Dear Parent and Student,

This summer packet is meant for students to practice the skills needed to be successful in Honors Geometry.

   -Students are expected to attempt all the problems and attempt them without a calculator.

   -There will be a <u>quiz</u> given in class during the 2nd or 3rd week of September that will reflect the problems and skills presented in this summer packet. Calculators will **not** be permitted on the quiz.

   -Detailed solutions and explanations to the summer packet will be posted on the high school/middle school websites on **August 1st**. Students are expected to check their answers and use this summer packet as a *study guide* for the quiz in September.

Enjoy the summer!

-Clearview Regional School District Mathematics Department
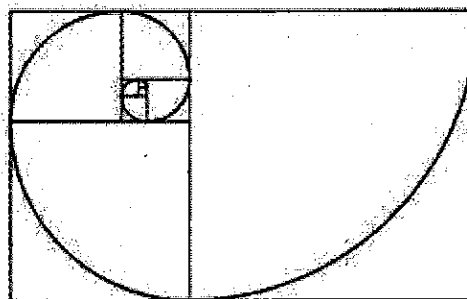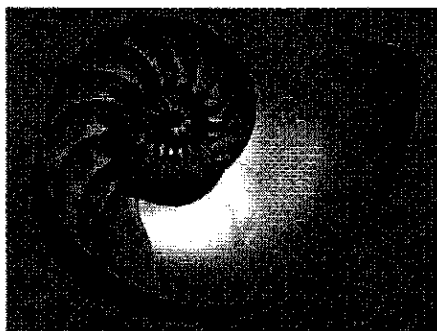
MULTIPLYING POLYNOMIALS

1] $(x^3 + 3)(x - 7)$ FOIL

$$\boxed{x^4 - 7x^3 + 3x - 21}$$

Distribute to each term

2] $(x - 4)(x^2 + 3x - 5)$

$x^3 + 3x^2 - 5x - 4x^2 - 12x + 20$

Combine like terms

$$\boxed{x^3 - x^2 - 17x + 20}$$

Add Fractions

$6 + \frac{5}{2} = \frac{12}{2} + \frac{5}{2}$

$= \frac{17}{2}$

3] $(5x - 6)(-x + \frac{1}{2})$

$-5x^2 + \frac{5}{2}x + 6x - 3$

$$\boxed{-5x^2 + \frac{17}{2}x - 3}$$

4] $(\sqrt{2} + x)(\sqrt{8} - x)$

$\sqrt{8} = 2\sqrt{2}$

$\sqrt{4}\sqrt{2}$

Simplify radical

$\sqrt{16} - x\sqrt{2} + x\sqrt{8} - x^2$

$4 \quad - x\sqrt{2} + 2x\sqrt{2} - x^2$

$$\boxed{4 + x\sqrt{2} - x^2}$$

FACTOR EACH OF THE EXPRESSIONS

5] $y^2 - 12y + 20$

$$\boxed{(y - 2)(y - 10)}$$

6] $x^3 + 3x^2 + 2x$ Factor out 'x'

$x(x^2 + 3x + 2)$

$$\boxed{x(x + 1)(x + 2)}$$

7] $z^2 - z - 6$

$$\boxed{(z + 2)(z - 3)}$$

8] $4ax^2 + 16ax + 16a$ Factor out '4a'

$4a(x^2 + 4x + 4)$

$$\boxed{4a(x + 2)(x + 2)}$$

9] $x^2 - 16$ Difference of Squares

$$\boxed{(x + 4)(x - 4)}$$

Different signs

10] $k^2 - 64w^2$ Difference of Squares

$$\boxed{(k - 8w)(k + 8w)}$$

RATIONALIZE EACH RADICAL EXPRESSION

To rationalize multiply top and bottom by __bottom__ square root

11] $\frac{3\sqrt{3}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{3\sqrt{6}}{\sqrt{4}} = \boxed{\frac{3\sqrt{6}}{2}}$

