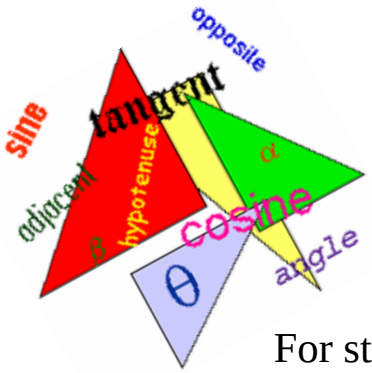


FRANKLIN HIGH SCHOOL

SUMMER REVIEW PACKET

For students entering ***Honors Trig w/ Analytic Geometry***

Name_____

These problems are designed to help you review Algebra II skills that are critical to your success in HTAG. ☺

If you are not confident in your ability to work with these types of problems after completing the required problems, you should work on the optional problems. ☺

1. All students will take a test on the first Friday of the new school year covering material contained in the packet. This assessment is not re-doable.
2. Mrs. Barrett is available via email for help for the entire summer. Please email her at LBARRETT@BCPS.ORG with any questions you have. If need be, we can set up a GOOGLE MEETS for "in-person" help.
3. When classes for the 20-21 school year are established in Schoology, you will receive a message from your teacher regarding the availability of the answer key.
4. If you have any questions, please email Mrs. Barrett at LBARRETT@BCPS.ORG
5. Enjoy your summer!! ☺

A. <u>Radicals</u>

Simplifying: Find any factors of the radicand that are perfect squares. The square roots of these factors are written in front of the radical (and multiplied). Any factors that are not perfect squares remain under the radical.

<u>Example</u>:

$$-5\sqrt{98} = -5 * \sqrt{2 * 49} = -5 * 7 * \sqrt{2} = -35\sqrt{2}$$

Simplify each of the following.

1. $-\sqrt{72}$

2. $12\sqrt{32}$

Multiplying: Simplify each radical before multiplying. Multiply the coefficients and multiply the radicands. Check to make sure the radicand is fully simplified.

<u>Example</u>:

$$(-3\sqrt{3})\left(-\frac{1}{4}\sqrt{5}\right)(2\sqrt{12}) = (-3\sqrt{3})\left(-\frac{1}{4}\sqrt{5}\right)(4\sqrt{3}) = 9\sqrt{5}$$

Simplify each of the following.

3. $\sqrt{12} * \sqrt{8} * \sqrt{10}$

4. $(-5\sqrt{3})^3$

Dividing: Simplify and/or divide the radicands then rationalize.

Simplify the coefficients. Reminder: $\sqrt{\frac{5}{7}} = \frac{\sqrt{5}}{\sqrt{7}}$

Example: $\frac{2\sqrt{30}}{3\sqrt{72}} = \frac{2\sqrt{5}}{3\sqrt{12}} = \frac{2\sqrt{5}}{6\sqrt{3}} * \frac{\sqrt{3}}{\sqrt{3}} = \frac{2\sqrt{15}}{18} = \frac{\sqrt{15}}{9}$

$$\frac{6}{\sqrt{5}-7} * \frac{\sqrt{5}+7}{\sqrt{5}+7} = \frac{6\sqrt{5}+42}{5-49} = \frac{6\sqrt{5}+42}{-44} = \frac{3\sqrt{5}+21}{-22}$$

Simplify each of the following.

5. $\frac{5\sqrt{40}}{7\sqrt{24}}$

6. $\frac{7-3\sqrt{5}}{7+3\sqrt{5}}$

Add/Subtracting: Simplify each radical. Adding and subtracting is a "like terms" issue. This means the radicand & the index (root) must be the same in order to be able to add/subtract. Add/subtract the coefficients and keep the radicand.

Example: $\sqrt{27} + \sqrt{48} = 3\sqrt{3} + 4\sqrt{3} = 7\sqrt{3}$

Simplify the following.

7) $3\sqrt{20} + 4\sqrt{2} - 2\sqrt{45}$

B. Solving Quadratic Equations

You have learned several ways to solve quadratics…factoring, quadratic formula, square root property and completing the square. You will use all of these methods at some point in the year. ☺

Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ **example:** $x^2 - 5x + 3 = 0$ $x = \frac{5 \pm \sqrt{(-5)^2-4(1)(3)}}{(2)(1)} = \frac{5 \pm \sqrt{13}}{2}$

Square Root Property: Use when one side of the equation is a perfect square. Take the square root of each side (don't forget the "plus/minus")

Example: $(x-3)^2 = 16 \rightarrow (x-3) = \pm 4 \rightarrow x = 7 \text{ \& } -1$

Factoring: The equation must be equal to zero. See factoring recap on page 8.

