Geometry 22-Review for Final—Answers

Name:

Period:

Note to student: This packet should be used as practice for the Geometry 22 final exam. This should not be the only tool that you use to prepare yourself for the exam. You must go through your notes, re-do homework problems, class work problems, formative assessment problems, and questions from your tests and quizzes throughout the year thus far.

Section 1

1) *Classify each statement as true or false, and explain your reasoning in each false case.*

   a) Two planes intersect in only one point. _____

          __False – they intersect in a line which has infinitely many points.__

   b) A ray starts at one point on a line and goes on forever. ___**True**___

   c) The intersection of 2 planes is one line ___**True**___

   d) Any four points are collinear. ___**False – any two points are collinear**___

   e) Any three parallel lines are coplanar. ___**False – any 2 parallel lines are coplanar.**___

2) *Use the figure below for #6-14. Note that $\overleftrightarrow{RN}$ pierces the plane at N. It is not coplanar with V.*

   a) Name two segments shown in the figure. $\boxed{\overline{MN} \text{ and } \overline{MX}}$

   b) What is the intersection of $\overleftrightarrow{CM}$ and $\overleftrightarrow{RN}$? **Point N**

   c) Name three collinear points. **Points A, N, & X**

   d) What are two other ways to name plane V? **ANC or MNX**

   e) Are points R, N, M, and X coplanar? **no**

   f) Name two rays shown in the figure. $\boxed{\overrightarrow{AX} \text{ and } \overrightarrow{NC}}$

   g) Name the pair of opposite rays with endpoint N. $\boxed{\overrightarrow{NX} \text{ and } \overrightarrow{NA}}$

   h) $\overleftrightarrow{AN}$ is the same as $\overleftrightarrow{NA}$. True or False? **True**

   i) ANX names a plane. True or False? **False**

3) *Construct and label the following:*

   a) The circumscribed circle of $\triangle JKL$
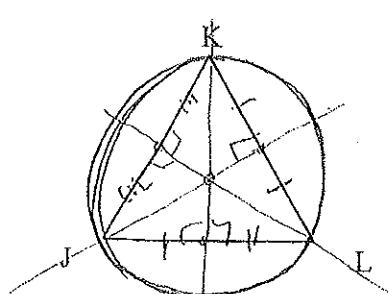
   b) The inscribed circle of $\triangle MNO$
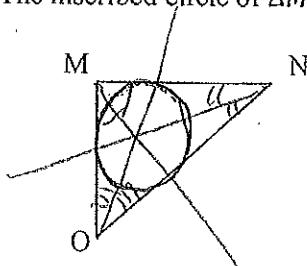
4) For the following exercises, do the construction using the figures below.
   a) Construct $\overline{AB}$ congruent to $\overline{XY}$.
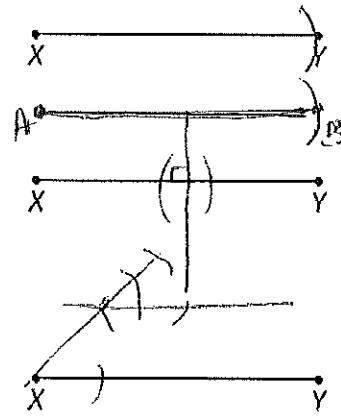
   b) Construct the perpendicular bisector of $\overline{XY}$.
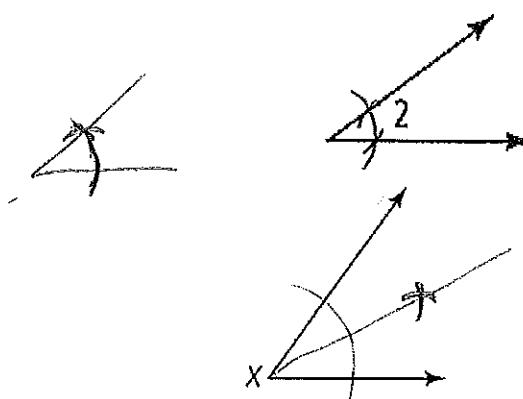
   c) Construct a segment parallel to $\overline{XY}$.
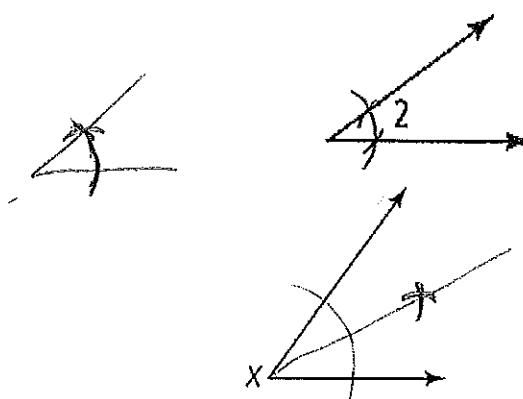
   d) Construct an angle congruent to $\angle 2$
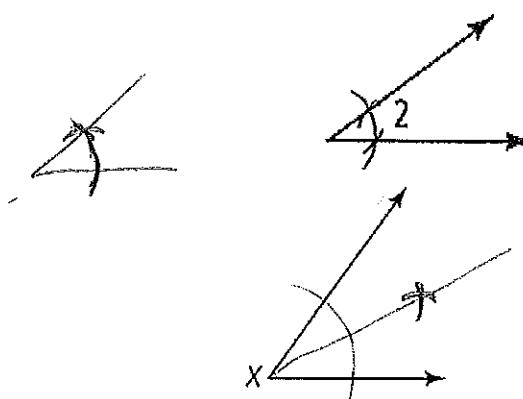
   e) Construct the angle bisector of $\angle X$
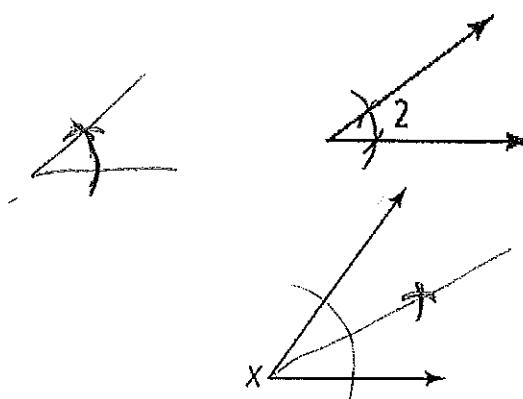
5) Below each figure write the name of the kind of rigid transformation shown.
   a.   b.   c.
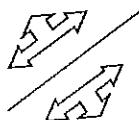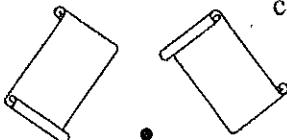
   __reflection__   __rotation__   __translation__
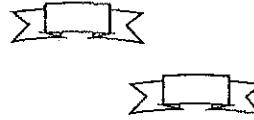
Section 2
Complete the following statements:

