## Geometry Semester Exam Review Packet

## Chapter 1

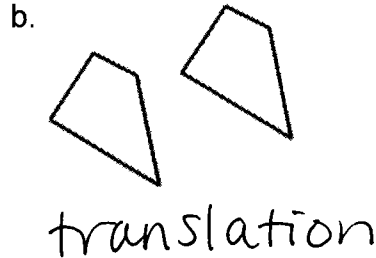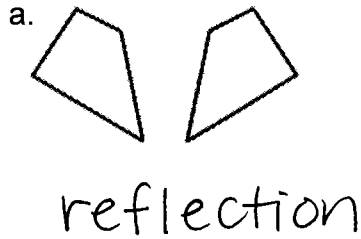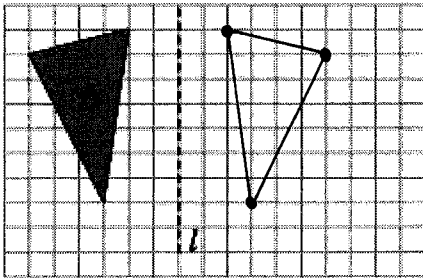**1.** Decide which transformation was used on each pair of shapes below. Some may have undergone more than one transformation, but try to name a single transformation, if possible.
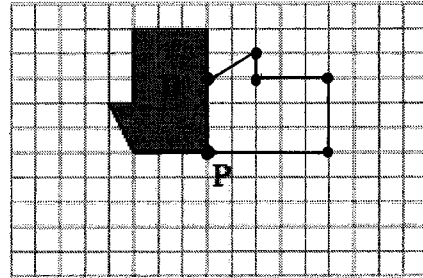
a.

reflection

b.

translation

c.

rotation

d.

rotation

e.

reflection

f.

rotation and reflection
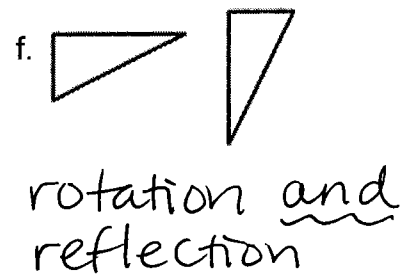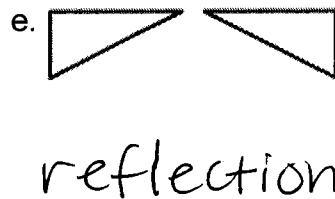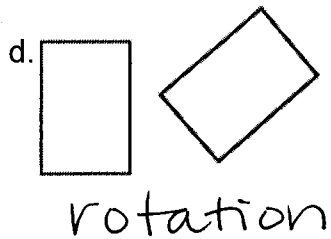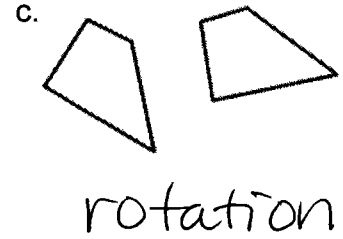
**2.** Find the result when each indicated transformation is performed.

a. Reflect Figure A across line *l*.

b. Rotate Figure B 90° clockwise ( ↻ ) about point P.

c. Reflect Figure C across line *m*.
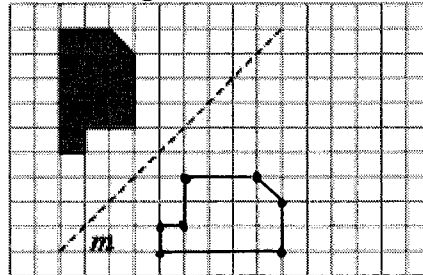
d. Rotate Figure D 180° about point Q.
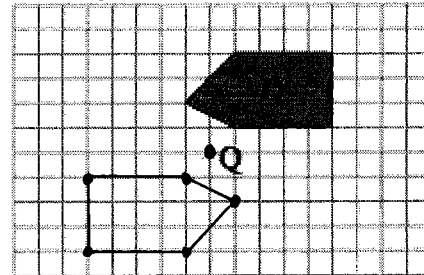
**3.** Find the probabilities of randomly selecting the following shapes from the Shape Toolkit, which contains all 16 basic shapes.

