

Simplify.

1) $(1/4)^{-1} =$

2) $(4.5)^0 =$

3) $2^3 \cdot 3^2 =$

4) $\frac{10^5}{10} =$

5) $[(11^2)^5]^3 =$

6) $5^{12} = (5^3)^x$, $X = \underline{\hspace{2cm}}$

7) $\frac{X^5 Y^{-6} X^{-7}}{Y^{-3} Y^{-8}} =$

8) $\frac{D^8 C^{-3} A^{-2}}{A^0 D^{-7} C^2} =$

9) $(-2/3)^3 =$

10) $-(1/5)^3 =$

Multiply all the elements of the equation by the least common multiple to simplify, then solve.

11) $\frac{2}{3}X + \frac{1}{4}X - \frac{1}{2} = 0$

12) $1.3 - .6F - .07 = 0$

13) $\frac{3}{4} + \frac{1}{3}Q = 1\frac{5}{6}$

14) $.2X - .03 = .97$

Find the greatest common factor and simplify the expression using parentheses.

15) $27Q - 54XQ =$

16) $A^2 B + A^4 B^2 =$

Use the distributive property to eliminate the parentheses.

17) $2/3(6Y^2 + 15Y - 9) =$

18) $X^2(XY + X^3) =$

Solve.

19) $-4^2 + (7 - 2)^2 - |-2| =$

20) $6(10 - 3) - 5(8) + 9 \div 2 =$

In numbers 1 & 2 tell whether the equation is correct or incorrect. If incorrect show what is correct.

$$1) \frac{3}{X+1} = \frac{2}{X+1} + \frac{3^0}{X+1}$$

$$2) \frac{5}{X-5} = \frac{7}{X-5} - \frac{2}{X-5}$$

Simplify the expression.

$$3) \frac{YX + Y^2X}{YX} =$$

$$4) \frac{16X^2 + 24X}{8X} =$$

$$5) \frac{25Y - 15}{10} =$$

Find the common denominator and combine.

$$6) \frac{3}{Y} - \frac{Z}{X} =$$

$$7) \frac{2}{X+1} + \frac{3X}{X-1} =$$

$$8) \frac{1}{2} - \frac{X}{Y} =$$

Simplify.

$$9) X^0 \div X^3 =$$

$$10) \left(\frac{2}{3}\right)^{-3} =$$

$$11) (X^4)^{-1} =$$

$$12) [(2^2)^{-2}]^{-2} =$$

$$13) (R^{-2}S^3)^{-3} =$$

$$14) (P^3)^0(P^4P^{-1})^2 =$$

Multiply all the elements of the equation by the least common multiple to simplify, then solve.

$$15) .14 - .023 = .07C$$

$$16) 2\frac{3}{5}D - \frac{3}{8}D = 4\frac{7}{10}$$

Find the greatest common factor and simplify the expression using parentheses.

$$17) 10^2ABC + 50A^2C =$$

$$18) 98C + 196 - 7^2A =$$

Solve.

$$19) 5 \cdot 3 - 4^0 + 15^2 - X = 0$$

$$20) 2X + 4 \cdot 8 + 9 - 3(X-2) = 4X$$

Change to scientific notation.

1) 32

2) .0000047

3) .00058

4) 290,000,000

Multiply using scientific notation.

5) $(32)(290,000,000) =$

6) $(.0000047)(.00058) =$

Divide using scientific notation.

7) $(32) \div (290,000,000) =$

8) $(.00058) \div (32) =$

Combine like terms.

9) $\frac{7X^{-1}}{Y^2} - \frac{10X^2Y}{Y^0X^1Y^{-1}} - \frac{4X^2Y^3}{X^2 X^{-1}Y}$

10) $\frac{8YYX^{-1}}{Y^{-1}X^{-2}} - \frac{6X^3X^{-2}X^0}{Y^{-2}Y^{-1}}$

11) $\frac{2A}{B^2} - \frac{A^{-1}B}{BA^{-2}} - \frac{4AB}{A^0B^{-1}}$

12) $5A^{-2}BA + 6A^{-1}B^{-1} + 3A^3BA^{-2}A^{-2}$

Simplify.

13) $\frac{9AB - 12A^2B^2}{3AB} =$

14) $\frac{10X^2 + 15XY + 5Y^2}{5X} =$

Find the common denominator and combine.

15) $\frac{X^2}{Y} + \frac{Y^2}{3X} =$

16) $\frac{2}{9} + \frac{4}{Q} =$

Simplify.

17) $(8^0)^5$

18) $\frac{X^4Y^5X^0}{X^{-2}Y^3Y^{-1}}$

Distribute.

19) $-3^{-1}X^{-3} - Y^0 (Y^4 - 6X^{-1}Y^3) =$

20) $\frac{X^3Y}{Y^2} \left(\frac{X}{XY} + \frac{4Y^2}{X^3} \right) =$

Simplify.

$$1) \frac{1}{5}\sqrt{225X^6} =$$

$$2) 2\sqrt{7} - 5\sqrt{7} =$$

$$3) (10\sqrt{20})(3\sqrt{5}) =$$

$$4) \sqrt{11}(2\sqrt{12} + 5\sqrt{13}) =$$

$$5) \frac{\sqrt{200}}{\sqrt{8}} =$$

$$6) \frac{\sqrt{45}}{\sqrt{15}} =$$

$$7) 7\sqrt{128} =$$

$$8) \frac{3}{4}\sqrt{24} =$$

$$9) \frac{6\sqrt{2}}{\sqrt{5}} =$$

$$10) \frac{1}{\sqrt{8}} + \frac{1}{\sqrt{10}} =$$

Solve using scientific notation.

$$11) (.086)(.93) =$$

$$12) (5,500,000)(.0023) =$$

$$13) (85,000) \div (.00017) =$$

$$14) \frac{(320,000,000)(.0000000022)}{(.00000088)} =$$

Combine like terms.

$$15) 7DEF^{-1}D - 4D^2E^{-2}F^{-1}E^2 - 8DF^{-2}FE =$$

Solve.

$$16) \frac{X+6}{X} - \frac{X-6}{X} = 6$$

Simplify.

$$17) (6AB^2)(-2A^5B)(5A^{-2}B) =$$

$$18) 56X^1Y^4 \div 8X^{-3}Y^2Z =$$

Solve for X.

$$19) \frac{6X}{5} - \frac{2X}{3} = X - 10$$

$$20) \frac{5X-1}{2} = \frac{4X+5}{3} + \frac{X+2}{6}$$

Find the factors.

1) $X^2 - 9X + 18$

2) $X^2 + 11X + 24$

3) $X^2 - 7X + 12$

4) $2X^2 + 17X + 35$

5) $25X^2 - 36$

6) $X^2 - 169$

7) $2X^2 + 5X - 3$

8) $4X^2 + 9X + 2$

Solve the equation by factoring to find the roots, then check your answer in the original equation.

9) $2X^2 + 3X = 98 + 3X$

10) $X^2 = \frac{9}{4} X$

Combine.

11) $\frac{1}{X} - \frac{1}{Y} + \frac{1}{2Y}$

12) $\frac{X+5}{X^2 - 16} + \frac{3-X}{4-X}$

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

14) $\frac{\frac{A}{B} + A}{\frac{2}{B} + \frac{3}{A}}$

Simplify.

15) $\frac{4\sqrt{42}}{\sqrt{7}}$

16) $9\sqrt{125}$

17) $\frac{27}{\sqrt{13}}$

18) $\frac{7}{\sqrt{13}} + \frac{8}{\sqrt{14}}$

Solve using scientific notation.

19) $\frac{(180)(.063)}{(20,000)(.00081)} =$

Reduce.

20) $\frac{X^2 + 5X}{X^2 - 25}$
 $X \neq 5, -5$

Solve.

1) $(8^{1/3})^{-5}$

2) $(25/49)^{-1/2}$

3) $(x^{1/4})^{-3}$

4) $(16/81)^{3/4}$

Rewrite using fraction exponents, then solve.