Bottom

12] $\frac{1}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{\sqrt{5}}{\sqrt{25}} = \boxed{\frac{\sqrt{5}}{5}}$

13] $\frac{12}{3\sqrt{2}} = \frac{4}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{4\sqrt{2}}{\sqrt{4}}$

$= \frac{4\sqrt{2}}{2} = \boxed{2\sqrt{2}}$

14] $\frac{xy}{\sqrt{x}} \cdot \frac{\sqrt{x}}{\sqrt{x}} = \frac{xy\sqrt{x}}{\sqrt{x^2}} = \frac{xy\sqrt{x}}{x}$

$= \boxed{y\sqrt{x}}$

SOLVE EACH SYSTEM OF EQUATIONS USING SUBSTITUTION.

15] $\begin{cases} 2x + y = 4 \\ 3x + y = 1 \end{cases}$

$\boxed{y = 4 - 2x}$

Replace in second equation

$3x + (4 - 2x) = 1$

$x + 4 = 1$

$\boxed{x = -3}$

$y = 4 - 2(-3)$

$\boxed{y = 10}$

16] $\begin{cases} y = 3x - 27 \\ y = \frac{1}{2}x - 7 \end{cases}$

SET EQUAL

multiply whole equation by 2 to cancel $\frac{1}{2}$

$\left(3x - 27 = \frac{1}{2}x - 7 \right) 2$

$6x - 54 = x - 14$

$-x \qquad -x$

$5x - 54 = -14$

$+54 \qquad +54$

$5x = 40$

$\boxed{x = 8}$

$y = 3(8) - 27$

$\boxed{y = -3}$

SOLVE EACH SYSTEM OF EQUATIONS USING <u>ELIMINATION</u>

17] $\begin{cases} 3k + 5g = -12 \\ 2k - 3g = -8 \end{cases} \begin{matrix} 2 \\ -3 \end{matrix}$

$6k + 10g = -24$

$-6k + 9g = 24$

Add both Equations to cancel 'k'

$19g = 0$

$\boxed{g = 0}$

$3k + 5(0) = -12$ solve for 'k'

$\boxed{K = -4}$

18] $\begin{cases} 2k - g = 8 \\ 6k - 3g = -9 \end{cases} (-3)$
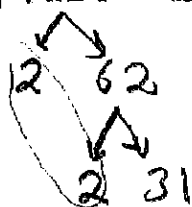
$-6k + 3g = -24$

$6k - 3g = -9$

$0 = -33$

FALSE

No solution

these line equations

Don't intersect.

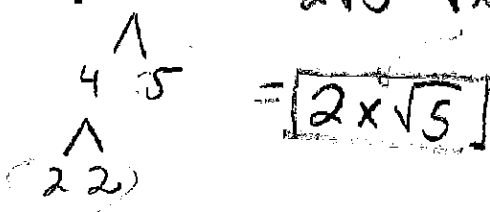# SIMPLIFY EACH RADICAL EXPRESSION

19] $\sqrt{124}$ = $\boxed{2\sqrt{31}}$

```
  124
  /  \
 2    62
      / \
     2   31
```

20] $\sqrt{215}$ (Doesn't Simplify !! (!))

