This packet contains material you have learned in Algebra 2 and Geometry. Since you may have forgotten some of that material, this packet gives you the opportunity to review and in some cases relearn much of the Geometry and Algebra that you will once again need starting in the fall. This packet should be done during August so the material is still fresh when you return to school.

Due: This packet will be collected on <u>DAY 1</u> and play a role in your first quarter effort
Grade. SHOW ALL WORK.

Use the ANSWER KEY to help with any problems that you don't remember. Also, use the ANSWER KEY to CORRECT your work. The purpose of this packet is to refresh your Algebra and Geometry skills. This will not be graded but IT WILL BE COLLECTED DAY 1.
Give this a good effort and the first quarter will go much smoother for you.

NAME: ANSWER Key

Approximate time : 1 Hour 30 Minutes

A) Given functions, f, g and h evaluate as indicated.

$$f(x) = \frac{x+6}{x-3} \qquad g(x) = 3 - x^2 \qquad h(x) = \sqrt{2x-1}$$

1) $f(4)$

$$\frac{4+6}{4-3} = \frac{10}{1} = 10$$

2) $g(-2)$

3) $h(5)$

$$\sqrt{2(5)-1}$$
$$\sqrt{10-1} = \sqrt{9} = \boxed{3}$$

4) $f(3)$

$$\frac{3+6}{3-3} = \frac{9}{0} = \text{UNDEFINED}$$

5) $f(g(2))$

$$g(2) = 3 - 2^2 = 3 - 4 = -1$$
$$f(g(2)) = f(-1) = \frac{-1+6}{-1-3} = \boxed{\frac{5}{-4}}$$

6) $g(f(2))$

7) $\dfrac{f(5)}{h(13)}$

8) $g(m+2)$

$$3 - (m+2)^2$$
$$3 - (m^2 + 4m + 4)$$
$$3 - m^2 - 4m - 4$$
$$= -m^2 - 4m - 1$$

Simplify:

9) $\sqrt{48}$

10) $4\sqrt{6} \cdot 3\sqrt{2}$

$$12\sqrt{12} = 12\sqrt{4}\sqrt{3}$$
$$= 24\sqrt{3}$$

11) $(\sqrt{3}+5)(\sqrt{3}-5)$

$$3 - 5\sqrt{3} + 5\sqrt{3} - 25$$
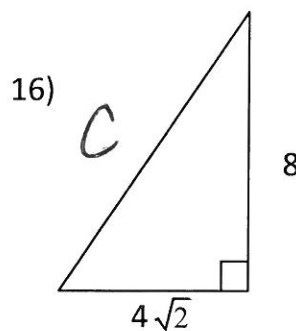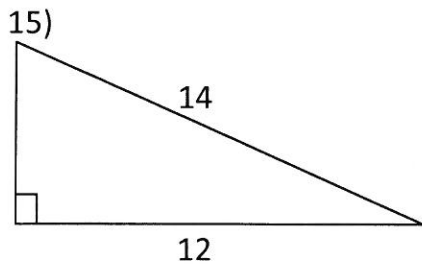$$\boxed{-22}$$

Rationalize the denominator:

12) $\dfrac{3}{\sqrt{5}} \cdot \dfrac{\sqrt{5}}{\sqrt{5}} = \dfrac{3\sqrt{5}}{5}$

13) $\dfrac{1}{\sqrt[3]{2}} \cdot \dfrac{\sqrt[3]{4}}{\sqrt[3]{4}} = \dfrac{\sqrt[3]{4}}{\sqrt[3]{8}}$

$$= \dfrac{\sqrt[3]{4}}{2}$$

14) $\dfrac{\sqrt{2}}{\sqrt{2}-\sqrt{3}}$

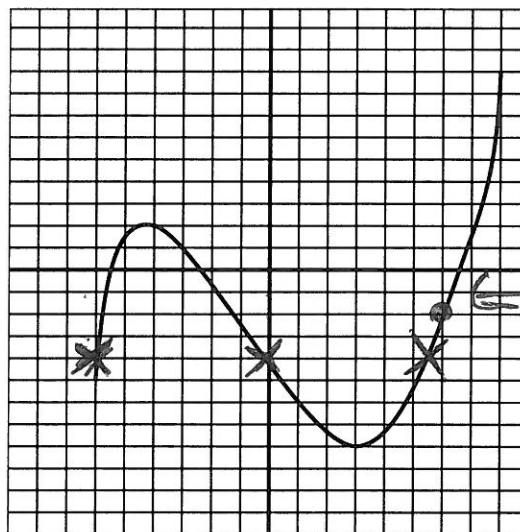Use the Pythagorean Theorem to find missing side of the given right triangles.