5) $\sqrt{\sqrt[3]{x^6}}$

6) $(\sqrt[4]{81})^1$

7) $\sqrt{\sqrt{10,000}}$

8) $(\sqrt[6]{64})^2$

Find the factors.

9) $x^2 + 14x + 49$

10) $16x^2 - 8x + 1$

11) $x^2 + 3x - 4$

12) $4x^2 + 4x + 1$

Solve the equation by factoring to find the roots, then check your answer in the original equation.

13) $x + 6 = x^2 + 6x - 18$

14) $-x - x^2 = 12 - 8x$

Combine.

15) $\frac{4}{x-2} - \frac{5}{x-8}$

16) $\frac{x+1}{x+3} - \frac{2x-5}{x^2+7x+12} + \frac{x+2}{x+4}$

Simplify.

17) $\frac{\frac{x}{5} + \frac{4}{7}}{\frac{2x}{5} + x}$

18) $\frac{x^2 - 4}{x^2 - 36} \div \frac{x^3 - 2x^2}{6x - 36} =$

19) $\frac{4}{\sqrt{9}}$

20) $\frac{5}{\sqrt{12}} \cdot \frac{9}{\sqrt{6}} =$

Simplify.

1) $\sqrt{25}$

2) $\sqrt{100}$

3) $\sqrt{16X^2}$

4) $\sqrt{\frac{100}{144}}$

5) $\sqrt{-169} + \sqrt{-225}$

6) $\sqrt{64} + \sqrt{-44}$

Simplify, and combine like terms when possible.

7) $\sqrt{50} + 2\sqrt{125}$

8) $(18i)(-7i)$

9) (i^4)

10) $(8\sqrt{100})(9\sqrt{4})$

Simplify.

11) $(64^{2/3})(4^{3/2})$

12) $(X^{-2})^{-2} (X^3)^0$

Rewrite using fraction exponents, then solve.

13) $(\sqrt{16})^{3/2}$

14) $\sqrt[3]{343}$

Solve the equation by factoring to find the roots, then check your answer in the original equation.

15) $X^2 = 5/2 X - 3/2$

16) $5X + 25X^2 - 16 = 5X - 7$

Simplify.

17) $\frac{5X^2 + 20X - 105}{14X - 70} \div \frac{X^2 + 7X}{3X - 15} =$

18) $\sqrt{\frac{1}{8}} \sqrt{\frac{4}{5}} =$

Solve using scientific notation.

19) $(12,000,000)(1,300)(.000005) =$

20) $\frac{7X^0Y^{-1}}{X^{-2}A^{-1}} - \frac{3X^0}{A^{-1}Y} + \frac{8XY^{-2}A}{Y^{-1}X^{-1}}$

Find the conjugate.

1) $8i + 5$

2) $5 - 2\sqrt{10}$

Multiply.

3) $(X + Yi)(X - Yi)$

4) $\left(\sqrt{3}X + \frac{1}{2}\right)\left(\sqrt{3}X - \frac{1}{2}\right)$

Find the factors.

5) $25X^2 - 1 = 0$

6) Solve for X in #5.

7) $3X^2 - 25 = 0$

8) Solve for X in #7.

Simplify, and combine like terms when possible.

9) $3\sqrt{24} + 4\sqrt{150}$

10) $(-6i)(2\sqrt{100})$

11) $\sqrt{8} - i\sqrt{2}$

12) $i^3 \cdot i^0$

Simplify.

13) $(5^2 + 12^2)^{1/2}$

14) $(\sqrt{625})^{3/2}$

Solve the equation by factoring to find the roots, then check your answer in the original equation.

15) $6X^2 - 12 = -4X + 3X$

16) $5X^2 + 5X = -X^2 + 6$

Simplify.

17) $\frac{X^2+8X+15}{X^2-X-2} \div \frac{-4X-20}{X^2+8X+7}$

18) $2\sqrt{\frac{1}{4X}} + 3\sqrt{\frac{8}{X}}$

19) $\left(\frac{1}{-3X^2X^3Y^{-3}}\right)^{-2}$

20) $\frac{6X + \frac{9}{X}}{5X + 7 + \frac{3}{X}}$

Expand.

1) $(X + 10)^2$

2) $(5X - 1)^2$

Find the binomial roots of the trinomial.

3) $X^2 - 12X + 36$

4) $4X^2 - 12X + 9$

Expand.

5) $(X + 1/4)^3$

6) $(X - 5)^3$

7) $(4X + 1)^3$

8) $(X + 10)^3$

9) The conjugate of $7 + 3i\sqrt{10}$ is _____ ?

10) What are the factors of $4X^2 - 4/25$?

Simplify so that there are no imaginary numbers or radicals in the denominator.

11) $\frac{6\sqrt{A}}{\sqrt{X+2}}$

12) $\frac{-3}{9+8i}$

Simplify, and combine like terms when possible.

13) $(5i^2)(\sqrt{-300})$

14) $(5i)(2i)$

Simplify.

15) $(1,000^{4/3})^{1/2}$

16) $(X^{1/2})^6$

Solve and check the answer.

17) $-4X = -7X^2$

18) $\frac{2^3X^3Y}{X^0Y} \cdot \frac{5X^2}{20XY^2}$

Simplify.

19) $X^2\sqrt{\frac{6}{2X}} + 4\sqrt{\frac{5}{X^2}}$

20) $\frac{1 - \frac{3X}{X-2}}{\frac{3}{X^2 - 4}}$

- 1) How many terms are in $(2X - 3)^4$?
- 2) Expand $(2X - 3)^4$.
- 3) How many terms are in $(X + 4)^6$?
- 4) Expand $(X + 4)^6$.
- 5) What is the third term of $(X + 4)^4$?
- 6) What is the fourth term of $(X + 4)^4$?
- 7) What is the second term of $(2X - 1)^6$?
- 8) What is the fifth term of $(2X - 1)^6$?
- 9) Expand $(3X + 2A)^2$.
- 10) Find the binomial root of the trinomial $4X^2 - 4/3X + 1/9$.
- 11) Expand $(2X + 7)^3$.
- 12) Expand $(X - 1/10)^3$.

Simplify so that there are no imaginary numbers or radicals in the denominator.

$$13) \frac{7\sqrt{2}}{8\sqrt{5} - 7}$$

$$14) \frac{10i}{6 - 12i}$$

Simplify, and combine like terms when possible.

$$15) -(15i)(15i) =$$

$$16) (8i\sqrt{-7})(11\sqrt{7}) =$$

$$17) 14\sqrt{\frac{2}{25}} + 5\sqrt{192}$$

$$18) (\sqrt{10,000})^{5/2}$$

$$19) \frac{2X^2+4X+2}{X^2-1} \div 6X^2+6X$$

$$20) \frac{4^3X^2Y^2Y^0}{A^{-2}Y^2} + \frac{3^0Y^2}{A^2} - \frac{2^{-2}A^2X^{-2}}{X^{-2}Y^{-2}}$$

1) Expand $(\frac{1}{3}X + \frac{1}{7})^2$.

2) Expand $(2X + 13)^2$.

Complete the square by finding the missing term.

3) $X^2 - 24X + \underline{\hspace{2cm}}$

4) $X^2 + X + \underline{\hspace{2cm}}$

5) $X^2 + \underline{\hspace{2cm}} + \frac{1}{16}$

6) $9X^2 + \underline{\hspace{2cm}} + 25$

Solve for X by completing the square, if necessary.

7) $X^2 + 10X + 20 = 0$

8) Check the validity of the root in #7 by placing it in the original equation.

9) $X^2 - 6X + 5 = 0$

10) Check the validity of the root in #9 by placing it in the original equation.

11) Expand $(X - 2)^4$.

12) Expand $(X + 1)^6$.

13) What is the first term of $(X - \frac{2}{3})^5$?

14) What is the fifth term of $(X - \frac{2}{3})^5$?

15) Expand $(X - \frac{1}{3})^3$.

16) Find the cube root of $X^3 - 6X^2 + 12X - 8$

Put in standard form.

17) $\frac{10\sqrt{10}}{6i} - \frac{10}{5}$

18) $\frac{4}{4} - \frac{\sqrt{5}}{2\sqrt{5}}$

Simplify, and combine like terms when possible.

