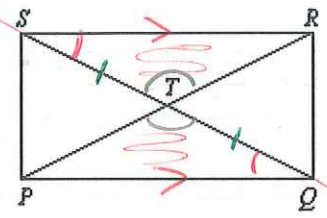
Name:_____ Class:_____ Date: Key

Chapter 4 Free Response Practice Test

1. Samantha has cut a pastry into four parts. Suppose $\overline{SR} \parallel \overline{PQ}$ and T is the midpoint of $\overline{SQ}$. Determine whether $\triangle SRT \cong \triangle QTP$. Justify your answer.

4 pts
1 pt each answer



$\angle RST \cong \angle TQP$ Alternate Interior $\angle$s are $\cong$

$\overline{ST} \cong \overline{TQ}$ Definition of midpt

$\angle STR \cong \angle PTQ$ Vertical $\angle$s are $\cong$

$\therefore \triangle SRT \cong \triangle QTP$ by SAS $\cong$

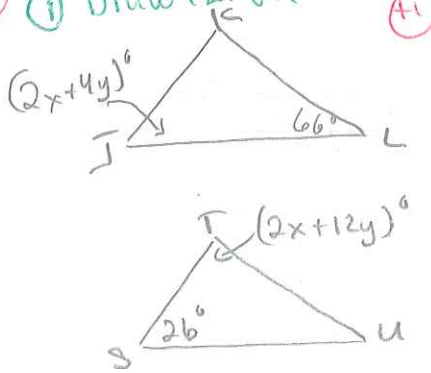
4 pts

2. Draw and label a figure to represent the congruent triangles described below. Then find x and y.

+1

$\triangle JKL \cong \triangle STU$, $m\angle S = 26°$, $m\angle J = (2x+4y)°$, $m\angle L = 66°$, $m\angle T = (2x+12y)°$

+1 (1) Draw & Label



+1 (2) Write equations

$\angle J \cong \angle S$

$2x+4y = 26$

$\angle T \cong \angle K$

$2x+12y = 88$

(3) Solve system

$2x+12y = 88$

$-(2x+4y = 26)$

$\frac{8y}{8} = \frac{62}{8}$

$y = 7\frac{6}{8} = 7\frac{3}{4} = 7.75$

+2 pts x, y

← find $\angle K$ to write equation

$\angle J + \angle K + \angle L = 180$

$26 + \angle K + 66 = 180$

$\angle K + 92 = 180$

$\angle K = 88$

$2x + 4\left(\frac{62}{8}\right)_2 = 26$

$2x + 31 = 26$

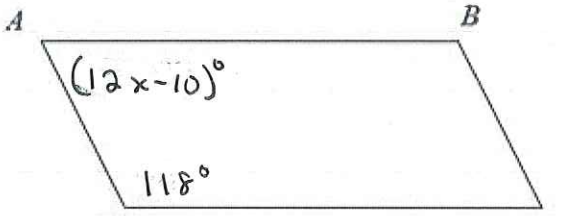
$-31 \quad -31$

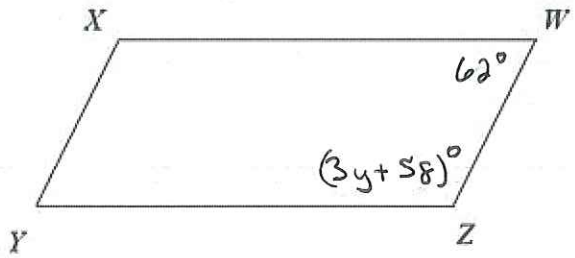
$\frac{2x}{2} = \frac{-5}{2}$

$x = -5/2$

3. Parallelogram $ABCD$ is congruent to parallelogram $WXYZ$. Solve for x and y.

4 pts
equations (2)
answers (2)