15)

14

12

16)

C

8

$4\sqrt{2}$

$a^2 + b^2 = c^2$

$(4\sqrt{2})^2 + (8)^2 = c^2$

$32 + 64 = c^2$

$96 = c^2$

$c = \sqrt{96}$

$= \sqrt{16}\sqrt{6}$

$= \boxed{4\sqrt{6}}$

17) The graph of f(x) is given to the right. Use the

Graph to estimate the following:

a)   domain of f
b)   range of f
c)   f(6)
d)   estimate the value(s) of x if f(x)=-4

$\longleftarrow (6,-2)$

SO

$f(6) = -2$

a) DOMAIN → POSSIBLE x VALUES

$-6 \le x \le 8$

b) RANGE → POSSIBLE y VALUES

$-8 \le y \le 9$

c) $f(6) = -2$

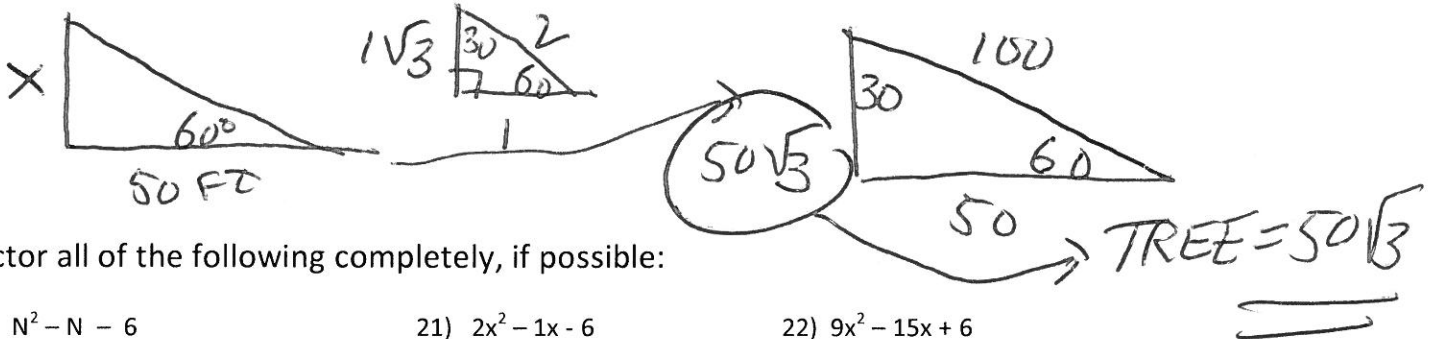d) when $f(x) = -4$ $\boxed{x=0}$ OR $\boxed{x=-6}$ OR $\boxed{x=5.5}$

LOOK FOR "x" MARKS ON GRAPH

Solve the following problems. Sketch a picture.

18) A rectangle has length 12 and width of 5. Find the diagonal.
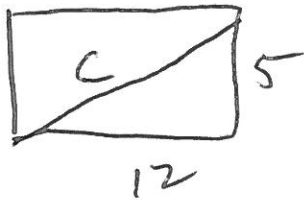
$c^2 = a^2 + b^2$

$c^2 = 5^2 + 12^2$

$c^2 = 25 + 144$

$c^2 = 169 \longrightarrow \boxed{C = 13}$

19) A boy is 50 ft from a tall tree. The angle from his feet to the top of the tree is $60°$. How tall is the tree?

