square Trinomial / Difference of Two Perfect Squares**Factor the common factor out of each expression.**

1) $14p^2 - 63p$

2) $64p^4 + 8p^3$

3) $4v^4 - 14v^3$

4) $-30x^3 - 35$

5) $35x + 42x^2 + 35x^4$

6) $-63 - 14x + 35x^7$

7) $81n^3 + 63n + 63$

8) $-15b^{10} - 6b^6 - 27b^5$

Factor completely each of the perfect square trinomials below.

9) $x^2 - 4x + 4$

10) $4r^2 + 20r + 25$

11) $16n^2 + 40n + 25$

12) $9x^2 + 12x + 4$

13) $9r^2 - 12r + 4$

14) $1 + 2m + m^2$

15) $25n^2 - 20n + 4$

16) $1 + 2r + r^2$

Each of the following polynomials represents the difference of two perfect squares. Factor them completely.

17) $9x^2 - 4$

18) $16a^2 - 1$

19) $x^2 - 25$

20) $25a^2 - 4$

21) $4n^2 - 25$

22) $25x^2 - 1$

23) $r^2 - 1$

24) $9v^2 - 1$

Each of the following polynomials can only be factored completely if the GCF is first factored out. Factor them completely. Remember to show all work!

25) $18v^2 + 12v + 2$

26) $32x^2 - 16x + 2$

27) $2p^2 - 50$

28) $4b^2 - 24b + 36$

29) $5p^2 - 45$

30) $16x^2 - 36$

31) $125n^2 + 50n + 5$

32) $64a^2 - 4$

33) $48p^2 - 3$

34) $4r^2 - 32r + 64$

35) $50x^2 + 60x + 18$

36) $32k^2 - 2$

Answers to Factoring I: GCF / Perfect Square Trinomial / Difference of Two Perfect Squares

- | | | | |
|-------------------------|-------------------------|-----------------------|---------------------------|
| 1) $7p(2p - 9)$ | 2) $8p^3(8p + 1)$ | 3) $2v^3(2v - 7)$ | 4) $-5(6x^3 + 7)$ |
| 5) $7x(5 + 6x + 5x^3)$ | 6) $7(-9 - 2x + 5x^7)$ | 7) $9(9n^3 + 7n + 7)$ | 8) $-3b^5(5b^5 + 2b + 9)$ |
| 9) $(x - 2)^2$ | 10) $(2r + 5)^2$ | 11) $(4n + 5)^2$ | 12) $(3x + 2)^2$ |
| 13) $(3r - 2)^2$ | 14) $(-1 - m)^2$ | 15) $(5n - 2)^2$ | 16) $(1 + r)^2$ |
| 17) $(3x + 2)(3x - 2)$ | 18) $(4a + 1)(4a - 1)$ | 19) $(x + 5)(x - 5)$ | 20) $(5a + 2)(5a - 2)$ |
| 21) $(2n + 5)(2n - 5)$ | 22) $(5x + 1)(5x - 1)$ | 23) $(r + 1)(r - 1)$ | 24) $(3v + 1)(3v - 1)$ |
| 25) $2(3v + 1)^2$ | 26) $2(4x - 1)^2$ | 27) $2(p + 5)(p - 5)$ | 28) $4(b - 3)^2$ |
| 29) $5(p + 3)(p - 3)$ | 30) $4(2x + 3)(2x - 3)$ | 31) $5(5n + 1)^2$ | 32) $4(4a + 1)(4a - 1)$ |
| 33) $3(4p + 1)(4p - 1)$ | 34) $4(r - 4)^2$ | 35) $2(5x + 3)^2$ | 36) $2(4k + 1)(4k - 1)$ |

Factoring II: Factoring by Grouping / Factoring expressions like x^2+bx+c **Factor each polynomial completely by grouping. Remember to always factor out the GCF first and show your work!**

