UNIT 6: GEOMETRY REVIEW SHEET

Part 1: Simplifying radicals.

1. $5\sqrt{6} \cdot \frac{1}{6}\sqrt{216}$

$5 \cdot \frac{1}{6}\sqrt{6 \cdot 216}$

$\frac{5}{6}\sqrt{1296}$

$\frac{5}{6} \cdot 36$

$\boxed{30}$

2. $-21\sqrt{27x^5}$

$-21\sqrt{9x^4 \cdot 3x}$

$-21 \cdot 3 \cdot x^{\frac{4}{2}}\sqrt{3x}$

$\boxed{-63x^2\sqrt{3x}}$

3. $3\sqrt{98a^3b^7}$

$3\sqrt{49a^2b^6 \cdot 2ab}$

$3 \cdot 7a^{\frac{2}{2}}b^{\frac{6}{2}}\sqrt{2ab}$

$\boxed{21ab^3\sqrt{2ab}}$

4. $\sqrt{12} \cdot \sqrt{75}$

$\sqrt{12 \cdot 75}$

$\sqrt{900}$

$\boxed{30}$

Part 2: Solving radical equations.

5. $3 - \sqrt{x} = -2$

$\underline{-3 \qquad -3}$

$\frac{-\sqrt{x}}{-1} = \frac{-5}{-1}$

$(\sqrt{x})^2 = (5)^2$

$\boxed{x = 25}$

check
$3 - \sqrt{25} \overset{?}{=} -2$
$3 - 5 \overset{?}{=} -2$
$\checkmark -2 = -2$

6. $\sqrt{10b + 6} = 6$

$(\sqrt{10b+6})^2 = (6)^2$

$10b + 6 = 36$

$\underline{\quad -6 \quad -6}$

$\frac{10b}{} = \frac{30}{}$

$\boxed{b = 3}$

check
$\sqrt{10(3)+6} \overset{?}{=} 6$
$\sqrt{30+6} \overset{?}{=} 6$
$\sqrt{36} \overset{?}{=} 6$
$\checkmark 6 = 6$

7. $\sqrt{n + 5} = \sqrt{5n - 11}$

$(\sqrt{n+5})^2 = (\sqrt{5n-11})^2$

$n + 5 = 5n - 11$

$\underline{-n+11 \qquad -n+11}$

$\frac{16}{4} = \frac{4n}{4}$

$\boxed{4 = n}$

check
$\sqrt{4+5} \overset{?}{=} \sqrt{5\cdot4 - 11}$
$\sqrt{9} \overset{?}{=} \sqrt{20-11}$
$\sqrt{9} \overset{?}{=} \sqrt{9} \checkmark$

8. $-2\sqrt{2r + 5} = 6$

$\frac{-2}{} \qquad \frac{-2}{}$

$(\sqrt{2r+5})^2 = (-3)^2$

$2r + 5 = 9$

$2r + 5 = 9$

$\underline{\quad -5 \quad -5}$

$\frac{2r}{2} = \frac{4}{2}$

$\boxed{r = 2}$

check
$-2\sqrt{2r+5} = 6$
$-2\sqrt{2\cdot2+5} = 6$
$-2\sqrt{9} = 6$
$-2 \cdot 3 = 6$
$-6 = 6$

$\boxed{\text{no solution}}$

Part 3: Pythagorean Theorem.