19) $(14i)(\sqrt{225} + 12i)$

20) $(i^{10})(i^{10})$

Find the roots, using the quadratic equation when necessary.

1) $9X^2 + 4 = 12X$

2) $2X^2 + 7X + 6 = 0$

3) $16X^2 + 9 = 24X$

4) $X^2 - 6X = -1$

5) $4X^2 + 20X = -25$

6) $2X^2 - 3X = 5$

Complete the square.

7) $25X^2 - 80X + \underline{\hspace{2cm}}$

8) $36X^2 + 60X + \underline{\hspace{2cm}}$

9) $X^2Y^2 - \underline{\hspace{2cm}} + 1/4$

10) $4X^2 - \underline{\hspace{2cm}} + 1/25$

Solve for X by completing the square, if necessary.

11) $3X^2 - 4X - 2 = 0$

12) Check the answer to #11 by placing it in the original equation.

13) Expand $(X - 4)^5$.

14) What is the fourth term of $(1/3X + 2)^5$?

15) Expand $(2X + 9)^3$.

16) Find the cube root of $X^3 - 3/5X^2 + 3/25X - 1/125$

Put in standard form.

17) $\frac{6 - 2i}{9i}$

18) $\frac{5 + \sqrt{7}}{\sqrt{7}}$

Simplify, and combine like terms when possible.

19) $\frac{X}{\sqrt{X} \sqrt{4}}$

20) $\frac{\sqrt{XA}}{2\sqrt{A} + 3\sqrt{X}}$

- 1) Tell the nature of the solution to $X^2 + 6X - 7 = 0$ using the discriminant.
- 2) Solve to find the exact root(s) of #1. Factor when possible.
- 3) Tell the nature of the solution to $3X^2 - 2 = 8X$ using the discriminant.
- 4) Solve to find the exact root(s) of #3. Factor when possible.
- 5) Tell the nature of the solution to $4X^2 + 2 = 5X$ using the discriminant.
- 6) Solve to find the exact root(s) of #5. Factor when possible.
- 7) Tell the nature of the solution to $4X^2 - 9X = -5$ using the discriminant.
- 8) Solve to find the exact root(s) of #7. Factor when possible.

Find the roots using the quadratic formula.

- 9) $X^2 + 2X + 2 = 0$
- 10) $9X^2 + 2 = 6X$

Solve for X by completing the square, if necessary.

- 11) $5X^2 - 6X - 2 = 0$
- 12) Check the answer to #11 by placing it in the original equation.
- 13) Expand $(2X + 3)^4$.
- 14) What is the first term of $(X - 4)^3$?
- 15) Expand $(X + 2A)^3$.
- 16) Find the cube root of $8X^3 + 9X^2 + \frac{27}{8}X + \frac{27}{64}$

Simplify.

- 17) $\frac{12 + \sqrt{X}}{\sqrt{10}} \left(\frac{12 + \sqrt{X}}{\sqrt{10}} \right)$
- 18) $\frac{3 + 2\frac{5}{9}}{1\frac{1}{4}}$

Solve and check the solution.

- 19) $\frac{3X+2}{4} + X = \frac{X-9}{3} + X$
- 20) $(4 - i)(4 + i)$

For #1 -3: Katie was employed to work as a pricing clerk at Stephanie's Dollar Store. She had to find the wholesale price, then mark up each item 45%, round it to the nearest dollar, and tag the item.

- 1) If the wholesale price on the perfume is \$11.32 what is the new price on Katie's tag?
- 2) If the wholesale price on the shampoo is \$2.80 what is the new price on Katie's tag?
- 3) If the wholesale price on the deodorant is \$3.58 what is the new price on Katie's tag?

For #4-6: The bill for the food at the swanky diner was \$43.90.

- 4) What is the tax if the rate is 6.75%?
- 5) How much is the 15% tip?
- 6) What percent of the final money spent for the evening is the tax and tip combined?

Use the table in the Teacher's Manual, page 14-3, for #7 and #8.

- 7) Find the percentage of carbon in CO.
- 8) Find the percentage of oxygen in CO.
- 9) Tell the nature of the solution to $5X^2 - 10X - 15 = 0$ using the discriminant.
- 10) Solve to find the exact root(s) of #9. Factor when possible.
- 11) Tell the nature of the solution to $9X^2 + 16 = 24X$ using the discriminant.
- 12) Solve to find the exact root(s) of #11. Factor when possible.
- 13) Tell the nature of the solution to $5X^2 + 2 = 6X$ using the discriminant.
- 14) Solve to find the exact root(s) of #13. Factor when possible.

Find the roots using the quadratic formula.

- 15) $5X^2 + 9 = 6X$
- 16) $5X^2 + 6X = -5$

Solve for X by completing the square if necessary.

- 17) $2X^2 + X = 0$
- 18) Check the answer to #17 by placing it in the original equation.
- 19) Expand $(X - 1)^4$.
- 20) What is the second term of $(2X - 3)^5$?

1) Solve for L.

$$V = LWH$$

2) Solve for A.

$$S = N \left(\frac{A+L}{2} \right)$$

3) Solve for B_1 .

$$A = \frac{H}{2} (B_1 + B_2)$$

4) Solve for N.

$$L = A + (N - 1)D$$

5) Solve for F.

$$C = \frac{5}{9}(F - 32)$$

6) Solve for E.

$$I = \frac{E}{R+r}$$

7) There were ten lepers healed and only one returned to give thanks. What percent returned?

8) What percentage of the lepers kept going?

9) If the percent stays the same and there were 530 lepers, how many would return?

10) What if the percent increases to 30%? Of the 530 lepers, how many would return?

Use the table in the Teacher's Manual, page 14-3, for #11 and #12.

11) Find the percentage of carbon in CS_2 .12) Find the percentage of sulfur in CS_2 .13) Tell the nature of the solution to $X^2 = 2X - 5$ using the discriminant.

14) Solve to find the exact root(s) of #13. Factor when possible.

15) Tell the nature of the solution to $2X^2 = X + 3$ using the discriminant.

16) Solve to find the exact root(s) of #15. Factor when possible.

Find the roots using the quadratic formula.

17) $X^2 + 4X = 5$

18) $3X^2 + 5X = 1$

Solve for X.

19) $3 - .05X = .2X - 1.25$

20) $\frac{X-8}{7} + X = 4$

For #1-3: The ratio of G scale trains to HO scale trains is 1 to 8. A recent survey revealed 1,180 G scale trains in Delaware. How many HO trains are there?

- 1) List all the possible equations.
- 2) Which one will be used and why?
- 3) Solve.

For #4-6: Carbon and hydrogen are present in 168 grams of C_2H_4 .

- 4) List all the possible equations.
- 5) What is the mass of the carbon?
- 6) What is the mass of the hydrogen?

For #7-9: Carbon and fluorine are present in 616 grams of CF_4 .

- 7) List all the possible equations.
- 8) What is the mass of the carbon?
- 9) What is the mass of the fluorine?

10) Solve for R.

$$S = \frac{A-RL}{I-R}$$

11) Solve for A.

$$S = \frac{A-RL}{I-R}$$

For #12-13: I saved 42% of my phone bill after I switched my long distance in April.

- 12) The May bill came and it was \$268.00. What would I have paid if I hadn't switched?
- 13) The June bill was \$294.80. What percentage did I increase from May to June?

Use the table in the Teacher's Manual, page 14-3, for #14 - #16.

- 14) Find the percentage of sodium in Na_3PO_4 .
- 15) Find the percentage of phosphorous in Na_3PO_4 .
- 16) Find the percentage of oxygen in Na_3PO_4 .
- 17) Tell the nature of the solution to $X^2 - 5X + 8 = 0$ using the discriminant.
- 18) Solve to find the exact root(s) of #17. Factor when possible.

Solve for X.

$$19) \frac{4X-3}{5} - \frac{5-3X}{10} = \frac{X-1}{2}$$

$$20) \frac{4X}{3} - \frac{5X}{6} = \frac{3X}{4} + 2$$

Use unit multipliers to change the unit of measure.