| a.  P(quadrilateral)  $\frac{1}{2}$ | b.  P(shape with an obtuse angle)  $\frac{9}{16}$ |
|---|---|
| c.  P(equilateral triangle)  $\frac{1}{16}$ | d.  P(shape with parallel sides)  $\frac{7}{16}$ |

**4.** For each equation below, solve for $x$. Show all work.

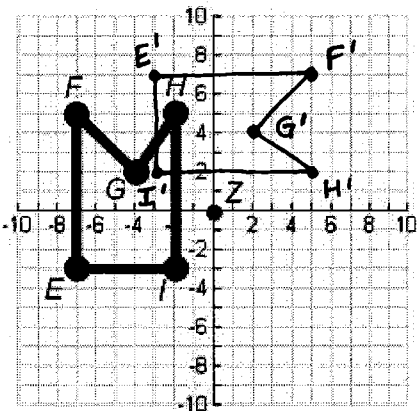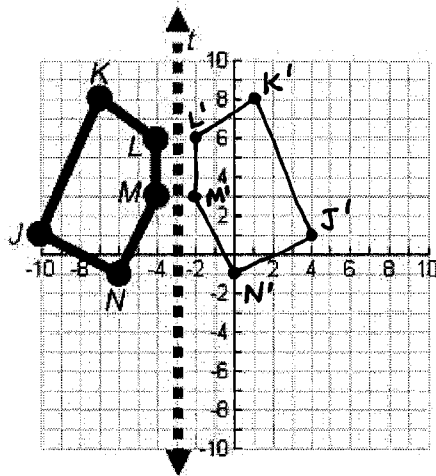| a. $5x - 2x + x = 15$ | b. $(5 - x)(2x + 3) = 0$ |
|---|---|
| $X = \dfrac{15}{4}$ or $3.75$ | $X = 5$ or $X = -\dfrac{3}{2}$ or $-1.5$ <br> \* both answers required! |
| c. $3 - (-x + 1) = 2x - 3 + 3x$ | d. $3(2 - x) = 5(2x - 7) + 2$ |
| $X = \dfrac{5}{4}$ or $1.25$ | $X = 3$ |
| e. $\dfrac{26}{57} = \dfrac{849}{5x}$ | f. $\dfrac{4x+1}{3} = \dfrac{x-5}{2}$ |
| $X = \dfrac{48393}{130}$ | $X = -\dfrac{17}{5}$ or $-3.4$ |

**5.** Perform the indicated transformations. Label each image with prime notation.

a. Rotate EFGHI 90° clockwise ↻ about point Z
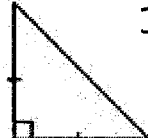
b. Reflect JKLMN over line t

b. Translate ABCD down 5 units and right 3 units
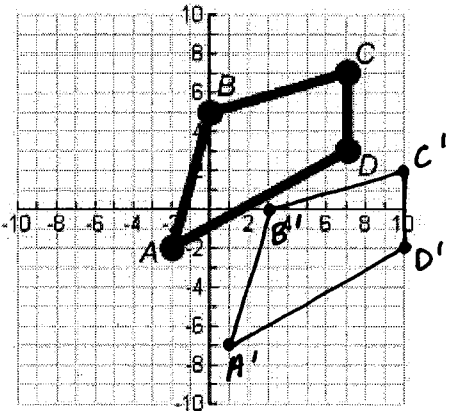


**6.** Without referring to your Shapes Toolkit, see if you can recall the names of each of the shapes below. Then check your answers with definitions from your Shapes Toolkit.

| a. Isosceles Acute Triangle | b. Pentagon (appears to be regular, but not marked) | c. Parallelogram |
|---|---|---|
| d. Scalene Obtuse Triangle | e. Isosceles Right Triangle | f. Trapezoid |

**7.** Use your knowledge of angle relationships to solve for *x* in the diagrams below. Justify your solutions by giving the angle pair name you used, and their geometric relationship.

a.