$TREE = 50\sqrt{3}$

Factor all of the following completely, if possible:

20) $N^2 - N - 6$ 21) $2x^2 - 1x - 6$ 22) $9x^2 - 15x + 6$

$(N-3)(N+2)$ $(9x-6)(x-1)$

23) $(2x-3)^2 - 6(2x-3) + 8$ 24) $m(n-2) - 3(2-n)$ 25) $9x^4 + 16$

$(2x-3)(2x-3)^2$ ↓ Take $\ominus$ out

let $N = 2x-3$ $M(N-2) + 3(N-2)$

$N^2 - 6N + 8$ $(N-2)(M+3)$

$(N-4)(N-2)$

$(2x-7)(2x-5)$ Evaluate WITHOUT A CALCULATOR

26) $(2^{\sqrt{2}})^{\sqrt{8}} =$ _____   27) $Log_2 8 =$ _____   28) $Log_3 9 =$ _____   29) $\ln(e) =$ _____   30) $Log\ 100^5 =$ _10_

16   3   2   1   ↓

$5 Log\ 100$

$5(2) = 10$

Write and solve an equation for the each of the following problems.

31) A rectangular garden has a perimeter of 66 ft and an area of 216 ft^2 Find the dimensions of the rectangle.

x | y | x

y
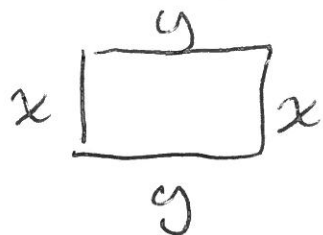
$2x + 2y = 66$
$2x = 66 - 2y$
$x = 33 - y$

AREA $x \cdot y = 216$
SINCE $x = 33 - y$

$(33-y)(y) = 216$
$33y - y^2 = 216$
$y^2 - 33y + 216 = 0$
$(y-24)(y-9) = 0$

$y = 24$
$y = 9$

24×9

32) Find three consecutive even integers such that the product of the two largest is 20 more than 10 times the smallest even integer.

Solve for x :

33) $\left(\sqrt{2x-5} \ \ 4\right)^2$

$2x - 5 = 16$
$2x = 21$
$x = 21/2$

34) State the QUADRATIC FORMULA :

$X = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve by any method : (Answers should be exact and MAY contain Radicals)

35) $(x-3)^2 = 16$

$x - 3 = \pm 4$
$x = 3 \pm 4$
$x = 7, -1$

36) $(3x-1)(x-3) = 0$

$3x - 1 = 0 \ | \ x - 3 = 0$
$x = \dfrac{1}{3} \ | \ x = 3$

37) $x^2 - 5x + 3 = 0$

38) Solve by COMPLETING the square. (SHOW ALL WORK...RELEARN COMPLETING THE SQUARE, if necessary)

$$x^2 - 8x + 3 = 0$$

$$\underline{-3 \quad -3}$$

$\longrightarrow$ Take $\frac{1}{2}$ of Then SQUARE iT and ADD To BOTH SiDes

$$x^2 - 8x = -3$$

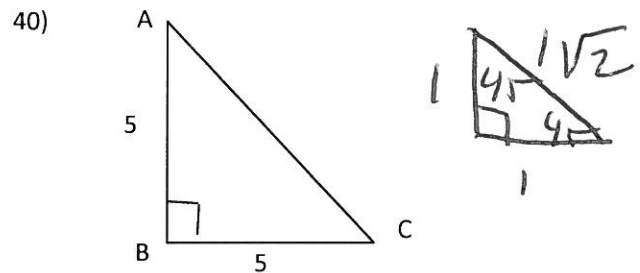$$x^2 - 8x + 16 = -3 + 16$$

$$\sqrt{(x-4)^2} = \sqrt{13}$$

$$x - 4 = \pm\sqrt{13}$$

$$\boxed{x = 4 \pm \sqrt{13}}$$

Use your knowledge of **RIGHT** Triangles to find ALL sides and ALL angles (Capital letter are angles, small = sides)