$\angle A \cong \angle W$

$12x - 10 = 62$

$12x = 72$

$x = 6$

$\angle Z \cong \angle D$

$3y + 58 = 118$

$-58 \quad -58$

$\frac{3y}{3} = \frac{60}{3}$

$y = 20$

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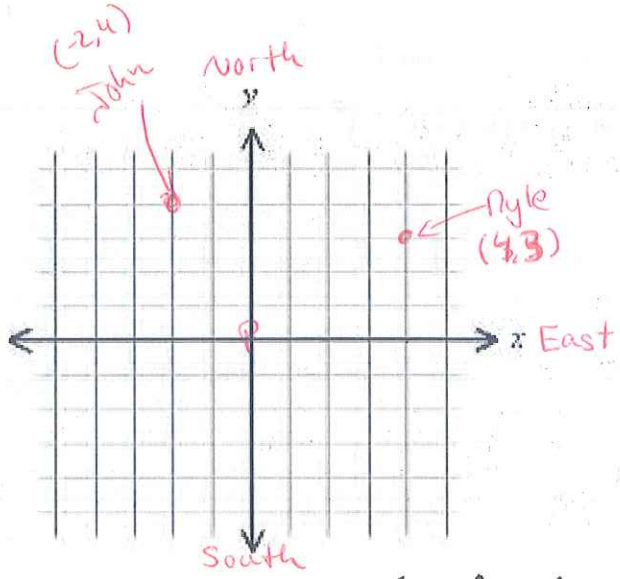
Chapter 4 Free Response Test

4. John and Nyle are playing in the playground. They mark a point on the ground. John moves 2 feet west of the point and then moves 4 feet north. Nyle moves 4 feet east of the point and then moves 3 feet to the north. Find the distance between John and Nyle.

4 pts
- Locations of John & Nyle on graph (2)
- distance formula (1)
- answer with units (1)



$$d = \sqrt{(4-(-2))^2 + (4-3)^2}$$
$$= \sqrt{6^2+1^2}$$
$$= \sqrt{36+1}$$
$$= \sqrt{37} \approx 6.1 \text{ feet apart}$$

4 pts equations answers

5. If $\Delta LMN \cong \Delta RST$, $LM = 74°$, $RS = (6x+44)°$, $MN = (8y-16)°$ and $ST = 32°$, solve for x and y.

- $LM \cong RS$

$74 = 6x + 44$
$-44 \quad -44$

$\frac{30}{6} = \frac{6x}{6}$

$5 = x$

- $MN \cong ST$

$8y - 16 = 32$
$+16 \quad +16$

$\frac{8y}{8} = \frac{48}{8}$

$y = 6$

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Chapter 4 Paper Review

Indicate the answer choice that best completes the statement or answers the question.

1. Two angles are supplementary. One angle measures 23° more than the other. **Find the measure of the two angles.**

$78.5^\circ, 101.5^\circ$

$m\angle 1 + m\angle 2 = 180$ defn of supplementary

$x + (x+23) = 180$

$2x + 23 = 180$

$-23 \quad -23$

$2x = 157$

$\frac{2x}{2} = \frac{157}{2}$

$x = 78.5^\circ = m\angle 1$

$m\angle 2 = 78.5 + 23 = 101.5^\circ$

Find the coordinates of the midpoint of a segment having the given endpoints.

2. Q(4, 9), R(−4, −3)

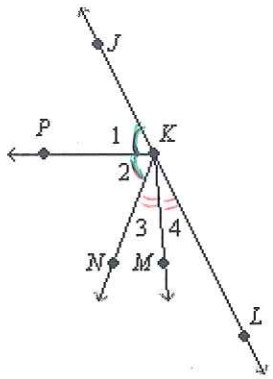
$\left(\frac{x+x}{2}, \frac{y+y}{2}\right) = \left(\frac{4+-4}{2}, \frac{9+-3}{2}\right) = \left(\frac{0}{2}, \frac{6}{2}\right) = (0, 3)$ ← midpoint

3. Q(2.6, 3.4) R(1.2, 5.4)

$\left(\frac{2.6+1.2}{2}, \frac{3.4+5.4}{2}\right) = \left(\frac{3.8}{2}, \frac{8.8}{2}\right) = (1.9, 4.4)$ ← midpoint

In the figure, $\overrightarrow{KJ}$ and $\overrightarrow{KL}$ are opposite rays. $\angle 1 \cong \angle 2$ and $\overrightarrow{KM}$ bisects $\angle NKL$.

So $m\angle JKM = \angle LKM$ by definition of bisects



4. Using the figure above, if $\angle JKN$ is a right angle and $m\angle 4 = 4x - 10^\circ$ what is x?

If $\angle JKN$ is a right angle
it measures 90°
So $m\angle NKL = 180 - 90 = 90^\circ$
Therefore, $m\angle 4 = 45^\circ$
by the definition of bisects.