1) $\angle ABC$ and $\angle BCD$ are complementary. $m\angle ABC = 6x°$ and $m\angle BCD = 12x°$. Find x.
$$6x + 12x = 90 \quad SO \quad x = 5$$

2) $\angle ABC$ and $\angle BCD$ are supplementary. $m\angle ABC = 40x°$ and $m\angle BCD = 20°$. Find x.
$$40x + 20 = 180 \quad SO \quad x = 4$$

3) $AB = 2x + 1$, $BC = 16$ inches, $AC = 5x - 4$. Use the diagram to solve for x:

A ———————— B ———————— C

$2x + 1 + 16 = 5x - 4$ SO $x = 5$

$$21 = 3x$$
$$7 = x$$

4) Solve for y: $m\angle DGF = 12y - 5$, $m\angle EGF = 24°$, $m\angle DGE = 5y + 6$

$$12y - 5 = 24 + 5y + 6$$

SO $x = 5$

Section #3
Correct
x = 7
not 5
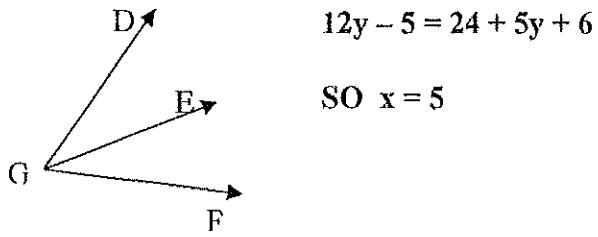
5) $\overrightarrow{WS}$ bisects $\angle$ BWV. m$\angle$BWS = 32°. What is m$\angle$BWV?

64°
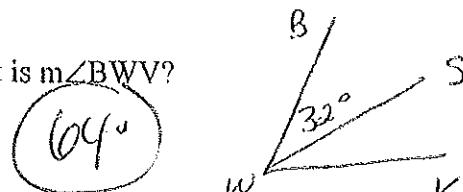
6) Determine the value of x:

a)

$50°$ $2x + 20$

$50 = 2x + 20$
$-20 \quad -20$
$30 = 2x$
$x = 15$

b)

$55°$ $x + 74$
$54°$

$55 + 54 + x + 74 = 180$
$183 + x = 180$
$-183 \quad -183$
$x = -3$

c)

$x + 23$
$4x + 17$ $80°$
$x + 17$

$4x + 17 + x + 23 + 80 = 180$
$5x + 120 = 180$
$5x = 60 \quad x = 12$

d)

$112°$ x x

$2x + 112 = 180$
$2x = 68$
$x = 34$

7) Use the following steps to determine whether the given statement is a definition.

Linear pairs are supplementary, adjacent angles.

a) Conditional statement   If it is a linear pair, then the angles are supplement and adjacent

b) Converse   If 2 angles are supplementry and adjacent, then they form a linear pair.

c) Biconditional statement   A pair of angles form a linear pair if and only if they are supplementary and adjacent.

d) Decide whether the statement is a definition. Explain your reasoning.
    Yes, b/c conditional and converse both true,

8) Write the conditional statement that corresponds to the Venn diagram below:
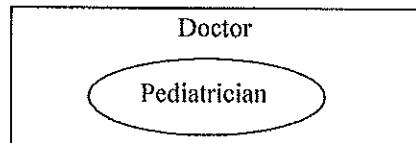
If a person is a pediastrician, they he/she is a doctor.

Doctor
Pediatrician

Section 3

1) For the following exercises, refer to the diagram below. Lines m and n are parallel. Name all angles congruent to the given angle and give the theorems or postulates that justify your answer.

a) $\angle 6$ $\cong \angle 7$ Vertical ∡ Thm; ∠3 alt. int, ∡ thm; ∠2 corresp. ∡ thm

b) $\angle 8$ ∠5 Vert ∡. thm; ∠1 alt. exterior ∡∡ thm; ∠4 corresp ∡ Thm

c) $\angle 5$ ∠4 alt. Int ∡ thm; ∠1 corresp. ∡ thm; ∠8 Vert. ∡ Thm

d) $\angle 7$ ∠6 vert ∡ thm; ∠3 corresp. ∡ thm; ∠2 alt. ext. ∡ thm
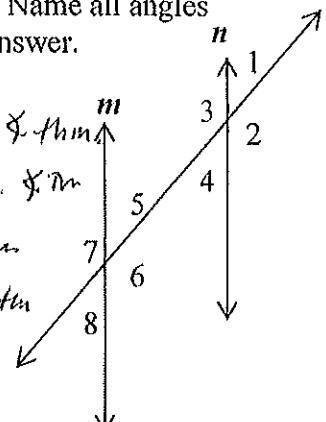
(3)

2) For the figure to the right m∠BCD = 160 - 3x °, and

m∠CFH = 35°. What is x?
What Theorem or Postulate supports your answer?