- 1) 13 gallons = _____ quarts
- 2) 7.94 meters = _____ millimeters
- 3) 1 foot³ = _____ inches³
- 4) 11 yards³ = _____ feet³
- 5) 31,760 centimeters³ = _____ meters³

Use unit multipliers to convert from English to metric or metric to English measure.

- 6) 128 inches = _____ meters
- 7) 400 ounces = _____ kilograms
- 8) 19 meters = _____ inches
- 9) 8 kilometers = _____ miles
- 10) 50 gallons = _____ liters

For #11-13: Carbon and sulfur are present in 1976 grams of CS₂.

- 11) List all the possible equations.
- 12) What is the mass of the carbon?
- 13) What is the mass of the sulfur?

For #14-16: One evening the manager of Arbys kept a tally of who ordered milkshakes. The ratio of those who ordered mocha shakes to all other flavors of shakes was 1 to 3. They sold 28 mocha shakes. How many shakes did they sell all evening?

- 14) List all the possible ratios.
- 15) Which one will be used and why?
- 16) Solve.
- 17) Solve for S.

$$R - P = \frac{T}{S + Q}$$

- 18) Solve for T.

$$R - P = \frac{T}{S + Q}$$

Use the table in the Teacher's Manual, page 14-3 for #19-20

- 19) Find the percentage of nitrogen in NF₃.
- 20) Find the percentage of fluorine in NF₃.

- 1) Chuck and Lisa took up bike riding for exercise. They rode a tandem bicycle. The first day they rode 2 miles at 4 mph. How long were they pedaling?
- 2) They improved gradually. The second week they were on the road for 45 minutes at 5 mph. How far did they go?
- 3) By the third week they were able to ride 4 1/2 miles in 45 minutes. How fast was that?
- 4-5) Steve and Ann left with the children evenly distributed among two vehicles. They headed for the conference at Salt Lake City. Steve drove 75 mph, and they both left at 1:00 PM. Ann traveled 6 mph less than Steve. He got to the exhibit hall at 8:40 PM. How far was the trip? When did Ann arrive?
- 6-7) On the return trip they came a different way. Ann traveled at 60 mph, left at 5:20 AM, and arrived at 3:20 PM. Steve traveled 15 mph faster than Ann. How long did it take Steve to get home, and how many miles was the new way?

Use unit multipliers to change the unit of measure.

- 8) 46 pounds = _____ ounces
- 9) 705 centimeters = _____ meters
- 10) .5 meters³ = _____ millimeters³
- 11) 696 in² = _____ yards²

Use unit multipliers to convert from English to metric or metric to English measure.

- 12) 16 pounds = _____ kilograms
- 13) 40 liters = _____ gallons

For #14-16: It was a beautiful day on the Susquehanna River. Motorboats outnumbered non-motorboats by a 3 to 2 ratio. There were 135 motorboats. How many boats are on the river?

- 14) List all the possible ratios.
- 15) Which one will be used and why?
- 16) Solve to find how many boats are on the river.
- 17) Solve for B: $\frac{A}{X+Y} = \frac{X}{B}$

Use the table in the Teacher's Manual, page 14-3 for #18-19.

- 18) Find the percentage of iron in FeCl₃.
- 19) Find the percentage of chlorine in FeCl₃.
- 20) Expand (A + 2X)³

- 1) Carl did 50 sit-ups per day for 3 days. How many did he do?
- 2) Over the weekend he did 212 sit-ups in 2 days. What was his rate?
- 3) The next week he averaged 60 sit-ups per day. He did a total of 300. How many days did it take?
- 4-5) The Emorys found that they drove to Myrtle Beach much quicker than they drove home at the end of the week. Heading to the shore they averaged 10 mph faster than on the way home. They drove for 16 hours to the shore and 20 hours from the shore. What were the speeds going and coming?
- 6-8) Joshua and Catherine were 26 miles apart and were racing to meet each other. They kept at it for two hours. Joshua pedaled 1 mph faster than Catherine. How fast did they each pedal?
- 9-11) Two spies met in the dead of the night during the Civil War. They exchanged information, then Rhett departed to the south. Two hours later, Tell stealthily made for the north. At dawn, 6 hours after Rhett started, they were 49 miles apart. Rhett realized he had walked at $4\frac{1}{2}$ mph. How fast did Tell travel, and how far did they each travel?

Use unit multipliers to change the unit of measure.

- 12) $132\text{ m}^3 = \underline{\hspace{2cm}}\text{ cm}^3$
- 13) $5,000\text{ mm}^3 = \underline{\hspace{2cm}}\text{ cm}^3$

Use unit multipliers to convert from English to metric or metric to English measure.

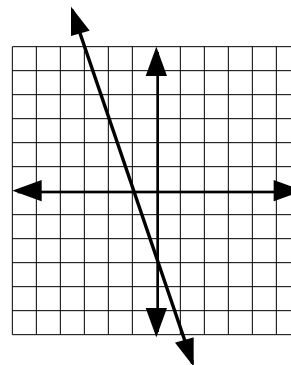
- 14) 75 liters = quarts
- 15) 100 yd. = m

For #16-18: In bowling, strikes and spares are called marks. During the tournament Walter rolled 180 strikes. His ratio of strikes to spares was 5 to 3. How many marks did he have?

- 16) *List all the possible ratios.*
- 17) Which one will be used and why?
- 18) Solve to find how many strikes Walter had.
- 19) Solve for A by completing the square. $2A^2 - 18A + 10 = 2A + 4$
- 20) Solve for B using the quadratic formula. $B^2 + 5 = -4B$

1) Estimate the slope (m).

2) Estimate the intercept (b).



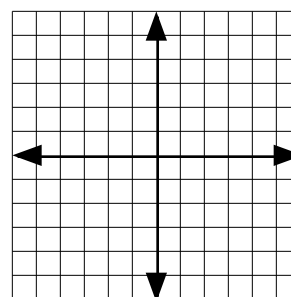
Given the slope, -3, through the point, (-1,1)

3) Find the intercept.

4) Write the slope/intercept formula.

5) Write the standard equation of a line.

6) Graph the line.



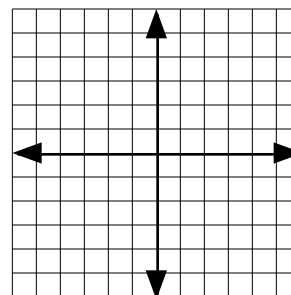
Given these two points, (-4,0) & (4,2)

7) Find the slope and intercept.

8) Write the slope/intercept formula.

9) Write the standard equation of a line.

10) Graph the line.



11-13) Jacob had been enroute for 2 days with his herds and family, making 12 miles per day, when Esau heard he was coming. Esau immediately left on horseback at 60 miles per day. They were 240 miles apart when Jacob left. When did they meet, and how far did each travel?

14-15) Driving up the long ascent at 24 mph with a full load took Ben 1.5 hours. He came down the mountain twice as fast as going up. What was his rate coming down, how long did it take him to descend, and how long is the mountain road?

Use unit multipliers to change the unit of measure.

16) $2.5 \text{ yd.}^3 = \text{ ______ } \text{ ft.}^3$

17) $37 \text{ mi.} = \text{ ______ } \text{ yd.}$

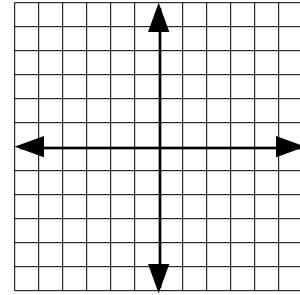
For #18-20: There are 1,804 grams of Na_3PO_4 .

18) What is the mass of the sodium?

19) What is the mass of the phosphorus?

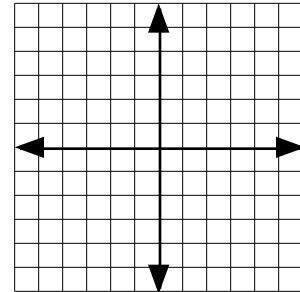
20) What is the mass of the oxygen?