1) $35b^3 + 28b^2 + 25b + 20$

2) $49x^3 + 21x^2 + 35x + 15$

3) $25p^3 + 40p^2 + 35p + 56$

4) $v^3 - 7v^2 + 3v - 21$

5) $14b^3 + 10b^2 + 35b + 25$

6) $6n^3 - 14n^2 + 15n - 35$

7) $100x^3 - 60x^2 - 20x + 12$

8) $10n^3 + 25n^2 - 50n - 125$

$$9) 8m^3 + 20m^2 - 12m - 30$$

$$10) 18r^3 + 45r^2 - 12r - 30$$

$$11) 30n^3 - 20n^2 + 6n - 4$$

$$12) 6k^3 - 4k^2 + 6k - 4$$

Factor completely each of the following polynomials. Remember to always factor out the GCF first and show your work!

$$13) n^2 + 14n + 40$$

$$14) m^2 + 10m + 16$$

$$15) n^2 + 16n + 60$$

$$16) b^2 + 4b - 45$$

$$17) n^2 + 14n + 48$$

$$18) 5x^2 + 10x - 175$$

19) $4p^2 + 32p + 48$

20) $3n^2 - 42n + 144$

21) $3x^2 - 12x - 15$

22) $3n^2 + 24n + 36$

23) $4n^2 - 24n - 28$

24) $3v^2 - 9v - 84$

25) $6r^2 + 48r + 72$

26) $2x^2 + 12x + 16$

27) $2n^2 + 26n + 60$

The following polynomials are of mixed format. Some have common factors for which you will need to first factor out the GCF. In any case, factor completely each of the following polynomials. Show all of your work!

28) $3a^2 - 15a - 72$

29) $2x^2 + 28x + 90$

30) $4x^2 - 60x + 216$

31) $4p^2 - 8p - 96$

32) $4x^2 - 4x - 360$

33) $5n^2 - 80n + 300$

34) $5n^2 - 90n + 400$

35) $2k^2 + 28k + 80$

36) $6n^2 + 24n - 270$

37) $3b^2 - 45b + 150$

Answers to Factoring II: Factoring by Grouping / Factoring expressions like x^2+bx+c

- | | | | |
|--------------------------|---------------------------|---------------------------|--------------------------|
| 1) $(7b^2 + 5)(5b + 4)$ | 2) $(7x^2 + 5)(7x + 3)$ | 3) $(5p^2 + 7)(5p + 8)$ | 4) $(v^2 + 3)(v - 7)$ |
| 5) $(2b^2 + 5)(7b + 5)$ | 6) $(2n^2 + 5)(3n - 7)$ | 7) $4(5x^2 - 1)(5x - 3)$ | 8) $5(n^2 - 5)(2n + 5)$ |
| 9) $2(2m^2 - 3)(2m + 5)$ | 10) $3(3r^2 - 2)(2r + 5)$ | 11) $2(5n^2 + 1)(3n - 2)$ | 12) $2(k^2 + 1)(3k - 2)$ |
| 13) $(n + 4)(n + 10)$ | 14) $(m + 2)(m + 8)$ | 15) $(n + 10)(n + 6)$ | 16) $(b + 9)(b - 5)$ |
| 17) $(n + 6)(n + 8)$ | 18) $5(x + 7)(x - 5)$ | 19) $4(p + 2)(p + 6)$ | 20) $3(n - 6)(n - 8)$ |
| 21) $3(x + 1)(x - 5)$ | 22) $3(n + 6)(n + 2)$ | 23) $4(n + 1)(n - 7)$ | 24) $3(v + 4)(v - 7)$ |
| 25) $6(r + 6)(r + 2)$ | 26) $2(x + 2)(x + 4)$ | 27) $2(n + 10)(n + 3)$ | 28) $3(a - 8)(a + 3)$ |
| 29) $2(x + 9)(x + 5)$ | 30) $4(x - 6)(x - 9)$ | 31) $4(p - 6)(p + 4)$ | 32) $4(x - 10)(x + 9)$ |
| 33) $5(n - 10)(n - 6)$ | 34) $5(n - 8)(n - 10)$ | 35) $2(k + 10)(k + 4)$ | 36) $6(n + 9)(n - 5)$ |
| 37) $3(b - 5)(b - 10)$ | | | |