$160 - 3x + 35 = 180$

$195 - 3x = 180$

$-3x = -15$

$\boxed{x = 5}$

(Reasons vary)
∠BCA and ∠CFH
are congruent
(corresponding)

∠BCA and ∠BCD form a linear pair (=180)
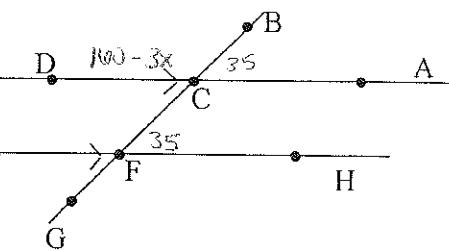
3) For the figure to the right m∠BCA = 68°, and
m∠CFH = 92 - 8x°. What value of x makes $\overrightarrow{AD} \parallel \overrightarrow{EH}$?
What Theorem or Postulate supports your answer?

$68 = 92 - 8x$

$-24 = -8x$

$\boxed{x = 3}$

∠BCA and ∠CFH
are congruent
(corresponding)
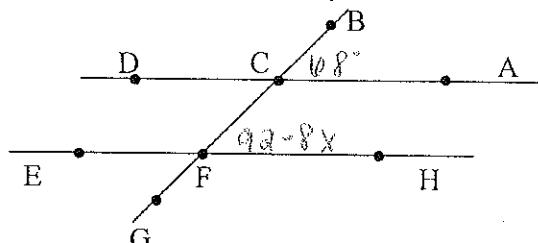
4) Fill in the blanks so that the sentences are true.

a) The sum of angles in any quadrilateral is __360°__.

b) In a parallelogram diagonals __bisect each other__ and opposite angles are

c) __congruent__.

d) A __rhombus__ and a __square__ have perpendicular diagonals.

e) A __trapezoid__ is a quadrilateral with only one pair of parallel sides.

f) A square is a quadrilateral with __four__ congruent sides and __four__ right angles.

g) A rhombus is a __parallelogram__ with four __congruent__ sides.

h) A __parallelogram__ is a quadrilateral with 2 pairs of parallel sides.

i) Any four-sided polygon is a __quadrilateral__.

j) A rectangle is a quadrilateral with __2 pairs of // sides, 2 pairs of ≅ sides, 4 right angles, ≅ bisecting diagonals__

5) Polygon DEFG is a parallelogram. GF = 3 in, DG = 2 in, m∠GDE = 110°
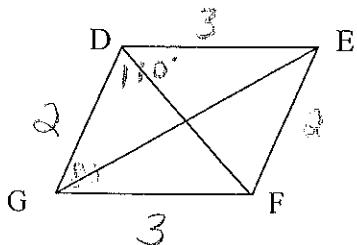
a) m∠DGF = __70°__
$180 - 110$

b) m∠GFE = __110°__
≅ to ∠GDE

c) $\overline{EF}$ = __2 in__
≅ to DG

d) $\overline{DE}$ = __3 in__
≅ to DG

④

6) *MNOP* is a rhombus. If $m\angle MNO = 88°$, find each of the following:

   a) $m\angle NOP =$ ___ $92°$
      $180-88$

   b) $m\angle OPG =$ ___ $44°$ $\frac{88}{2}$

   c) $m\angle OGN =$ ___ $90°$
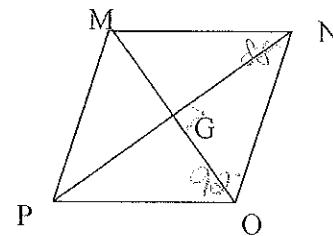
7) Use polygon *GHIJ* to the right to answer the following:

   a) If $GJ = 3x + 5$, $GH = 22 - 9x$, $HI = x + 17$, find *x*.

   $3X + 5 = X + 17$

   $2X = 12$ $X = 6$


   b) If $GI = 3x – 12$, $JH = 2x + 10$, find *JH*.

   $3x - 12 = 2X + 10$

   $X = 22$ 22
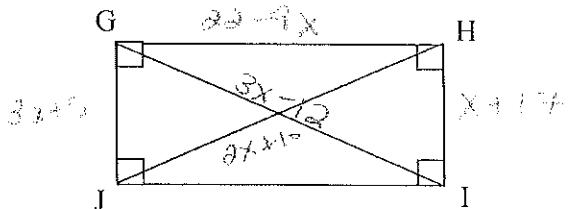
8) Find the following.

   a) $NM =$ ___ 25 u $\frac{50}{2}$

   b) $x =$ ___ -4

   $2(120) = 32 - 52x$
   $240 = 32 - 52X$
   $208 = -52X$
   $X = -4$

   Sec. 3
   #7 b
   should be
   $X = 22$

   c) What is $\overline{NM}$ called? ___ midsegment

9) Find the **slope, midpoint, and length** of each of the following segments whose endpoints are given.

   a) *(-1, 4)* and *(4, 10)*

   slope: $\frac{10-4}{4-1} = \frac{6}{5}$

   midpoint: $\left(\frac{-1+4}{2}, \frac{4+10}{2}\right) = \left(\frac{3}{2}, 7\right)$

   length: $d = \sqrt{(4-1)^2 + (10-4)^2} = \sqrt{61}$
   $= 7.81$

   b) *(8, 0)* and *(10, 6)*

   slope: $\frac{6-0}{10-8} = \frac{6}{2} = 3$

   midpoint: $\left(\frac{8+10}{2}, \frac{0+6}{2}\right) = (9, 3)$

   length:
   $d = \sqrt{(10-8)^2 + (6-0)^2} = \sqrt{40}$
   $= 6.32$

10) Lines that are parallel have ___ same ___ slopes and lines that are perpendicular have ___ opposite ___ slopes.
    reciprocal

⑤

11) For the following, a quadrilateral has vertices (2, –5), (–8, –5), (–2, 10) and (6, 5).

a) Graph the quadrilateral on the grid provided.