21] $\sqrt{20x^2}$ = $2\sqrt{5} \cdot \sqrt{x^2}$

square root and "2" cancel

```
20
/ \
4   5
/\
2 2
```

= $\boxed{2x\sqrt{5}}$

22] $\sqrt{12} \cdot \sqrt{48}$ = $(2\sqrt{3})(2 \cdot 2\sqrt{3})$

```
12        48
/\        /\
2  6     2  24
   /\        /\
  2  3      2  12
              /\
             2  6
                /\
               2  3
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= $8\sqrt{9}$

= $8 \cdot 3$

$\boxed{= 24}$
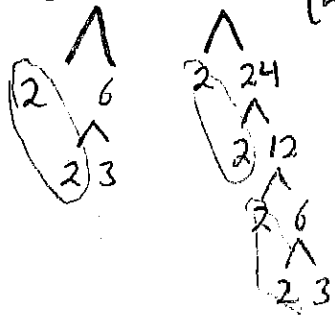
23] $\sqrt{32} + \sqrt{54} - \sqrt{98}$

$4\sqrt{2} + 3\sqrt{6} - 7\sqrt{2}$

combine

$\boxed{3\sqrt{6} - 3\sqrt{2}}$

EVALUATE EACH OF THE EXPRESSIONS *UNDERLINE WITHOUT* THE USE OF A CALCULATOR

24] $45 - [3(5 - 3)]$

$45 - (3 \cdot 2)$

$\boxed{39}$

25] $(9^2 + 4 \cdot 9 \div 4 - 6) \div 3$

$(81 + 36 \div 4 - 6) \div 3$

$(81 + 9 - 6) \div 3$

$84 \div 3 = \boxed{28}$

26] What does $2x^2 + 3x - 4$ equal when x = -3?

$2(-3)^2 + 3(-3) - 4$

$2 \cdot 9 - 9 - 4 = \boxed{5}$

27] $-21 + (+0.8)$

$\boxed{-20.2}$

$\overset{20\ 10}{\cancel{21.0}}$
$- \ 0.8$
$\overline{20.2}$

28] $-0.8 + (+1.1)$

$\overset{0\ 1}{\cancel{1.1}}$
-0.8
$\overline{0.3}$

$\boxed{0.3}$

29] $\frac{15}{16} - \frac{7}{20}$

$= \frac{75}{80} - \frac{28}{80} = \frac{47}{80}$

LCM = 80
$16 \cdot 5 = 80$
$20 \cdot 4 = 80$

30] $13 \div (+2)$

$\boxed{15}$

31] $(1\frac{1}{5})(4\frac{1}{2})$

$(\frac{6}{5})(\frac{9}{2}) = \frac{54}{10} = \boxed{\frac{27}{5}}$

32] $(7.3)(-12.1)$

$\begin{array}{r} 12.1 \\ \times\ 7.3 \\ \hline 36\ 3 \\ 84\ 7 \\ \hline 8\ \text{?}.\ \text{?}\ \text{?} \end{array}$

$\boxed{-88.33}$

33] $+21.07 \div (+4.3)$

$\boxed{4.9}$

$\begin{array}{r} 4.9 \\ 43\overline{)210.7} \\ -172\ \downarrow \\ \hline 38\ 7 \\ 38\ 7 \\ \hline 0 \end{array}$

34] $(5\frac{1}{3}) \div (3\frac{1}{5})$