39)
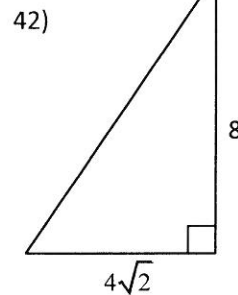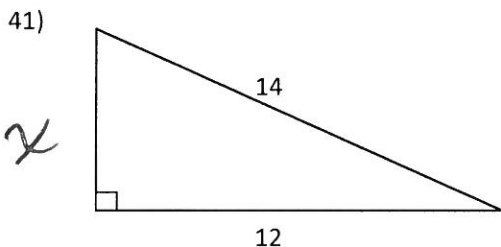
A, 4 (side B to A), B right angle, 30° at C, C

$$A = \underline{60°} \quad a = \underline{\sqrt{3}} \quad b = \underline{2}$$

40)

A, 5 (side B to A), B right angle, C, 5 (side B to C)

small triangle: $1\sqrt{2}$, 45°, 1, 45°, 1
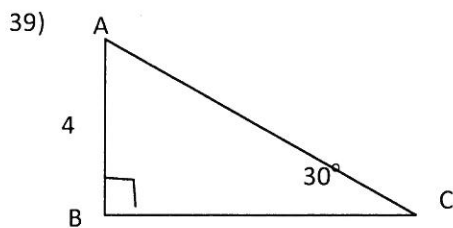
$$A = \underline{45°} \quad B = \underline{45°} \quad b = \underline{5\sqrt{2}}$$

Use the Pythagorean Theorem to find missing side of the given right triangles.

41)

14 (hypotenuse), x (left side), 12 (bottom)

42)

8 (right side), $4\sqrt{2}$ (bottom)

$$a^2 + b^2 = c^2$$

$$x^2 + 12^2 = 14^2$$

$$x^2 + 144 = 196$$

$$x^2 = 52$$

$$x = \pm\sqrt{52} \longrightarrow x = \sqrt{52} = \boxed{2\sqrt{13}}$$

43) A rectangle has length 12 and width of 5. Find the diagonal.   (SHOW ALL WORK)

44) Find a third degree polynomial given the Zeros are :   5, -5, and 2

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

$$(x^2-25)(x-2)$$

$$\boxed{x^3-2x^2-25x+50}$$

Perform the indicated operation and simplify. Leave you answer in factored form if necessary.

45) $\dfrac{x^2-2x+1}{x^3+x} \bullet \dfrac{4x^2+4}{x^2+x-2}$

$$\frac{(x-1)(x-1)}{x(x^2+1)} \bullet \frac{4(x^2+1)}{(x+2)(x-1)}$$

$$= \frac{4(x-1)}{x(x+2)}$$

46) $\dfrac{x+3}{x^2-4} \div \dfrac{x^2-x-12}{x+2}$

47) Solve for x. $\left[\dfrac{5}{x+4}=4+\dfrac{3}{x-2}\right]\dfrac{(x+4)(x-2)}{1}$ MULT. all by LCD

$$5(x-2) = 4(x+4)(x-2) +3(x+4)$$
$$5x-10 = 4x^2+8x-32 +3x+12$$
$$5x-10 = 4x^2+11x-20$$
$$0 = 4x^2+6x-10$$
$$0 = 2x^2+3x-5 \longrightarrow (2x+5)(x-1)=0$$
$$\boxed{x=\dfrac{-5}{2} \quad x=1}$$

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49) Find **all of the Zeros** of the polynomial $f(x)=x^3+2x^2-5x-6$ given that x = -3 is one of the Zeros

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50) Is $(x-4)$ a factor of $x^3-3x^2-16x+48$? EXPLAIN/ Show how you know

IF you plug in 4 and Get Zero Then yes! $f(4)=0$

$$(4)^3-3(4)^2-16(4)+48$$
$$64-48-64+48 \boxed{=0}$$

$\underline{yes}$ $(x-4)$ is A FACTOR

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51) Solve each system of equations, if possible.

a) $\left(\begin{array}{c}3x-y=9 \\ x+2y=-4\end{array}\right)$

b) $-x+2y=-4$
   $3x-6y=12$

$$6x-2y=18$$
$$x+2y=-4$$
$$\overline{}$$
$$\dfrac{7x}{7} \quad \dfrac{=14}{7}$$

$$\boxed{x=2}$$

$$x+2y=-4$$
$$2+2y=-4$$
$$2y=-6$$
$$\boxed{y=-3}$$