A   B   C   D

b) What type of quadrilateral is this? Show ALL work necessary to justify your answer.

slopes

$\overline{AD} = \frac{10}{4} = \frac{5}{2}$

$\overline{CB} = \frac{15}{6} = \frac{5}{2}$

$\overline{AD} \parallel \overline{CB}$

one pair of $\parallel$

sides → trapezoid
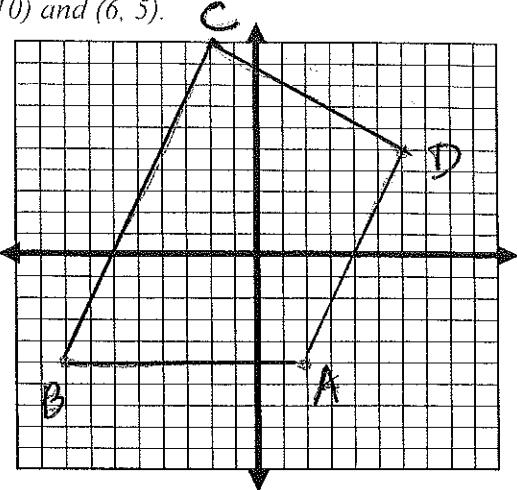
Section 4

1) Write a congruency statement for the following polygons. Why are they congruent?

$ABCD \cong HEFG$
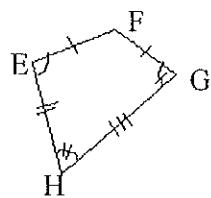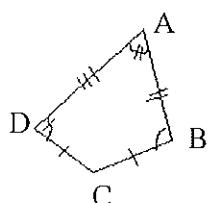
all sides are $\cong$

all angles are $\cong$

2) Determine whether each pair of triangles can be proven **congruent** by using the SSS, SAS, ASA or AAS congruence postulates. If so, identify what postulate is used.

a) not $\cong$

b) not $\cong$

c) $\cong$ by AAS
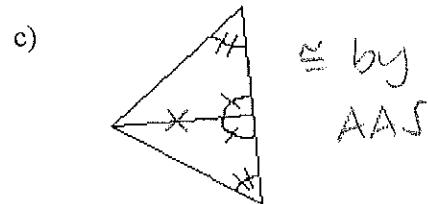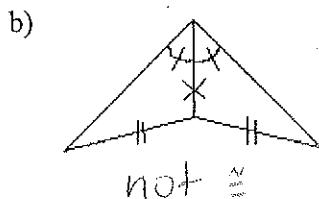
3) Determine whether each pair of triangle scan be proven congruent by using the SSS, SAS, ASA, AAS or HL congruence postulates. If so, identify what postulate is used and write a congruency statement.

a) not $\cong$

b) not $\cong$

c) $\triangle FGJ \cong \triangle HJG$ $\cong$ by HL

d) $\triangle MNO \cong \triangle YZX$ $\cong$ by AAS

e) $\cong$ by HL $\triangle WXY \cong \triangle GER$

f) $\cong$ by SSS $\triangle ABD \cong \triangle CBD$
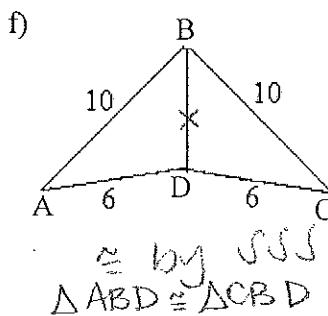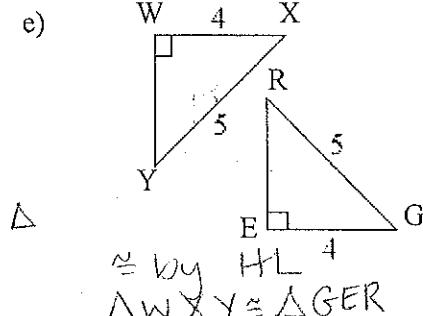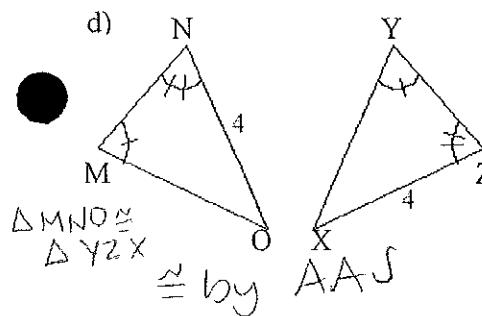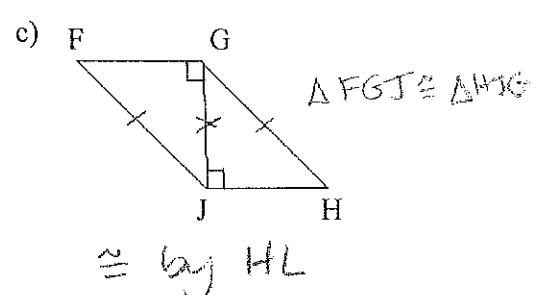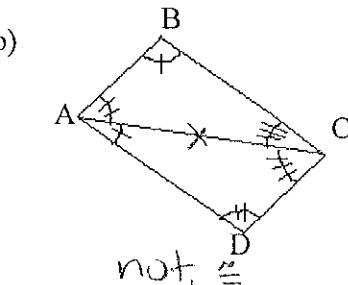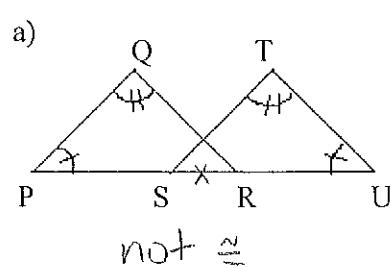
⑥