9. The area of a square is 49in². Find the length of its diagonal. Leave your answer as a simplified radical.

area $= s^2$
$49 = s^2$
$\sqrt{49} = \sqrt{s^2}$
$7 = s$
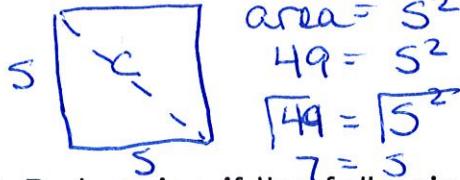
$7^2 + 7^2 = c^2$
$49 + 49 = c^2$
$\sqrt{98} = \sqrt{c^2}$

$\sqrt{98} = c$
$\sqrt{49 \cdot 2} = c$
$\boxed{7\sqrt{2} = c}$

**10.** Determine if the following sides lengths create a right triangle: 13, 38, 35

$a \quad c \quad b$

$a^2 + b^2 \overset{?}{=} c^2$
$13^2 + 35^2 \overset{?}{=} 38^2$
$169 + 1225 = 1444$
$1394 \ne 1444$

$\boxed{\text{No not a right triangle}}$

11. If you walked 3 blocks north and then 8 blocks west and then 10 blocks south, how far are you from your starting point if each block is 2/10 of a mile?
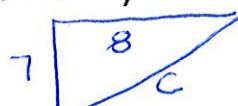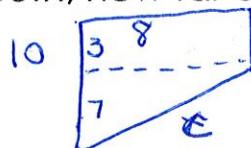
$8^2 + 7^2 = c^2$
$64 + 49 = c^2$
$\sqrt{113} = \sqrt{c^2}$
$c \approx 10.6 \times \frac{2}{10}$

$\boxed{c = 2.12 \text{ miles}}$

Part 4: Distance and Midpoint

Find the distance and midpoint between each pair of points.

$x_1\ y_1 \qquad x_2\ y_2$

12. A(3,5) and B(8,5)

$d = \sqrt{(8-3)^2 + (5-5)^2} \qquad x_m = \frac{3+8}{2} = \frac{11}{2}$

$d = \sqrt{5^2 + 0^2}$

$d = \sqrt{25} \qquad\qquad y_m = \frac{5+5}{2} = \frac{10}{2} = 5$

$\boxed{d = 5} \qquad \boxed{mid = \left(\frac{11}{2}, 5\right)}$

$x_1\ y_1 \qquad x_2\ y_2$

13. A(10,-2) and B(-6,3)

$d = \sqrt{(-6-10)^2 + (3--2)^2} \qquad x_m = \frac{-6+10}{2} = \frac{4}{2} = 2$

$d = \sqrt{(-16)^2 + (5)^2}$

$d = \sqrt{256 + 25} \qquad\qquad y_m = \frac{3+2}{2} = \frac{1}{2}$

$\boxed{d = \sqrt{281}} \qquad \boxed{mid = \left(2, \frac{1}{2}\right)}$

14. M is the midpoint of AB. If A is located at (6,10) and M is located at (5,7), find the coordinates of B.

A   M   B

(6,10)   (5,7) $x_2\ y_2$

$x_1\ y_1$ $x_m\ y_m$

$5 = \frac{6+x_2}{2}$

$10 = 6 + x_2$

$4 = x_2$

$7 = \frac{10+y_2}{2}$

$14 = 10 + y_2$

$4 = y_2$

$\boxed{\begin{array}{c} B \\ (4,4) \end{array}}$
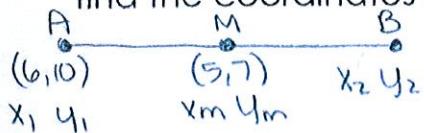
Part 5: Geometry

15. Find the perimeter of a triangle if the vertices are located at A(2,1) B(6,-3) and C(1,-7).

See Below

$\boxed{P = 20.12 \text{ units}}$

16. The volume of a cylinder is 1526.04 in³. If the height is 6in, find the length of the diameter.

$V = \pi r^2 h$

$1526.04 = (3.14) r^2 (6)$

$1526.04 = 18.84 r^2$

$81 = r^2$

$9 = r$

Diameter $= 2r$

$d = 2(9)$

$\boxed{d = 18 \text{ in}}$

17. Find the volume of a sphere if the circumference around the sphere is 31.4 inches.

$V = \frac{4\pi r^3}{3}$

$C = 2\pi r$

$31.4 = 2(3.14) r$

$31.4 = 6.28 r$

$r = 5$

$V = \frac{4(3.14)(5^3)}{3}$

$\boxed{V = 523.3 \text{ in}^3}$

18. If you double the radius of a sphere, how many times greater is the new volume?

$r = 1$

$r = 2$

$V = \frac{4(3.14)(1)^3}{3}$

$V = 4.187$

$V = \frac{4(3.14)(2^3)}{3}$

$V = 33.493$

$\frac{33.493}{4.187} = \boxed{8 \text{ times greater}}$

11.