Example: $2x^2 - 5x - 12 = 0 \rightarrow (2x + 3)(x - 4) = 0 \rightarrow x = -2/3 \text{ \& } 4$

Complete the Square: Lead coefficient must =1; divide linear coefficient by 2 & square; add this value to both sides of the equation. Factor & use the Square Root Property to finish solving.

$x^2 - 6x - 10 = 0 \rightarrow x^2 - 6x = 10 \rightarrow x^2 - 6x + 9 = 10 + 9 \rightarrow (x-3)^2 = 19 \rightarrow x-3 = \pm\sqrt{19} \rightarrow x = 3 \pm \sqrt{19}$

move 10 to other side | 6/2 = 3; $3^2 = 9$; add 9 to both sides | left side is a perfect square

Solve the following equations.

8) $2y^2 + 34y + 132 = 0$

9) $192 = 3(4 - c)^2$

10) $m^2 + 2\sqrt{7}m + 7 = 0$

11) $5v^2 - 140 = 0$

12) $m^2 - 2m - 11 = 0$

13) $w^4 - 20w^2 + 64 = 0$

14) $w^4 - 5w^2 + 6 = 0$

C. Foil and Factor

Reminder: Squaring means to multiply by itself….FOIL!

Example: $(2a - b)^2 = (2a - b)(2a - b) = 4a^2 - 4ab + b^2$

For #16 see the factoring recap on page 8

15) $\left(\frac{1}{5}a^2 + \frac{4}{5}\right)^2 =$

16) Factor: $125a^3 - 27$

D. Simplify Rational Expressions

To Simplify a rational expression, factor first, then cancel common factors.

Example: $\frac{p^2+7p-18}{p^2-13p+22} = \frac{(p+9)(p-2)}{(p-11)(p-2)} = \frac{p+9}{p-11}$

Simplify the following expressions.

17) $\frac{f^2-11f+30}{7f-42}$

18) $\frac{a^2-9b^2}{5a^2-11ab-12b^2}$

E. Fractions

Add/Subtracting: Factor all denominators, find the LCD, rewrite each numerator and add/subtract. Don't forget to make sure your final answer is fully simplified.

Example: $\frac{x+y}{x-3y} + \frac{x+2y}{5x-15y} = \frac{x+y}{x-3y} + \frac{x+2y}{5(x-3y)} = \frac{(x+y)*5+(x+2y)}{5(x-3y)} = \frac{5x+5y+x+2y}{5(x-3y)} = \frac{6x+7y}{5(x-3y)}$

Add/Subtract the following fractions.

19) $\frac{2y-1}{y+5} + \frac{y-2}{2y+5}$

20) $\frac{a-b}{5-10b} - \frac{a+2b}{3-6b}$

21) $\frac{2a-5b}{7a} - \frac{a+4b}{3a}$

Dividing: To divide fractions, multiply by the reciprocal and simplify.

Example: $\frac{6w}{\frac{18w^3}{5a}} = 6w * \frac{5a}{18w^3} = \frac{5a}{3w^2}$

Simplify the following fractions.

22) $\frac{\frac{9pq}{7r}}{\frac{18pq}{21r}}$

23) $\frac{\frac{9p^2}{5q}}{\frac{27p}{10q^2}}$

F. Special Right Triangles

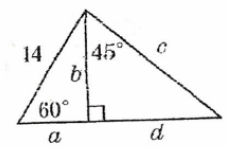
The special right triangles are 30°-60°-90° and 45°-45°-90°.

30°-60°-90° side lengths are: $x, x\sqrt{3}$ **and** $2x$

45°-45°-90° side lengths are: x, x **and** $x\sqrt{2}$

Find the exact value of each labeled part in each figure.

24)



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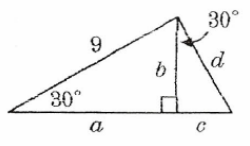

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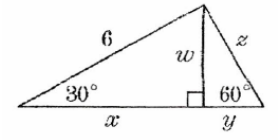

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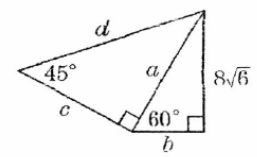

FACTORING RECAP

- Always look for a GCF first

- Next, how many terms do you have?