4) State what additional information is required in order to know that the triangles are **congruent** for the reason given. Need ∠D ≅ ∠S

a) ASA
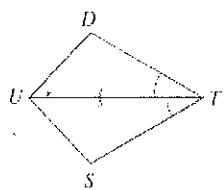

b) ASA
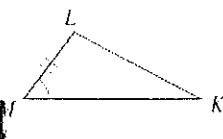
Need ∠L ≅ ∠T

c) SAS
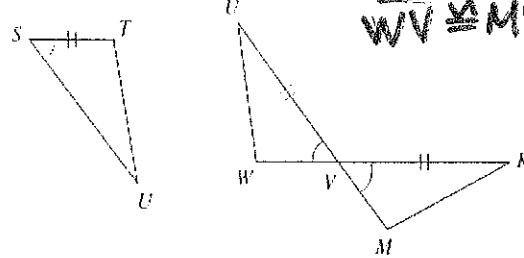
Need $\overline{WV} \cong \overline{MV}$

5) Determine whether or not the triangles below are **similar** (you may need to do a little work to figure it out) by AA, SSS, or SAS, or none of them. If they are similar, complete the similarity statement.

a) NOT ~

$$\begin{array}{r} 41 \\ 92 \\ +57 \\ \hline 190 \end{array}$$

△ABC ~

b) by AA ~

$$\begin{array}{r} 77 \\ 48 \\ +55 \\ \hline 180 \end{array}$$

△ABC ~ △DEF

c) by SSS ~

△DGF ~ △RTS

d)

by SSS ~

△ABC ~ △XZY $\frac{4}{6} = \frac{6}{9}$ ✓

e)

$\frac{1.5}{3} = \frac{1.25}{2.5}$ ✓

△TUV ~ △WXY
by SAS ~

f)
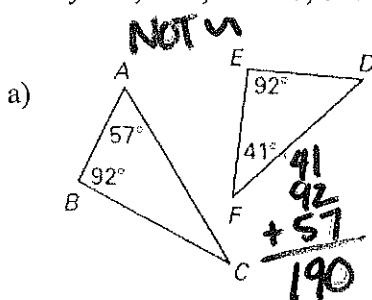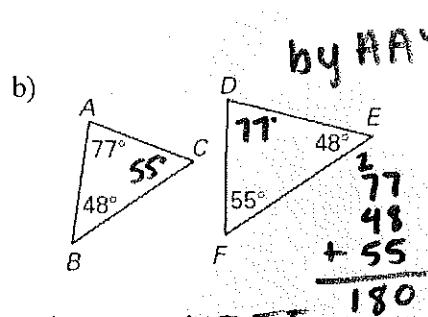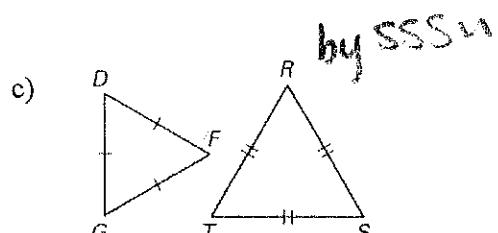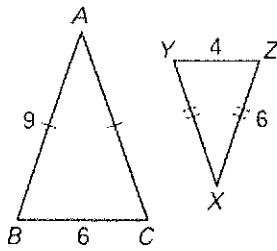
△WXY ~ △VZY   by AA ~

6) Determine whether the polygons are similar, not similar, or not enough information given. If they are similar, determine the scale factor comparing the first to second figure.

a) NOT enough info.
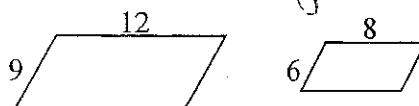
b)
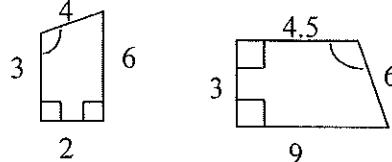
yes, scale factor of 1.5

c)
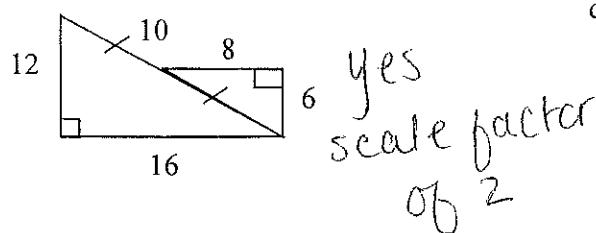
yes scale factor of 2

d)
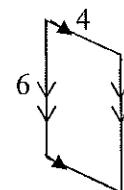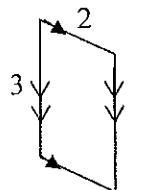
yes, scale factor of 2

⑦

7) The following polygons are similar; find x and y.