N / W / E / S compass

8

3 ... 3

10 { 8 ... 7

X

8

7

X

$8^2 + 7^2 = x^2$ $x = \sqrt{113}$

$64 + 49 = x^2$ $x \approx 10.6$ blocks

$113 = x^2$
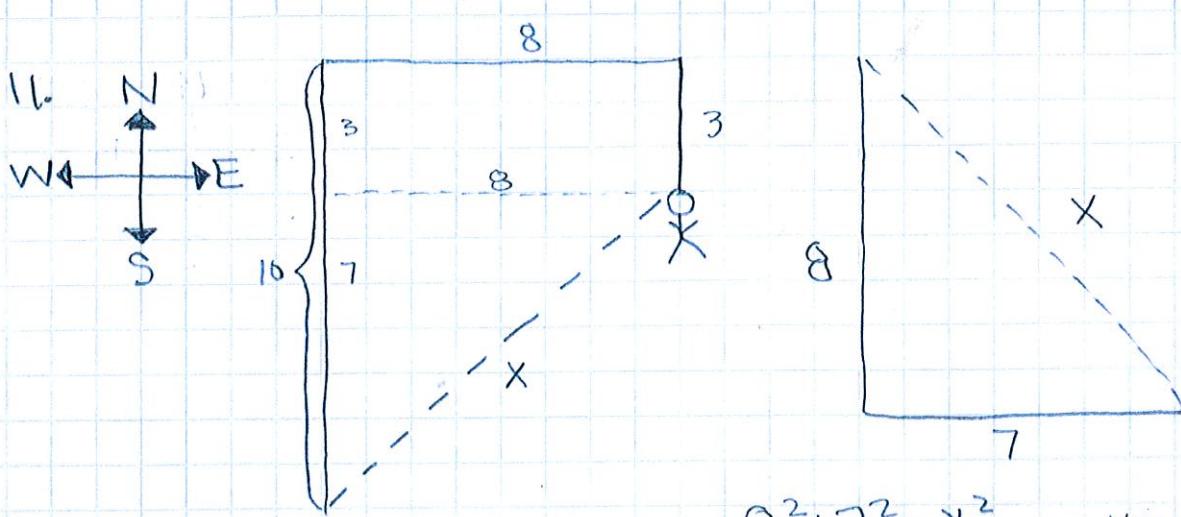
Each block is 2/10 of a mile