- 1) Find the slope and intercept of the line perpendicular to $2Y = 4X - 3$ through the point $(2,2)$.
- 2) Write the slope/intercept formula of the new line.
- 3) Write the equation of the new line in standard form.
- 4) Graph the new line.



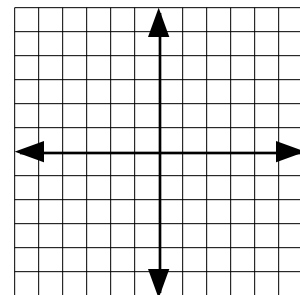
For #5-8: Graph $-4Y \leq X - 6$

- 5) Graph $-4Y = X - 6$
- 6) Plot 2 points, 1 on each side of the line.
- 7) Put the points in the equation and test whether they are true or not.
- 8) Shade in the graph and make the line solid, or dotted.



Given these two points, $(4,-3)$ & $(-2,-1)$

- 9) Find the slope, then the intercept.
- 10) Write the slope/intercept formula.
- 11) Write the standard equation of the line.
- 12) Graph the line.



- 13-15) Simon Kenton was in dogged pursuit of the Indians. He ran for 5 hours, then took a break by walking. He ran 4 mph faster than he walked. How much ground did he cover in the 7 hours of his 62 mile pursuit. What was his rate while walking? What was his rate while running?

Use unit multipliers to change the unit of measure.

16) $428,000 \text{ mm}^3 = \underline{\hspace{2cm}} \text{ cm}^3$

Use unit multipliers to convert from English to metric or metric to English measure.

17) $9 \text{ cm} = \underline{\hspace{2cm}} \text{ in.}$

For #18-20: If there are 384 grams of the compound C_2H_5Cl :

- 18) How many grams are carbon?
- 19) How many grams are hydrogen?
- 20) How many grams are chlorine?

For #1-11: points A (-5, 5), B (-2, 3), C (3, 5), D (2, -1), E (-3, -3)

- 1) Plot points A, B, C, D and E.
- 2) Draw a line between E and C.
- 3) Make a right triangle.
- 4) Find the length of the legs.
- 5) Use the Pythagorean Theorem to find the distance between the two points.
- 6) Compute the distance between points D and B.
- 7) Compute the distance between points A and E.
- 8) Compute the distance between points D and E.
- 9) Find the midpoint between points B and E.
- 10) Find the midpoint between points A and D.
- 11) Find the midpoint between points B and C.

Given these two points: (-1, 3) & (1, -2)

- 12) Find the slope/intercept formula of the line.
- 13) Graph the line.

Given this line: $3Y = 5X$

- 14) Find the slope/intercept formula of the line parallel to the given line through the point (-1, -4).
- 15) Graph the line.

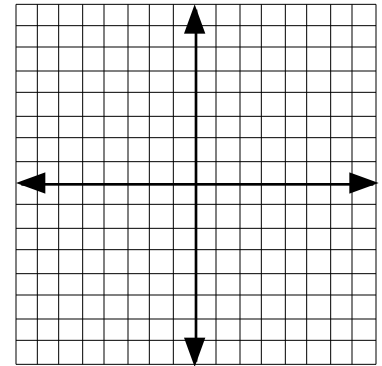
Given this line: $Y = \frac{2}{3}X$

- 16) Find the slope/intercept formula of the line perpendicular to the given line through the point (1, 3).
- 17) Graph the line.

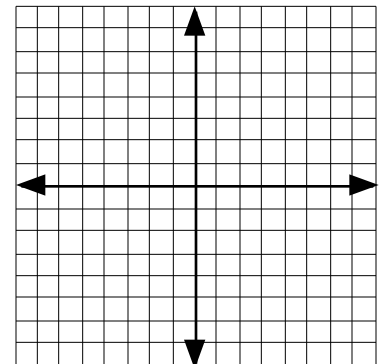
Given: $-Y + 2X \geq 1$

- 18) Graph the line.
- 19) Plot two points and test them.
- 20) Shade the graph and make the line dotted or solid.

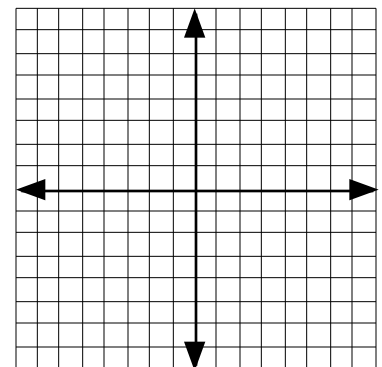
1-5



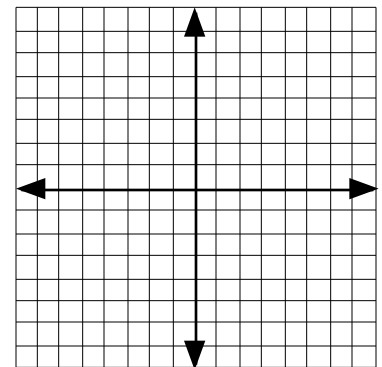
12-13



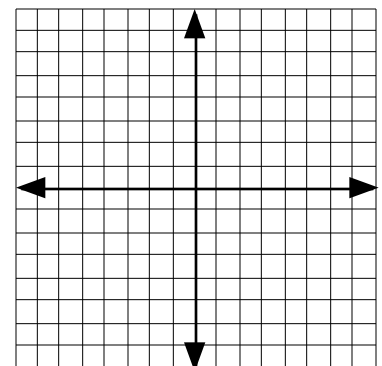
14-15



16-17



18-20



- 1) Find the coordinates of the center and radius of

$$X^2 + (Y-1)^2 = 49$$

- 2) Graph the result.

2 & 4

- 3) Given the center (-3, 2) and radius (4), create the equation of the circle.

- 4) Graph the result.

- 5) By completing the square, find the center and radius of the equation

$$X^2 + Y^2 - 4Y = 5.$$

- 6) Sketch the result.

Given: $18(X-2)^2 + 8Y^2 = 72$

6 & 10

- 7) Find the coordinates of the center.

- 8) Find the coordinates of the X extremity.

- 9) Find the coordinates of the Y extremity.

- 10) Sketch the result.

Given: points A (-2, 7), B (-5, -4), C (3, -2)

16

- 11) Compute the distance between points A and C.

- 12) Compute the distance between points B and C.

- 13) Find the midpoint between points A and C.

- 14) Find the midpoint between points A and B.

Given this line: $6X = -3Y + 2$

18

- 15) Find the slope/intercept formula of the line parallel to the given line through the point (1, 3).

- 16) Graph the line.

Given this line: $4Y = 3X + 2$

- 17) Find the slope/intercept formula of the line perpendicular to the given line through the point (4, 0).

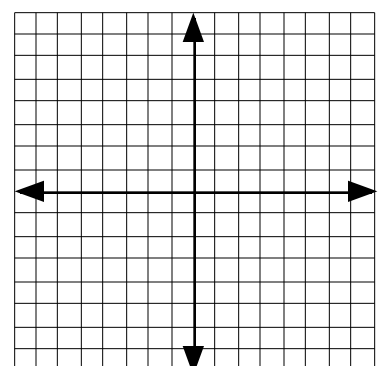
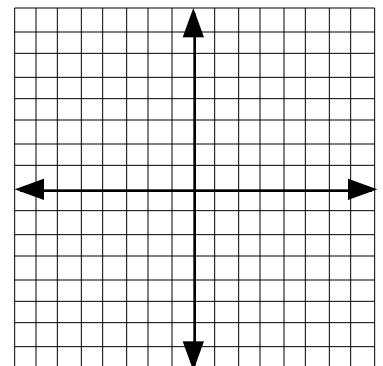
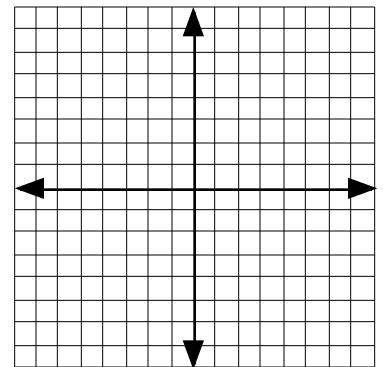
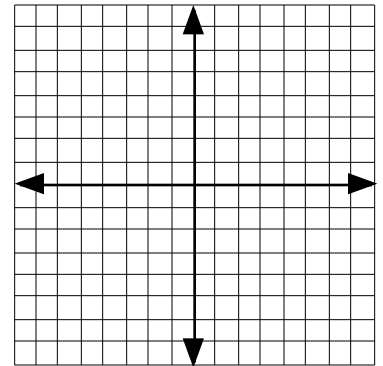
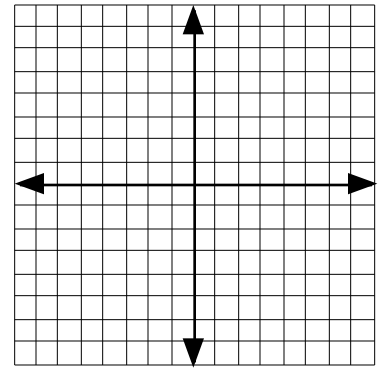
- 18) Graph the line.