$54 + y = 180$
$\boxed{y = 126}$

a)

5

$54°$

1

$\frac{5}{1} = \frac{3}{2x-1}$

$3 \underset{}{\angle} y°$

$2x - 1$

$10x - 5 = 3$
$10x = 8$
$\boxed{x = .8}$

b)

$x + 2$

x

5

y

5

8

$\frac{y}{5} = \frac{5}{3.3}$
$3.3y = 25$
$\boxed{y = 7.6}$
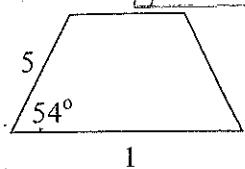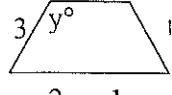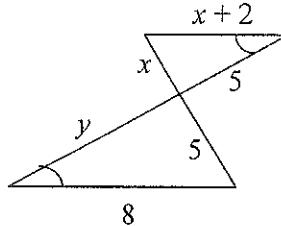
$\frac{x}{x+2} = \frac{5}{8}$

$8x = 5x + 10$
$3x = 10$
$\boxed{x = 3.3}$

8) $\triangle AFN \sim \triangle DPG$, $AF = 2$ cm., $FN = 3$ cm., $DG = 10$ cm., and $PD = 8$ cm. Find AN.
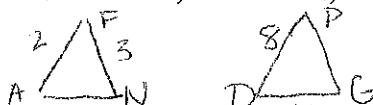
$\frac{2}{x} = \frac{8}{10}$ $20 = 8x$
$\boxed{x = 2.5}$

9) Use the following image to explain why the two triangles are similar, then estimate the length of the lake.

As are similar
by AA~

$\frac{2.4}{.9} = \frac{3.6}{x}$

$3.24 = 2.4x$
$\boxed{x = 1.35\,mi}$
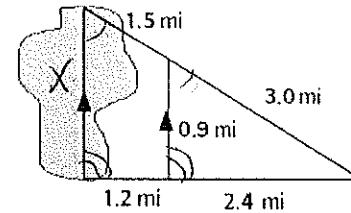
1.5 mi
3.0 mi
0.9 mi
1.2 mi   2.4 mi

10) Solve for x.

a)

5
x
10
18

$\frac{5}{x} = \frac{15}{18}$ $\boxed{x = 6}$
$15x = 90$

b)

x
12
8
24

$\frac{12}{8} = \frac{x}{24}$ $\boxed{x = 36}$
$8x = 288$

c)

7.5
2.5
12
x
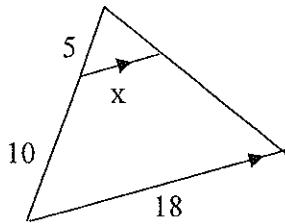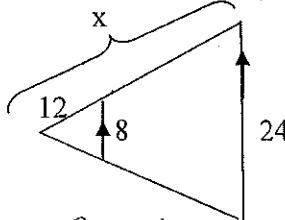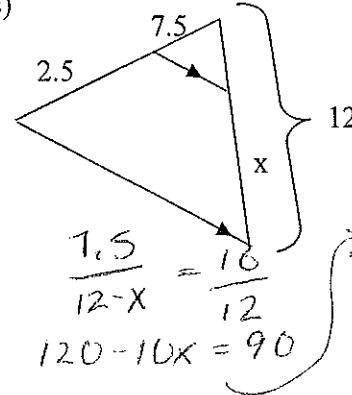
$\frac{7.5}{12-x} = \frac{10}{12}$ $-10x = -30$ $\boxed{x = 3}$
$120 - 10x = 90$

11) Use the diagram to find the height of each building.

a)

x
36 ft
30 ft   40 ft
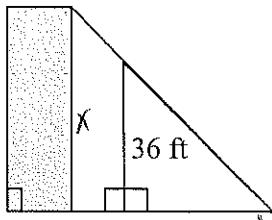
$\frac{40}{30} = \frac{70}{x}$

$40x = 2520$

$\boxed{x = 63}$

b)

x
16 ft
12 ft
24 ft
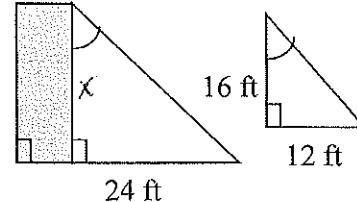
$\frac{x}{24} = \frac{16}{12}$

$12x = 384$

$\boxed{x = 32}$

c)

20 ft
24 ft
x
18 ft
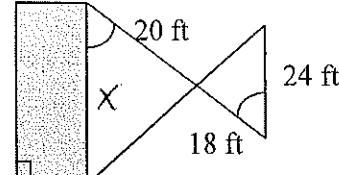
$\frac{18}{24} = \frac{20}{x}$

$18x = 480$

$\boxed{x = 26.67}$

⑧

Section 5

1) For # 1-3 two lengths of the right triangle are given. Find the missing length.

   a) a = 13   b = __5.2__   c = 14

   b) a = 12   b = 16   c = __20__
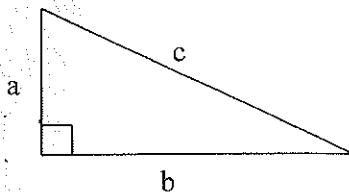
   c) a = __10.95__   b = 7   c = 13

2) Find the missing side lengths. Leave your answers in radical form.

a)

$45°$ y $9\sqrt{2}$
9 x
$45°$
9

b)

$30°$
10 x
$5\sqrt{3}$
$60°$
y
5

c)

22 $45°$ $22\sqrt{2}$
x
$45°$
y
22

d)

$30°$
14 $7\sqrt{3}$
x
$60°$
y
7
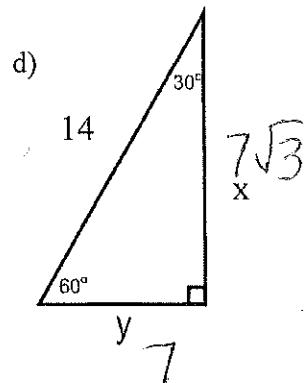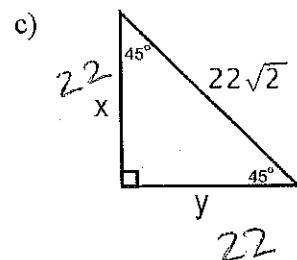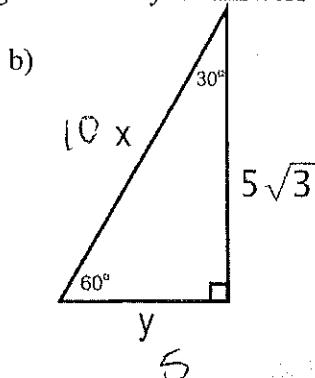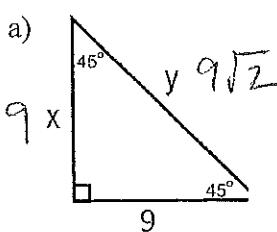
sec^5