$\frac{16}{3} \div \frac{16}{5} = \frac{16}{3} \times \frac{5}{16} = \boxed{\frac{5}{3}}$

35] $\frac{3}{10} + \frac{1}{4} = \frac{6}{20} + \frac{5}{20}$

$= \boxed{\frac{11}{20}}$

36] $\frac{10}{33} \cdot \frac{9^{3}}{50} = \frac{1}{11} \cdot \frac{3}{5}$

$= \boxed{\frac{3}{55}}$

37] 0.35×0.3

$\boxed{0.105}$

$\overset{1\ 1}{0.35}$
$\times\ \ 0.3$
$\overline{1\ 0\ 5}$
$+\ 0\ 0\ 0$
$\overline{0.1\ 0\ 5}$

SOLVE EACH LINEAR EQUATION BELOW FOR 'X'

38] $3(2x - 5) - 1 = -2(x + 4)$

$6x - 15 - 1 = -2x - 8$

$6x - 16 = -2x - 8$

$8x = 8$

$\boxed{x = 1}$

39] $\left(\dfrac{4x + 2}{3} = 5x - 1\right) 3$ Multiply whole equation by 3

$4x + 2 = 15x - 3$

$-4x \qquad -4x$

$2 = 11x - 3$

$+3 \qquad +3$ → $\boxed{x = \dfrac{5}{11}}$

40] $\dfrac{t + x - p}{m} = y$

$t + x - p = my$

$-t \quad +p \qquad -t + +p$

$\boxed{x = my - t + p}$

41] $\dfrac{2x - 12y = 10}{2}$

$x - 6y = 5$

$+6y \qquad +6y$

$\boxed{x = 5 + 6y}$

42] $\left(\dfrac{3}{2}x - 3 = \dfrac{3}{4}\right)(4)$

$6x - 12 = 3$

$+12 \quad +12$

$\dfrac{6x}{6} = \dfrac{15}{6}$

$x = \dfrac{15}{6} = \dfrac{5}{2}$

$\boxed{x = 5/2}$

EVALUATE EACH EXPRESSION WITHOUT A CALCULATOR. LEAVE ALL FINAL ANSWERS IN *SIMPLEST* FORM.

43] $\dfrac{2}{3} + \dfrac{3}{4} + \dfrac{5}{6} = \dfrac{8}{12} + \dfrac{9}{12} + \dfrac{10}{12}$

$= \boxed{\dfrac{27}{12}}$

44] $\dfrac{2x}{3} + \dfrac{3x}{8} = \dfrac{16x}{24} + \dfrac{9x}{24}$

$= \boxed{\dfrac{25x}{24}}$

45] $\left(\dfrac{4}{3} \times 9\right) \div \left(\dfrac{3}{4} \times \dfrac{8}{9}\right)$

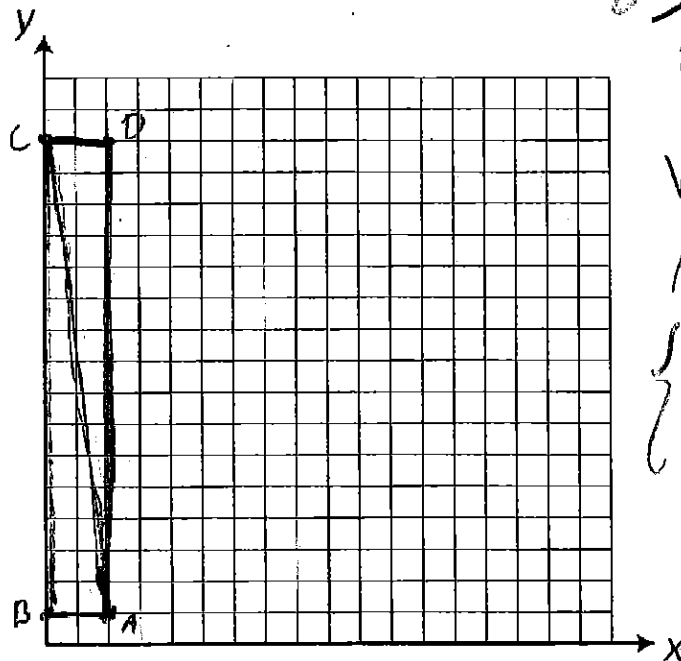$\left(\dfrac{4}{3} \times \dfrac{9}{1}\right) \div \left(\dfrac{24}{36}\right)$

$\left(\dfrac{36}{3}\right) \div \left(\dfrac{24}{36}\right) = \dfrac{36}{3} \times \dfrac{36}{24}$

$= \boxed{18}$

46] $\left(\dfrac{mt}{p}\right)\left(\dfrac{pt}{m}\right) = \boxed{t^2}$