$5x + 7°$  $9x - 63°$

$X = \frac{35}{2}$ or $17.5$

If $\parallel$, corresponding $<$'s $\cong$.

b.

$12x - 14°$

$5x + 21°$  $20x + 34°$
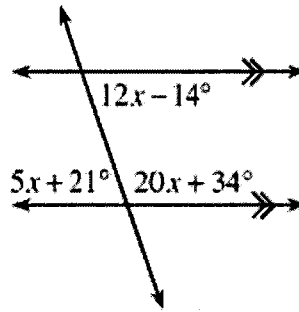
$X = 5$

Straight $<$ pr. is Supplementary

$\cong$  or If $\parallel$, same side interior $<$'s are Supplementary.

**8.** For each diagram below, set up an equation and solve for *x*.  or If $\parallel$, alternate interior $<$'s are $\cong$.
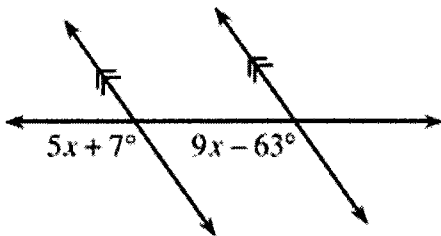
| a. Perimeter = 76 units | b. |
|---|---|
| $2x$  $x - 1$  $x$  $2x - 3$  $2x$  $X = 10$ units | $3x + 5°$  $2x + 18°$  $2x + 17°$  $X = 20$ |
| c. $5x$  $3x + 20°$  $X = 20$ | d. $3x + 20°$  $5x$  $X = 10$ |
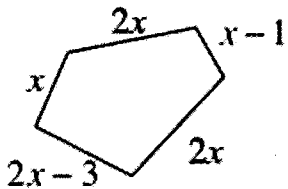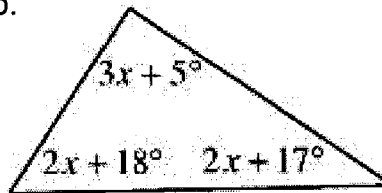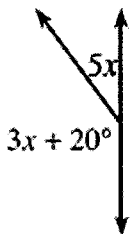
**9.** Find the equation of a line that is perpendicular to $y = \frac{4}{3}x + 4$ and goes through (2, 3).

$y = -\frac{3}{4}x + \frac{9}{2}$

**10.** Examine the diagram at right. Use the information provided in the diagram to find the measures of the following angles. Name the angle pair name and relationship from your Angle Relationships Toolkit to justify your conclusion (vertical angles, same side interior angles, etc.)
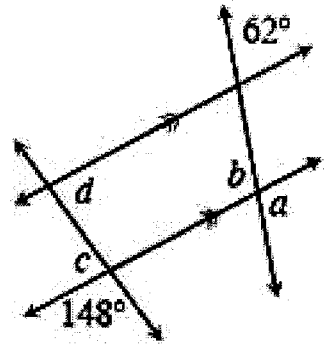
a = __118°__    reason: _Corresponding <'s and straight < pair_

b = __118°__    reason: _Corresponding <'s and straight < pair or vertical <'s (to <a)_

c = __32°__    reason: _Straight < pair (to <c)_

d = __32°__    reason: _alternate interior <'s (to <c)_

**11.** Examine the triangle at right. Solve for x if $m\angle D = 4x + 2$, $m\angle F = 7x - 8$ and $m\angle E = 4x + 6$. Then find $m\angle D$.
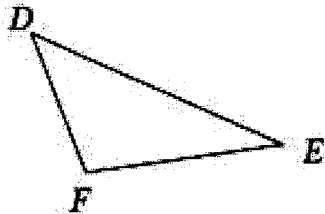
$x = 12$