12) For the following, ΔPQR, $m\angle PQR = 90°$, PQ = 6, $m\angle QPS = 60°$, and PR = 12.
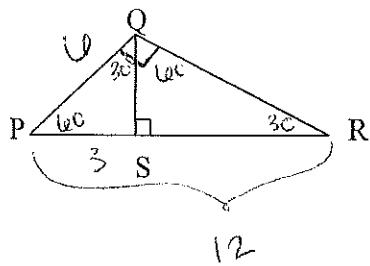
   a) Find QR = __$6\sqrt{3}$ & 10.2 10.4__

   b) Find QS = __$3\sqrt{3}$ & 5.1__

   c) Find SR = __9__

   d) Find the area of ΔPQR = ~~30.60~~ un^2 $3\ell_2$

   $\frac{1}{2}bh = \frac{1}{2}(12)3\sqrt{3} = 31.2 \, cm^2$

13) Find the area of each figure. Round your answers to the nearest tenth.

a)

E
4 m
D   F

$A = \frac{1}{2}(4)(4)$

$= \boxed{8 m^2}$

b)

G
6.1ft   7 ft
H 3.5 ft I
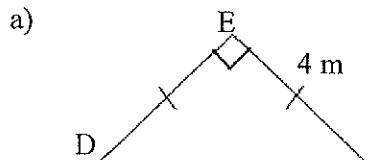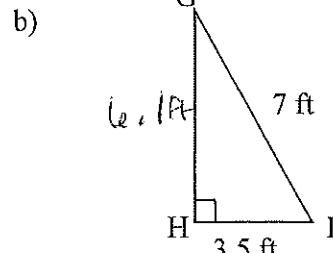
$7^2 \pm x^2 + 3.5^2$ $x = 6.1$

$A = \frac{1}{2}(3.5)(6.1)$

$= \boxed{10.7 \, Ft^2}$

(9)

14) Find the area of the following figures.

a)

12 ft

8 ft

14 ft

20 ft

$A = \dfrac{bh}{2}$

$A = \dfrac{20(8)}{2}$

$A = 80 ft^2$

b)

20 mm

8 mm

6 mm

$A = bh \qquad A = 20(6)$

$A = 120 mm^2$

c)

12 mi

8 mi   5 mi   8 mi

20 mi

$A = \dfrac{H(B_1 + B_2)}{2} \rightarrow \dfrac{5(12 + 20)}{2}$

$A = 80 mi^2$

d)

10 in

6.8

$A = \dfrac{aP}{2}$

$A = \dfrac{6.8(50)}{2}$

$A = 170 in^2$

e)

9 m

5 m

$A = d_1 \cdot d_2 \qquad A = \dfrac{18(10)}{2}$

$A = 90 m^2$

f)

9 cm

2 cm

12 cm

$A = \dfrac{d_1 \cdot d_2}{2}$

$A = \dfrac{18(14)}{2}$

$A = 126 cm^2$
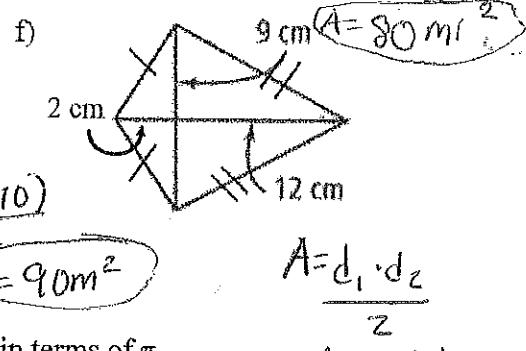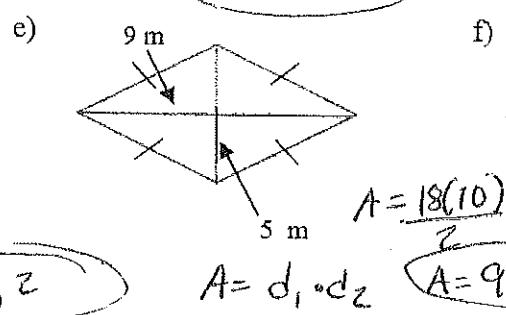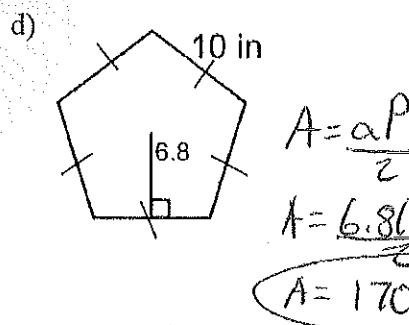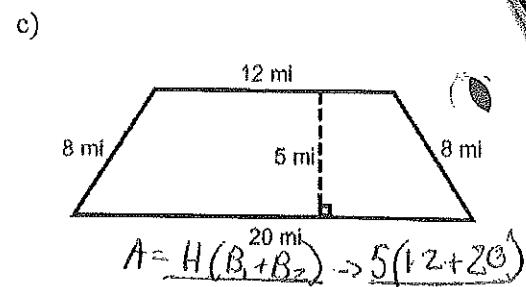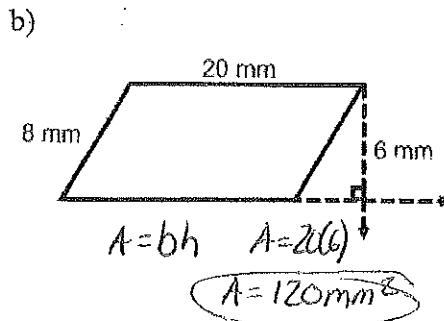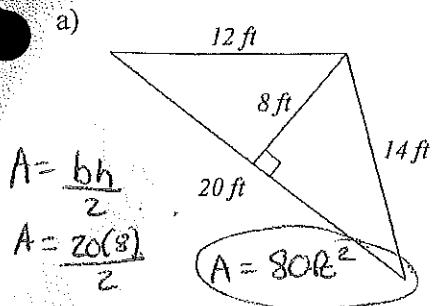
15) Find the circumference AND area of each figure. Leave your answer in terms of π.