Given: $Y > 2X + 3$

19-20

- 19) Graph the line. Plot two points and test them.

- 20) Shade the graph and make the line dotted or solid.



1-2) Estimate the graph of $Y + 2 = 3X^2$.
Plot 5 points to confirm your hypothesis, and graph it.

3-4) Estimate the graph of $Y - X^2 - 2 = 0$.
Plot 5 points to confirm your hypothesis, and graph it.

5-6) Estimate the coefficient of X^2 in parabola A.
Estimate the intercept of parabola A..

7-8) Estimate the coefficient of X^2 in parabola B.
Estimate the intercept of parabola B

Given: $X^2 + 2X + Y^2 - 6Y = 6$

9) Find the center and radius of the circle.

10) Graph the result.

11) Given the center $(-3, 0)$ and radius (4) ,
create the equation of the circle.

12) Graph the result.

Given: $9(X-3)^2 + Y^2 = 36$

13) Find the coordinates of the center.

14) Find the coordinates of the X and Y extremities
and sketch the result

Given: points A $(-4, -3)$, B $(5, -1)$, C $(2, -5)$

15) Compute the distance between points A and B.

16) Compute the distance between points A and C.

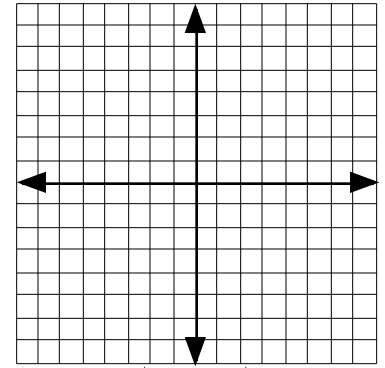
17) Find the midpoint between points B and C.

18) Find the midpoint between points A and C.

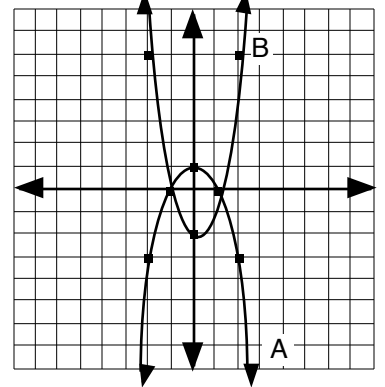
19) Find the slope/intercept formula of the line perpendicular
to $5Y = 4X + 15$, through the point $(-2, 1)$.

20) Graph $X - 2Y \geq 5$.

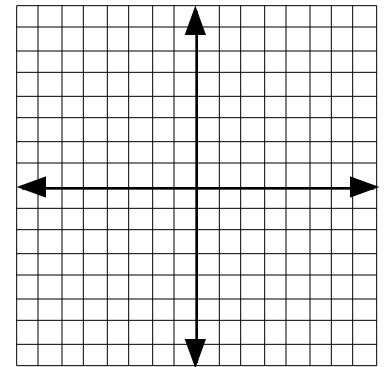
#2 & 4



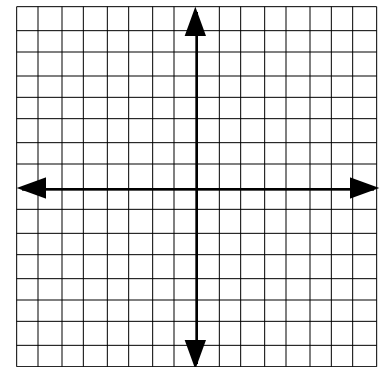
#5-8



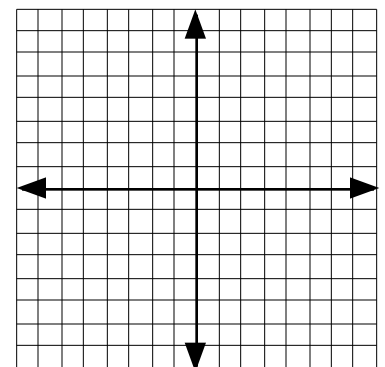
#10 & 12



#14



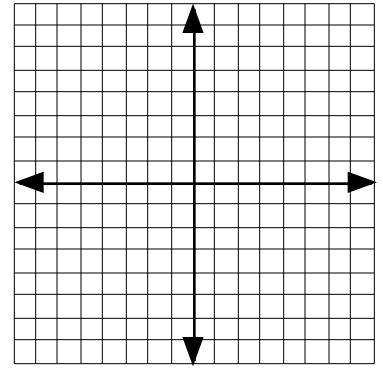
#20



Given: $4X^2 + 20X = 4 - 4Y$

- 1) Find the axis of symmetry.
- 2) Find the vertex.
- 3) Sketch the graph.

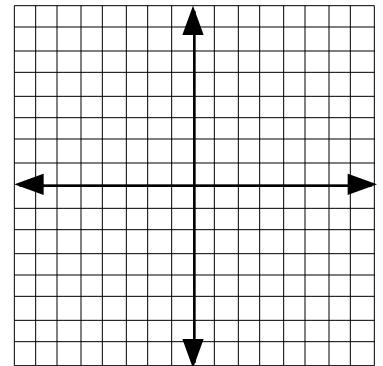
#3



Given: $3X^2 + 3X + 2 = Y$

- 4) Find the axis of symmetry.
- 5) Find the vertex.
- 6) Sketch the graph.

#6

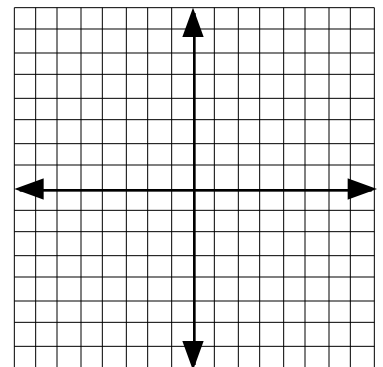


Complete the statements.

- 7) If $0 < |A| < 1$, the graph is flatter than _____.
- 8) The coordinates of the vertex are _____.

9-10) Isaac has 32' of treated 4"X 4" to make the edges around a rectangular brick patio. What should the dimensions of each side of the patio be to make as large an area as possible?

#11



11) Graph $-Y - 1 = 3X^2$

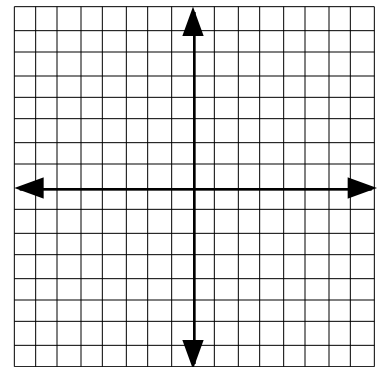
12) Graph $1/3 Y = 1/3 X^2 + 1$

13) Find the center and radius of $5(X+2)^2 + 5(Y-1)^2 = 45$

14) Given the center (0, 0) and radius (8), create the equation of the circle.