USE THE DISTANCE AND MIDPOINT FORMULAS TO ANSWER THE FOLLOWING QUESTIONS

**A rectangle has vertices located at A(2,1) B(0,1) C(0,16) and D(2,16)
Graph the rectangle on the grid provided.**

(You should know these formulas).

Distance Formula

$$\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

Midpoint Formula

$$\left\{ \frac{(x_1 + x_2)}{2}, \frac{(y_1 + y_2)}{2} \right\}$$

Slope

$$\frac{y_1 - y_2}{x_1 - x_2}$$

47] What is the horizontal width of the rectangle from A to B?

2

48] What is the length of a diagonal from A to C?

$$\sqrt{(2-0)^2 + (1-16)^2} = \sqrt{4 + 225} = \boxed{\sqrt{229}}$$

49] What are the coordinates of the point midway between A and C?

$$\left(\frac{2+0}{2}, \frac{1+16}{2} \right) = \left(1, \frac{17}{2} \right)$$ ← Final Answer has x,y coordinate

50] What is the slope of a line perpendicular to diagonal $\overline{AC}$?

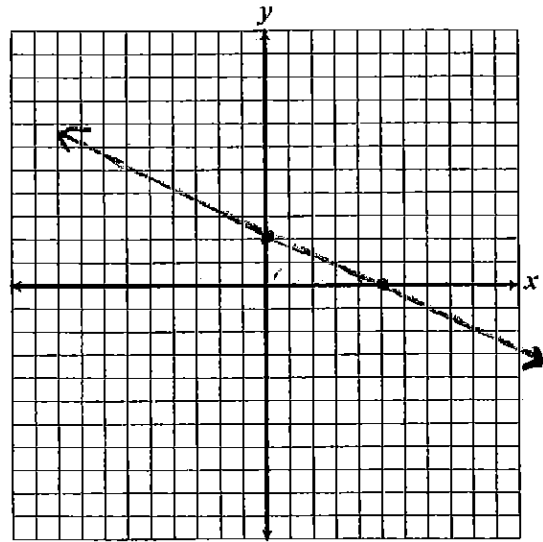slope $AC = \frac{16-1}{0-2} = \frac{15}{-2}$

$\boxed{\text{Perp. slope} = \frac{2}{15}}$ ★TAKE NEGATIVE RECIPROCAL★

GRAPH EACH LINEAR EQUATION ON THE COORDINATE PLANES PROVIDED.

51] $2x + 5y = 10$

You can use intercepts

$x = 0$

$2(0) + 5y = 10$

$y = 2$

$(0, 2)$

$y = 0$

$2x + 5(0) = 10$

$x = 5$

$(5, 0)$
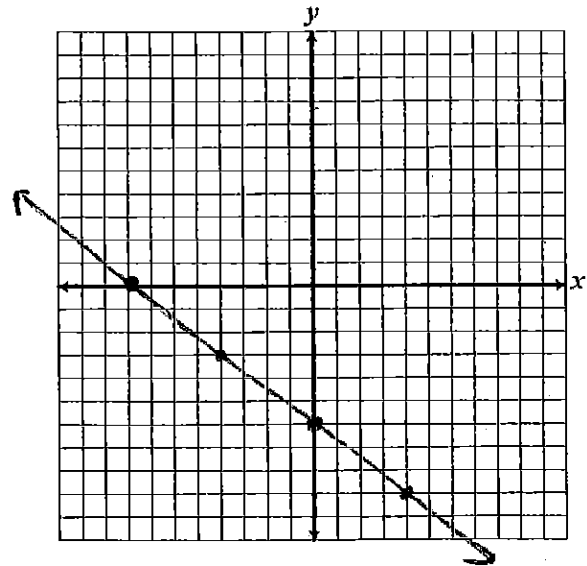
52] $\frac{x}{4} - \frac{y}{3} = 2$ You can convert to $y = mx + b$

$-\frac{y}{3} = \frac{x}{4} + 2$

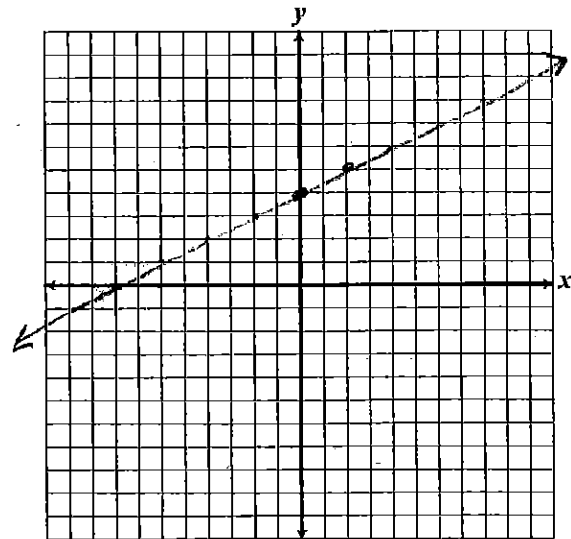$y = -3\left(\frac{x}{4} + 2\right)$

$y = -\frac{3}{4}x - 6$

$-\frac{3}{4} = \frac{rise}{run}$

$-6 = intercept$

53] $\frac{4y = 16 + 2x}{4}$

$y = 4 + \frac{1}{2}x$

WRITE THE EQUATION OF THE LINE FROM THE GIVEN INFORMATION. Use $y = mx + b$ form

54] Write an equation in <u>slope-intercept</u> form of the line passing through (0,1) and is perpendicular to the line 2x + 4 = y. m-perpendicular = $-\frac{1}{2}$