a) r = 8 mm

$C: 16\pi mm$

$A: 64\pi mm^2$

b) d = 26 cm

$C: 26\pi cm$

$A: 169\pi cm^2$

c)

26 ft

$C: 52\pi ft$

$A: 676\pi ft^2$
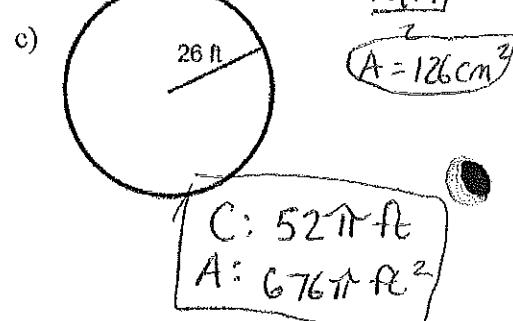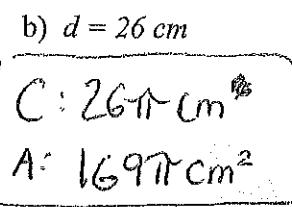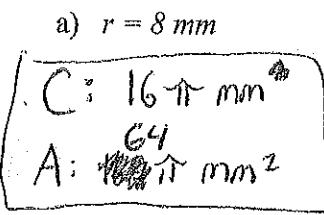
16) Round your answers to 12a) to the nearest hundredth.

C = 50.27 mm   A = 201.06 mm²

17) Find the radius of each circle from the given information. Round to the nearest tenth if necessary.

a) Area = 256π in²

$r = 16 in$

b) Circumference = 120 ft

$r = 19.1 ft$

18) If the area of a parallelogram is 100 cm² and the length of the base is 25 cm, what is the height?

$25h = 100$ $h = 4 cm$

19) If the area of a parallelogram is 45 ft² and the height is 3 ft, what is the length of the base?

$A = b(3)$ $45 = b(3)$ $b = 15 ft$

20) If the area of a trapezoid is 250 in², the lengths of the bases are 23 in and 27 in, what is the height?

$250 = \dfrac{H(23 + 27)}{2}$ $25H = 250$ $h = 10 in$

21) If the area of a triangle is 343 u² and the height is 14 u, what is the length of the base?

$343 = \dfrac{bh}{2}$ $343 = \dfrac{b(14)}{2}$ $b = 49 u$

10

22) Find the area of the shaded region.
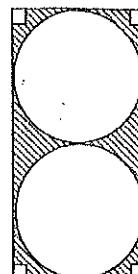
$20(40) = 800$ – Area of rectangle
$2(10)^2 \pi = 200\pi$
$800 - 200\pi = \boxed{171.68 u^2}$

20

23) Find the area of the composite figures below.

a)

6 cm

4 cm | 24 | 2π

$30.28 \ Cm^2$

b)

9

3 cm

30 | 5 cm

6 cm
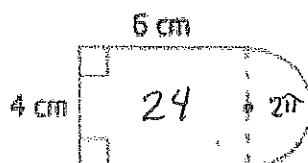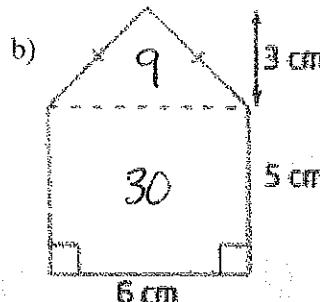
$\boxed{39 cm^2}$

Section 6

1) For the following, refer to the right prim below.

F

B

2 4

E D

A 3 C
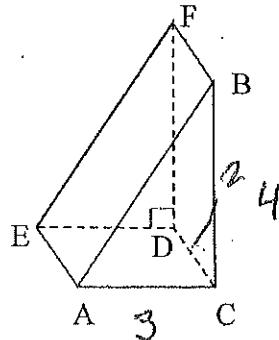
a) Name the prism. Triangular Prism

b) Name a pair of parallel planes. ABC & EFD

c) Name two segments skew to $\overline{BF}$ $\overline{AC}$ & $\overline{ED}$

d) Name two segments ⊥ to plane BFD. $\overline{AC}$ & $\overline{ED}$

e) What is the volume of the prism if BC = 4, AC = 3, and DC = 2.

$\boxed{12u^3}$

$V = BH$

$V = 6(2)$

$V = 12u^3$

2) What is the slant height of a right cone with a radius of 8 in. and a height of 14 in. _____

14in

8in
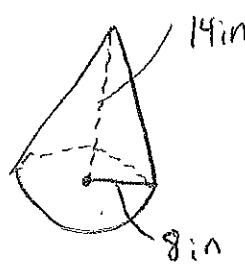
$8^2 + 14^2 = c^2$

$64 + 196 = c^2$

$260 = c^2$

$\boxed{c = 16.12 \ in}$