$m\angle 4 = 4x - 10$

$45 = 4x - 10$

$+10 \quad +10$

$\frac{55}{4} = \frac{4x}{4}$

$13\frac{3}{4} = x$

$13.75 = x$

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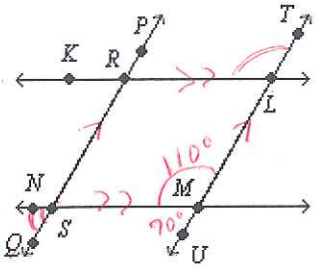
Chapter 4 Cumulative Test Review

5. In the figure, the measure of angle NML=110°, $\overleftrightarrow{PQ} \parallel \overleftrightarrow{TU}$ and $\overleftrightarrow{KL} \parallel \overleftrightarrow{NM}$. Find the measure of angle *QSN*.



$m\angle UMN + \angle NML = 180$ linear pair

$m\angle UMN + 110 = 180$

$m\angle UMN = 70°$

$\angle QSN \cong \angle UMN$ corresponding $\angle$s are =

$\therefore m\angle QSN = 70°$

Determine whether $\overleftrightarrow{WX}$ *and* $\overleftrightarrow{YZ}$ *are* parallel, perpendicular, or neither.

slopes need to be same

NOT same slopes NOT opposite reciprocal slopes

6. W (-2, 3) X (4, 1) Y (-1, 6) Z (0, 9)

slope of WX $= \frac{3-1}{-2-4} = \frac{2}{-6} = -\frac{1}{3}$

slope of YZ $= \frac{9-6}{0-(-1)} = \frac{3}{1}$

check

$-\frac{1}{3} \cdot \frac{3}{1} = \frac{-3}{3} = -1$

Since product of slopes is -1, Lines are perpendicular

Determine the slope of the line that contains the given points.

7. T (2, -2) V (7, 4)

$m = \frac{4--2}{7-2} = \frac{6}{5}$

8. **Find the value of the variable and *LM*** if *M* is between *L* and *N*.
HInt: draw segment LN and put M between L and N to "see" the equation.

***LM* = 7*a*, *MN* = 5*a*, *LN* = 84**

$LM + MN = LN$

$7a + 5a = 84$

$\frac{12a}{12} = \frac{84}{12}$

$a = 7$

$LM = 7a$

$LM = 7(7)$

$LM = 49$

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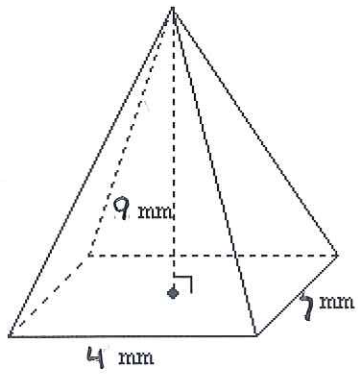
Chapter 4 Cumulative Test Review

Find the volume of the solid.

9.



① Volume of Pyramid $= \frac{1}{3} \cdot$ Area of Base $\cdot$ height

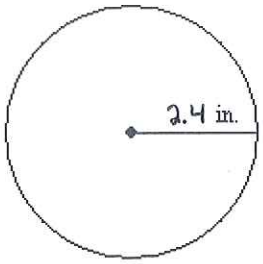
② Area of Base $= 4 \times 7 = 28$

③ $V = \frac{1}{3} \cdot 28 \cdot 9$

$V = 84 \text{ mm}^3$

Find the circumference of the figure.

10.



Circumference = 2 × radius × pi

$C = 2(2.4)\pi$

$C = 4.8\pi$ in ← exact

$C \approx 15.1$ in ← approximation

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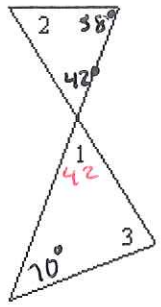
Chapter 4 Cumulative Test Review

Find each measure.