  - 2 Terms means either the difference of 2 squares or the sum/difference of cubes
    - Difference of 2 squares: $(a^2 – b^2) = (a + b)(a – b)$
    - Cubes: $(a^3 + b^3) = (a + b)(a^2 – ab + b^2)$ and $(a^3 – b^3) = (a – b)(a^2 + ab + b^2)$

  - 3 Terms: $ax^2 + bx + c$
    - If a = 1, find 2 numbers that multiply to c and add to b
      - $x^2 – 5x + 6$ find 2 numbers that multiply to +6 and add to -5; they are -2 & -3

        and $x^2 – 5x + 6 = (x – 2)(x – 3)$

    - If $a \neq 1$, multiply a*c, then find 2 numbers that multiply to that product and add to b
      - $2x^2 – 5x – 12$ multiply a*c = 2 *-12 = -24; find 2 numbers that multiply to -24 and add to -5; they are -8 & +3.
        - Rewrite -5x using the 2 numbers: $2x^2 – 5x – 12 = 2x^2 – 8x + 3x – 12$
        - Now, group and GCF factor: $(2x^2 – 8x) + (3x – 12) = 2x(x – 4) + 3(x – 4)$
        - The binomial in each set of parenthesis should be the same; it is a GCF:
          - $2x(x – 4) + 3(x – 4) = (x – 4)(2x + 3)$

OPTIONAL PROBLEMS

Simplify

1) $-\sqrt{98}$

2) $\pm\sqrt{50}$

3) $-\sqrt{245}$

4) $(3\sqrt{28})(\frac{\sqrt{74}}{4})(\sqrt{7})$

5) $\frac{5}{\sqrt{13}}$

6) $\frac{33}{\sqrt{33}}$

7) $\sqrt{\frac{56}{25}}$

8) $\frac{8\sqrt{11}}{3\sqrt{5}}$

9) $-2\sqrt{50}+5\sqrt{7}+3\sqrt{18}$

10) $\frac{4\sqrt{2}-1}{4\sqrt{2}+1}$

11) $\frac{9-\sqrt{2}}{9+\sqrt{2}}$

Solve

12) $9n^2 - 54n = 0$

13) $9p = p^2$

14) $a = \frac{a^3}{3}$

15) $n^2 + 3n - 28 = 0$

16) $-9x = 11x^2$

17) $p^2 - 5p - 24 = 0$

18) $0 = c^2 + 9c + 18$

19) $(p+3)^2 = 16$

20) $7m^2 - 1 = -3m^2 - 11m + 5$

21) $10 - 13c = 3c^2$

22) $x^2 - 2\sqrt{5}x + 5 = 0$

23) $3k^2 - 81 = 0$

24) $43 = \frac{2p^2}{3} - 7$

25) $c^2 - 4c - 1 = 0$

26) $4k^2 + 10k + 5 = 0$

27) $2x - 3x^2 = -2x - 12$

28) $6m^2 = 5m + 2$

29) $2w^2 - 3w - 3 = 0$

30) $12 = 2h^2 - h$

31) $a^4 - 5a^2 + 4 = 0$

32) $m^4 - 40m^2 + 144 = 0$

Simplify

33) $(\frac{3p}{5} - 4)^2$

34) $(k - \frac{2y}{3})^2$

35) $(\frac{3}{4} - 2x^2y)^2$

Factor

36) $27 - x^3$

37) $216z^3 - 125a^3$

38) $y^3 - 1$

39) $256b^5 - 4b^2$

Simplify

40) $\frac{81x^2 - 4y^2}{9x^2 - 25xy - 6y^2}$

41) $\frac{z+12}{z-5} \div \frac{z^2-7z+10}{z^2-10z+25}$

42) $\frac{r+9}{r^2-8r+15} \div \frac{r^2+8r-9}{r-3}$

43) $\frac{y^4-10y^2+9}{y^2-y-6} \div \frac{y^2+2y-3}{y^2+3y+2}$

44) $\frac{p-p^2}{10p+8} \div \frac{(p-1)^2}{5p^2+4p}$

45) $\frac{x^2-x-12}{2x^2+x} \div \frac{16-x^2}{2x^2+9x+4}$

46) $\frac{c^3-4c}{3c^2-5c-2} \div \frac{-2c-c^2}{6c^2+17c+5}$

Add

47) $\frac{q}{p+q} + \frac{p}{p+q}$

48) $\frac{12r^2-4}{r+2} + \frac{24r+4}{r+2}$

49) $\frac{p}{p-3q} - \frac{q}{2p+q}$

50) $\frac{c}{2c-d} - \frac{2d}{c+d}$

51) $\frac{2c}{3b-6c} + \frac{b}{4b-8c}$