$10.6 \left(\dfrac{2}{10}\right) = 2.12$ miles from start

15.
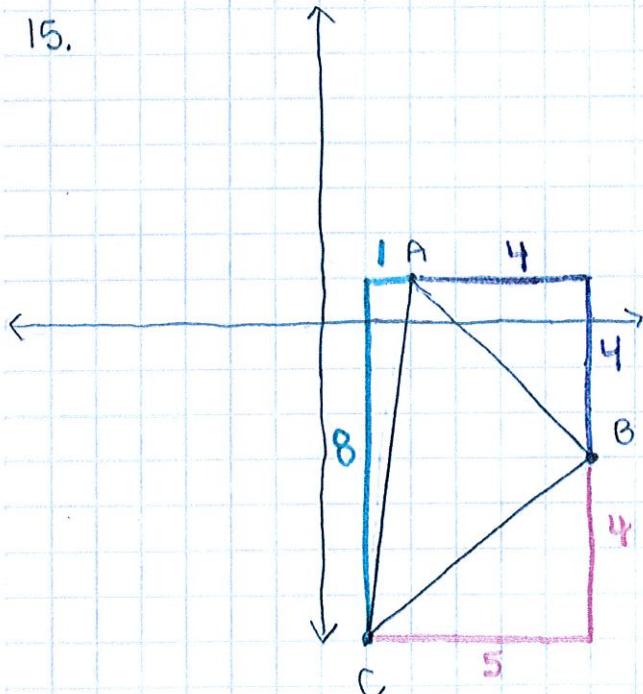
1 A   4

8   4

C   B   4

5

$8^2 + 1^2 = c^2$ $4^2 + 4^2 = c^2$

$64 + 1 = c^2$ $16 + 16 = c^2$

$c^2 = 65$ $c^2 = 32$

$c = \sqrt{65}$ $c = \sqrt{32}$

$4^2 + 5^2 = c^2$ $P = \sqrt{65} + \sqrt{32} + \sqrt{41}$

$16 + 25 = c^2$ $P = $ put in calc

$41 = c^2$ $P = 20.12$ units

$c = \sqrt{41}$

Part 6 Transformations:

19. Plot points A(1,2), B(1,4), C(4, 4), D(3, 2). Rotate 270° clockwise. Remember to label new shape with prime.
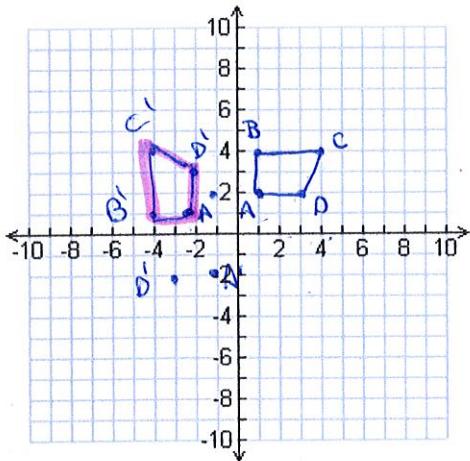
20. Plot points A(1,1), B(3,5), C(4,1). Translate 2 left and 4 down

-2 -4

A 1,1 A' -1, -3
B 35 B' 1, 1
C 4,1 C' 2, -3
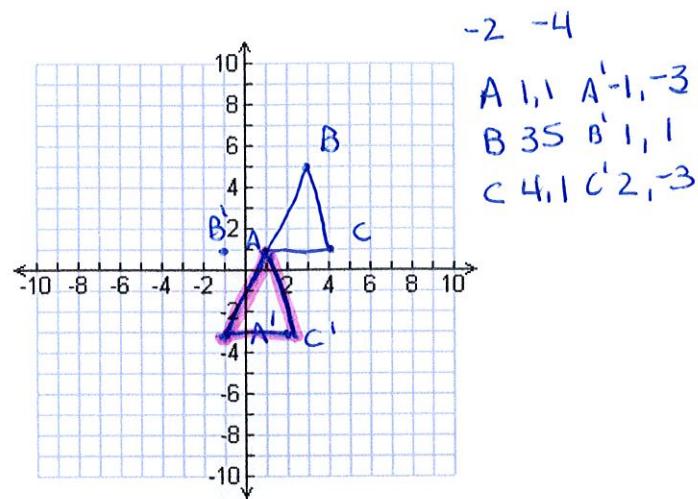
21. Plot points A(-4, 2), B (-2,5), C (-2, 3). Reflex across the x-axis.
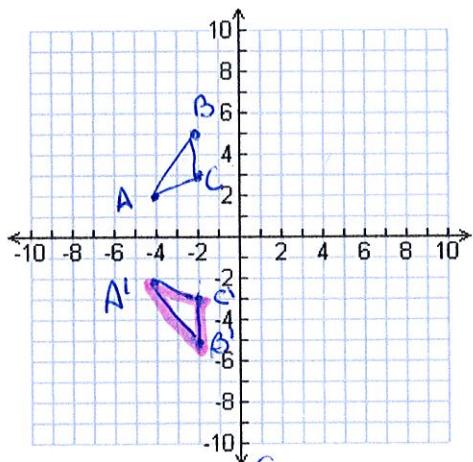
reflect across x Δ y sign