15-16) Find the center and radius of $X^2 - 4X = -Y^2 - 2Y + 20$

#12

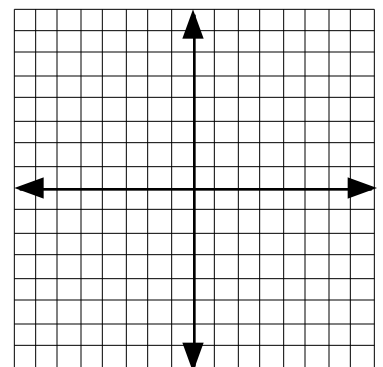


Given: points A (-3, 0), B (0, 4), C (5, 0)

- 17) Compute the distance between points A and B.
- 18) Find the midpoint between points B and C.

Given: $-Y + 2/5 X > 5/2$

#20

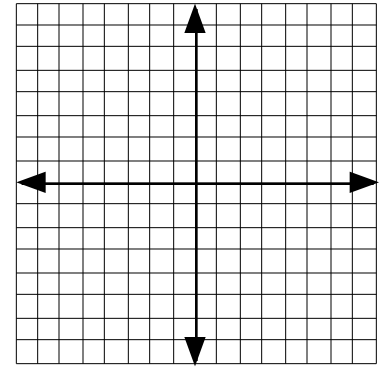


- 19) Change the equation to slope/intercept formula.
- 20) Graph it.

Given: $0 = 10 - XY$

- 1) Plot several points.
- 2) Sketch the graph.

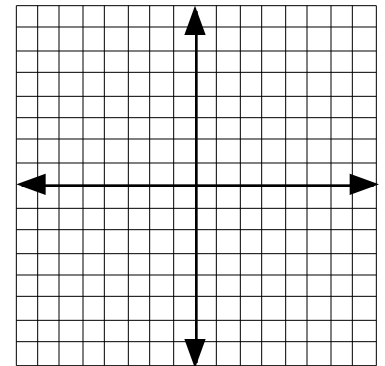
#2-4



Given: $0 = -4/Y - X$

- 3) Plot several points.
- 4) Sketch the graph.

#6



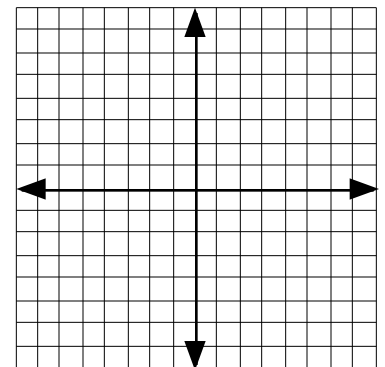
Given: $1/8 X^2 - 1/4 Y^2 = 1$

- 5) Plot several points.
- 6) Sketch the graph.

Given: $Y = 1/2 X^2 + 3X - 1$

- 7) Find the axis of symmetry.
- 8) Find the vertex.
- 9) Sketch the graph.

#9



10) Graph $10Y + 30X^2 - 20 = 0$

11) Graph $5 + 5Y = -10X^2$

12) Find the center and radius of $-(X-4)^2 - (Y+4)^2 = -121$

13) Given the center (2, 0) and radius (7), create the equation of the circle.

14-15) Find the center and radius of $X^2 + Y^2 - 2Y - 3 = 0$

#10-11

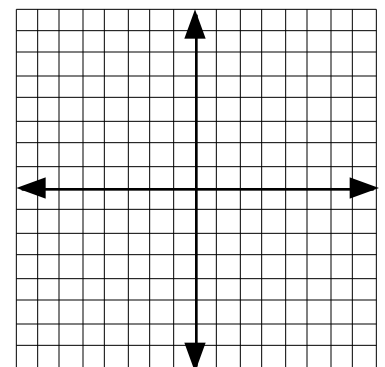
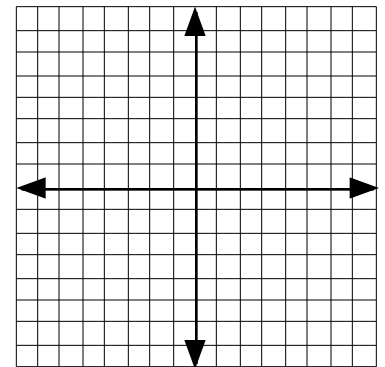
Given: points A (-2, 5), B (3, 1), C (-2, -2), D (4, -4)

16) Compute the distance between points A and D.

17) Find the midpoint between points A and D.

18) What is the slope/intercept equation of the line perpendicular to $3Y = -2X - 6$ through (-3, -3)?

#20



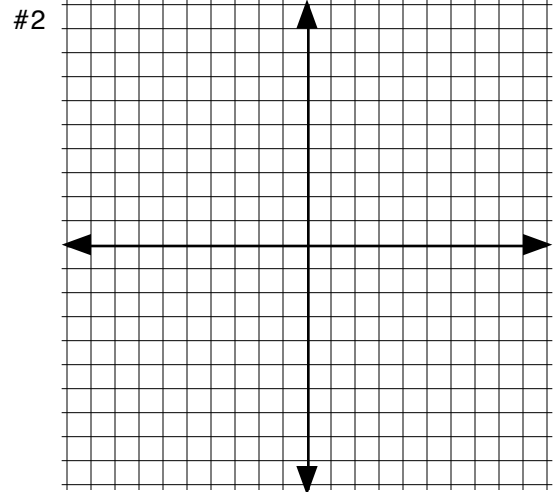
Given: $16(X+1)^2 + 9(Y-1)^2 = 144$

19) Find the center and the extremities.

20) Graph it.

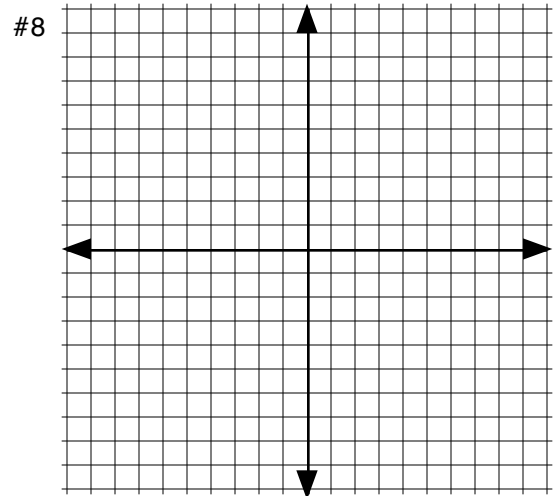
Find the solution of $\begin{cases} Y = 2X - 3 \\ X^2 + 4Y^2 = 16 \end{cases}$

- 1) Identify the nature of the equations.
- 2) Sketch a graph of each to estimate the solutions.
- 3) Substitute or eliminate to isolate one variable.
- 4) Solve for the unknown.
- 5) Solve for the other variable.
- 6) Give the final solution.



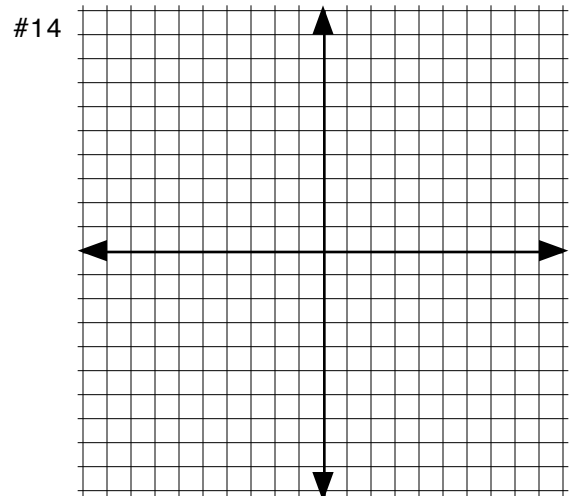
Find the solution of $\begin{cases} Y = -1/2 X^2 - 3X \\ Y = 2/5 X - 5/2 \end{cases}$

- 7) Identify the nature of the equations.
- 8) Sketch a graph of each to estimate the solutions.
- 9) Substitute or eliminate to isolate one variable.
- 10) Solve for the unknown.
- 11) Solve for the other variable.
- 12) Give the final solution.