↑
b

↑
m

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

55] Write an equation in <u>slope-intercept</u> form of the line passing through (-9,5) and is perpendicular to the line y = -3x + 2. m-perpendicular = $\frac{1}{3}$

x y

↑
m

$y = \frac{1}{3}x + b$

$5 = \frac{1}{3}(-9) + b$

$5 = -3 + b$

$b = 8$

$$y = \frac{1}{3}x + 8$$

56] Write an equation in <u>slope-intercept</u> form of the line passing through (4,6) and is parallel to the line $y = \frac{2}{3}x + \frac{10}{3}$. m = $\frac{2}{3}$

$y = \frac{2}{3}x + b$

$6 = \frac{2}{3}(4) + b$

$6 = \frac{8}{3} + b \rightarrow b = \frac{10}{3}$

$$y = \frac{2}{3}x + \frac{10}{3}$$

It is the same line !!

57] Write an equation in <u>slope-intercept</u> form of the line that passes through (2,5) and has slope = -3.

$y = -3x + b$

$5 = -3(2) + b$

$b = 11$

$$y = -3x + 11$$

FOR #58-60 DETERMINE IF THE PAIR OF LINES ARE PARALLEL, PERPENDICULAR, OR NEITHER.

58] $y = 2x + 5$
$\quad y = -2x + 4$

$slope = 2$
$slope = -2$

$\boxed{NEITHER}$

59] $2y + 3x = 5 \rightarrow y = -\frac{3}{2}x + \frac{5}{2}$
$\quad 3y = 2x - 7$
$\quad\quad\quad\quad \searrow y = \frac{2}{3}x - \frac{7}{3}$

$-\frac{3}{2}, \frac{2}{3}$ are Negative reciprocals

$\boxed{PERPENDICULAR}$

60] $x = 3y + 2 \rightarrow y = \frac{1}{3}x - \frac{2}{3}$
$\quad y = \frac{1}{3}x - 3$

Both slopes are $\frac{1}{3}$

$\boxed{PARALLEL}$

FOR EACH PROBLEM BELOW, THE SLOPE OF A LINE IS GIVEN. DETEMINE THE SLOPE OF THE PERPENDICULAR LINE.

Take negative reciprocal !! ☺

61] $m = 3/5$

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

62] $m = -6$

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

63] $m = -1/11$

$\boxed{11}$

64] $m = -\sqrt{2}$ Rationalize

$\frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \boxed{\frac{\sqrt{2}}{2}}$