A -4,2   -4, -2
B -2,5   -2 -5
C -2,3   -2 -3

22. Plot points A(-2,1), B(0,1), C(1, 2), D(2,0). Dilate by a factor of 3
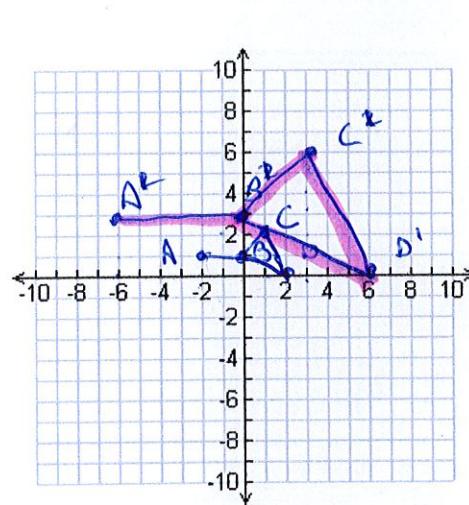
x3
A -2,1   -6,3
B .0 1   0,3
C 1,2   3,6
D 2,0   6,0

Complete the following angle puzzle.

Find the missing angles given: $\overleftrightarrow{AE} \parallel \overleftrightarrow{CK} \parallel \overleftrightarrow{HL}$
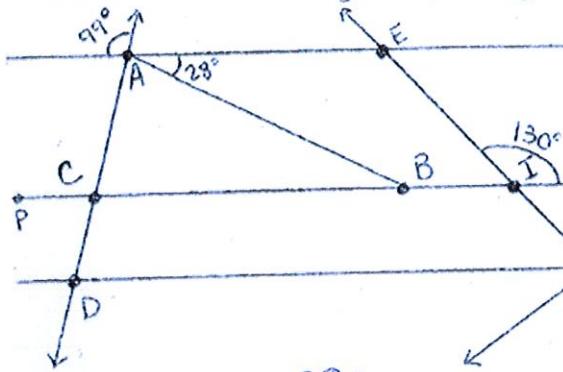
① ∠ACP = 99°
② ∠ACB = 81°
③ ∠CAB = 71°
④ ∠PCD = 81°
⑤ ∠CBA = 28°
⑥ ∠ABI = 52°
⑦ ∠CDH = 81°
⑧ ∠HGI = 39°

⑨ ∠GIH = 50°
⑩ ∠BIH = 130°
⑪ ∠EFG = 39°
⑫ ∠IEF = 50°
⑬ ∠GHI = 91°
⑭ ∠MNO = 71°
⑮ ∠NMO = 90°
⑯ ∠NOM = 19°
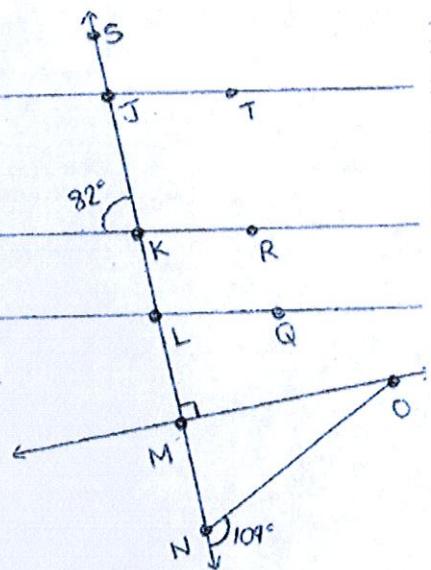
⑰ ∠MLQ = 82°
⑱ ∠JKR = 98°
⑲ ∠SJT = 98°
⑳ ∠HLK = 82°