Find the solution of $\begin{cases} X^2 - 2Y^2 = 8 \\ 4X^2 + 9Y^2 = 36 \end{cases}$

- 13) Identify the nature of the equations.
- 14) Sketch a graph of each to estimate the solutions.
- 15) Substitute or eliminate to isolate one variable.
- 16) Solve for the unknown.
- 17) Solve for the other variable.
- 18) Give the final solution.



Given: points A (-5, 0), B (0, 3), C (3, -2), D (-2, -4)

- 19) Compute the distance between points C and D.
- 20) Find the midpoint between points C and D.

I have 27 coins in my pocket. They are all dimes and nickels. The value of the coins is \$2.05. How many of each are there?

- 1) Substitute or eliminate to isolate how many of one coin.
- 2) Substitute the answer in #1 to find how many of the other coin.

Find three consecutive integers such that six times the third minus the second is equal to four times the first.

- 3) Solve for N.
- 4) Substitute N to find the value of the three integers.

Find three consecutive even integers such that five times the third is equal to seven times the second minus six.

- 5) Solve for N.
- 6) Substitute N to find the value of the three integers.

Find three consecutive odd integers such that four times the first plus three times the third is equal to five times the second.

- 7) Solve for N.
- 8) Substitute N to find the value of the three integers.

Paulette is baking and wants to add food coloring to the mix. She needs 28 ounces of a 55% green solution (45% water) and has two solutions to work with. One is 75% green and the other is 40% green. How much of each is needed?

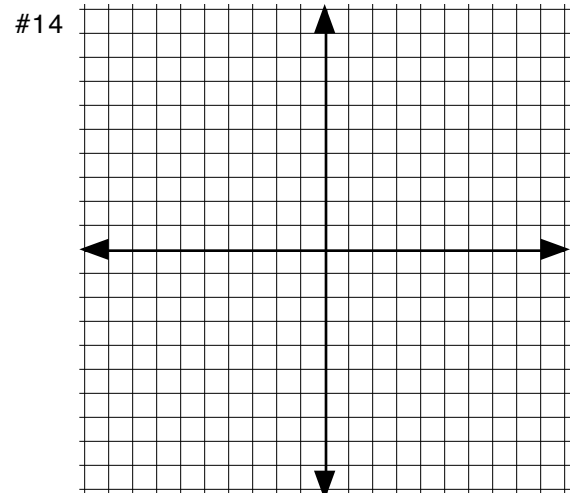
- 9) Solve for G.
- 10) Substitute G to find the final amounts.

Do the above problem using the percentages of water, instead of the colorant.

- 11) Solve for W.
- 12) Substitute W to find the final amounts.

Find the solution of $\begin{cases} Y = -2X - 1 \\ 2Y = -X^2 + 3 \end{cases}$

- 13) Identify the nature of the equations.
- 14) Sketch a graph of each to estimate the solutions.
- 15) Substitute or eliminate to isolate one variable.
- 16) Solve for the unknown.
- 17) Solve for the other variable.
- 18) Give the final solution.



In ten years Fritha will be one half the age of Jeff. Ten years ago, Jeff was six times the age of Fritha. How old are they now?

- 1) Choose the variable and write the first equation from the information given.
- 2) Using the same variables, write the second equation from the information given.
- 3) Isolate and solve for the value of one variable by substitution.
- 4) Use the answer from #3 to solve for the value of the other variable.

Presently Ben is one sixth the age of Dave. In four years Dave will be four times the age of Ben. How old are they now?

- 5) Choose the variable and write the first equation from the information given.
- 6) Using the same variables, write the second equation from the information given.
- 7) Isolate and solve for the value of one variable by substitution.
- 8) Use the answer from #7 to solve for the value of the other variable.

Daniel Boone took 3 hours to cover 21 miles downstream. Headed upstream it took him 7 hours to go the same distance. What is the rate of the current and the boat?

- 9) Choose the variable and write the first equation from the information given.
- 10) Using the same variables, write the second equation from the information given.
- 11) Isolate and solve for the value of one variable by substitution.
- 12) Use the answer from #11 to solve for the value of the other variable.

I have 13 coins in my pocket. They are all quarters and half dollars. The value of the coins is \$4.75. How many of each are there?

- 13) Substitute or eliminate to isolate how many of one coin.
- 14) Substitute the answer in #13 to find how many of the other coin.

Find three consecutive integers such that negative nine times the third minus twelve is the same as two times the second minus seven times the first.

- 15) Solve for N.
- 16) Substitute N to find the value of the three integers.

Find three consecutive even integers such that four times the second plus ten is the same as three times the first plus two times the third.

- 17) Solve for N.
- 18) Substitute N to find the value of the three integers.

Sue, the furniture refinisher, is looking for 16 oz. of a stain that is 40% pine and the rest mineral spirits. She has previously made 2 solutions, one with 60% pine and another with 10% pine. How much of each of these will she use?

- 19) Solve for P.
- 20) Substitute P to find the final amounts.

Find the solution that will satisfy all three variables.

A) $X + 2Y + 6Z = 7$

B) $4X - 5Y - 2Z = -11$

C) $-X - 6Y - 3Z = 14$

- 1) Choose two equations and eliminate one variable.
- 2) Choose two different equations and eliminate the same variable.
- 3) Now take the results of #1 and #2 and eliminate another variable and solve.
- 4) Take the results of #3 and substitute it into one of the equations from #1 or #2 and solve.
- 5) Take the results of #3 and #4 and substitute it into one of A, B, or C and solve.
- 6) Check your solution set in A, B, and C.

Find the solution that will satisfy all three variables.

A) $3X + Y + 2Z = 4$

B) $-X + 5Y + 3Z = -5$

C) $6X - 2Y + 3Z = 9$

- 7) Choose two equations and eliminate one variable.
- 8) Choose two different equations and eliminate the same variable.
- 9) Now take the results of #7 and #8 and eliminate another variable and solve.
- 10) Take the results of #9 and substitute it into one of the equations from #7 or #8 and solve.
- 11) Take the results of #9 and #10 and substitute it into one of A, B, or C and solve.
- 12) Check your solution set in A, B, and C.

In two years Don will be two times the age of Brad. Eight years ago Don was two and a half times the age of Brad. How old are they now?

- 13) Choose the variable and write the first equation from the information given.
- 14) Using the same variables, write the second equation from the information given.
- 15) Isolate and solve for the value of one variable by substitution.
- 16) Use the answer from #15 to solve for the value of the other variable.

Lewis and Clark took 5 hours to go 70 miles downstream. When headed upstream it took them the same time to make 20 miles. What is the rate of the current and the boat?

- 17) Choose the variable and write the first equation from the information given.
- 18) Using the same variables, write the second equation from the information given.
- 19) Isolate and solve for the value of one variable by substitution.
- 20) Use the answer from #19 to solve for the value of the other variable.

$$A) Y - 3X = -1; \quad B) 4Y + 3X = -19$$

- 1) Use Cramer's rule to find the solution for X.
- 2) Use Cramer's rule to find the solution for Y.
- 3) Check your solution to see if it is accurate.

$$A) Y = 2X + 2; \quad B) Y = -4X - 4$$

- 4) Use Cramer's rule to find the solution for X.
- 5) Use Cramer's rule to find the solution for Y.
- 6) Check your solution to see if it is accurate.

$$A) 3Y - 4X = 2; \quad B) Y - 2X = -6$$

- 7) Use Cramer's rule to find the solution for X.
- 8) Use Cramer's rule to find the solution for Y.
- 9) Check your solution to see if it is accurate.

$$A) X + 2Y + 6Z = 7; \quad B) 4X - 5Y - 2Z = -11; \quad C) -X - 6Y - 3Z = 14$$

- 10) Use Cramer's rule to find the solution for X.
- 11) Use Cramer's rule to find the solution for X.
- 12) Use Cramer's rule to find the solution for Z.
- 13) Check your solution to see if it is accurate.

$$A) 3X + Y + 2Z = 4; \quad B) -X + 5Y + 3Z = -5; \quad C) 6X - 2Y + 3Z = 9$$

- 14) Use Cramer's rule to find the solution for X.
- 15) Use Cramer's rule to find the solution for Y.
- 16) Use Cramer's rule to find the solution for Z.
- 17) Check your solution to see if it is accurate.