11. $m\angle 1$, $m\angle 2$, $m\angle 3$



$m\angle 1 = 42°$ Vertical angles are equal

$m\angle 2 + 58 + 42 = 180$ Triangle Sum Theorem

$m\angle 2 + 100 = 180$

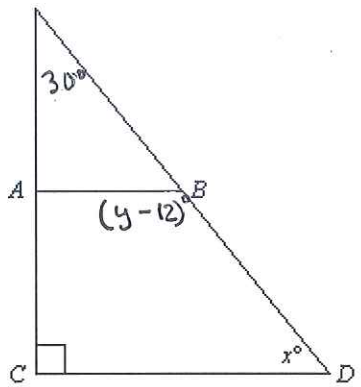
$m\angle 2 = 80°$

$m\angle 3 + 70 + 42 = 180$ Triangle Sum Theorem

$m\angle 3 + 112 = 180$

$m\angle 3 = 68°$

12. In the figure, $\overline{AB} \parallel \overline{CD}$. Find x and y.



$m\angle C + 30 + m\angle D = 180$ Triangle Sum Theorem

$90 + 30 + x = 180$

$120 + x = 180$

$x = 60°$

$m\angle ABD + m\angle D = 180$ Same-Side Interior $\angle$s are supplementary

$y - 12 + 60 = 180$

$y + 48 = 180$

$-48 \quad -48$

$y = 132$

Classify the triangle as acute, equiangular, obtuse, or right.

13.

All 3 angles are less than 90° so the $\triangle$ is acute.

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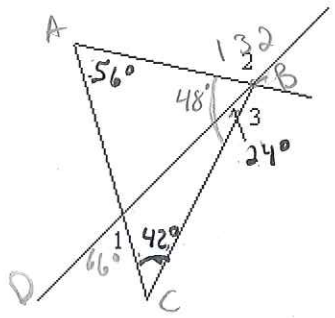
Chapter 4 Cumulative Test Review

Find each measure.

14. $m\angle 1$, $m\angle 2$, $m\angle 3$



$m\angle 1 = 42 + 24$ exterior $\angle$ theorem

$m\angle 1 = 66°$

$m\angle ABC + m\angle A + m\angle C = 180$ Triangle Sum thm

$m\angle ABC + 56 + 42 = 180$

$m\angle ABC + 108 = 180$

$m\angle ABC = 72$

So $m\angle ABD = 72 - 24 = 48°$

And

$m\angle 2 + 48 = 180$ Linear pair

$m\angle 2 = 132°$

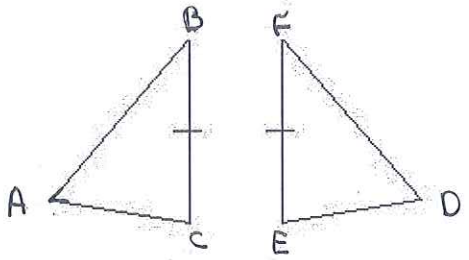
$m\angle 3 + 24 + 48 = 180$ (Every straight Line = 180°)

$m\angle 3 + 72 = 180$

$m\angle 3 = 108°$

Identify the congruent triangles in the figure.

15.



① Congruent corresponding parts

$\angle B \cong \angle F$

$\angle C \cong \angle E$

$\angle A \cong \angle D$

② Name $\triangle$ with corresponding parts in order

2 possible Answers: $\triangle BCA \cong \triangle FED$ or $\triangle ABC \cong \triangle DFE$

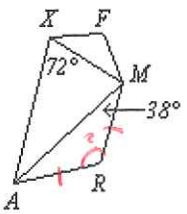
Write an equation in point-slope form of the line having the given slope that contains the given point.

16. $m = 3$, $(2, 1)$ x_1, y_1

$y - y_1 = m(x - x_1)$

$y - 1 = 3(x - 2)$ ← Answer just substitute given info into right place in formula!

*Refer to the figure. $\triangle ARM$, $\triangle MAX$, and $\triangle XFM$ are **all isosceles triangles.***



17. What is $m\angle ARM$?

• We know $m\angle RMA = m\angle MAR$ because base angles are $\cong$.

By the Triangle Sum Theorem

$38 + 38 + m\angle R = 180$

$76 + m\angle R = 180$

$m\angle R = 104°$

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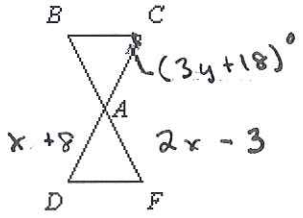
Chapter 4 Cumulative Test Review

18. Triangles *ABC* and *AFD* are vertical congruent equilateral triangles. Find *x* and *y*.



- Because all angles in an equilateral Δ = 60° we can write and solve

$$3y + 18 = 60$$
$$-18 \quad -18$$
$$\frac{3y}{3} = \frac{42}{3}$$
$$y = 14$$

- Because all side lengths in equilateral Δ's are = we know

$$AD = AF$$
$$x + 8 = 2x - 3$$
$$-x \quad -x$$
$$8 = x - 3$$
$$+3 \quad +3$$
$$11 = x$$