$m \angle D = 50°$

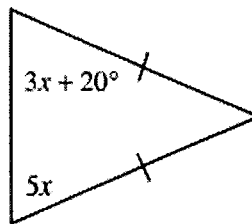**12.** For each diagram below, solve for x. Justify your equation for each problem by giving the angle pair name and the relationship.

a.
$6x$
$4x + 10°$
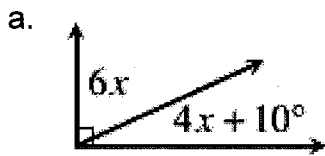
$x = 8$

right < pr. is complementary

b.
$2x + 2°$
$3x + 8°$
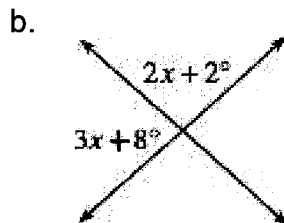
$x = 34$

straight < pr. is supplementary

c.
$102°$
$x + 15°$
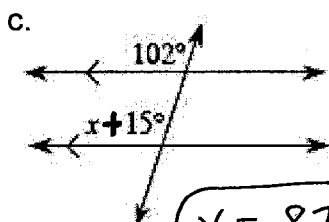
$x = 87$

If ||, corresponding <'s are ≅.

d.
$x + 21°$    $7x - 3°$
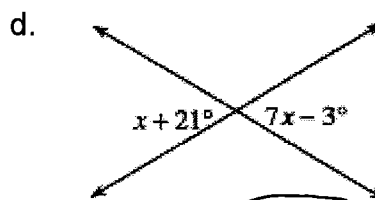
$x = 4$

vertical <'s are ≅.

**13.** Solve each system of equations below. Then verify that your solution makes each equation true.

a. $y = 5x - 2$

$y = 2x + 10$

$$(4, 18)$$

b. $x = -2y - 1$

$2x + y = -20$

$$(-13, 6)$$

**14.** Find the area of each figure.

a.

11 m

6 m

8 m

$$A = 57 \, m^2$$

b.

3 cm

8 cm
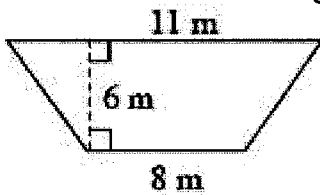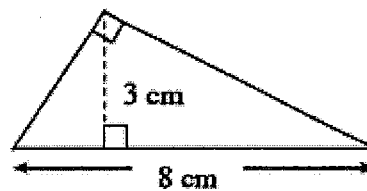
$$A = 12 \, cm^2$$

**15.** On the graph below, plot quadrilateral *ABCD*.

$A$ (2, 7), $B$ (4, 8), $C$ (4, 2), and $D$ (2, 3).

a. What is the best name for this shape? Justify your conclusion.

Hint: Use slopes in your response.

Slopes

$\overline{AB} = \frac{1}{2}$

$\overline{BC} =$ undefined

$\overline{CD} = -\frac{1}{2}$

$\overline{AD} =$ undefined
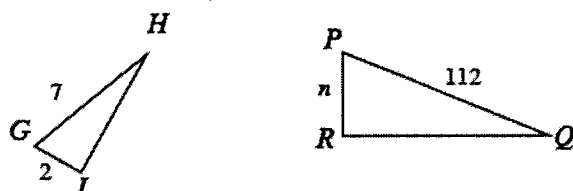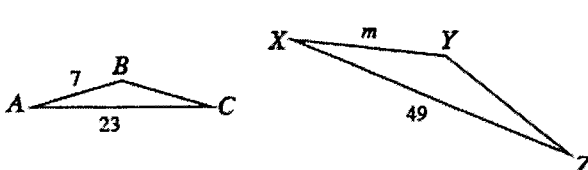
Isosceles trapezoid.
One pair of sides
is parallel, and
the other pair
is congruent.
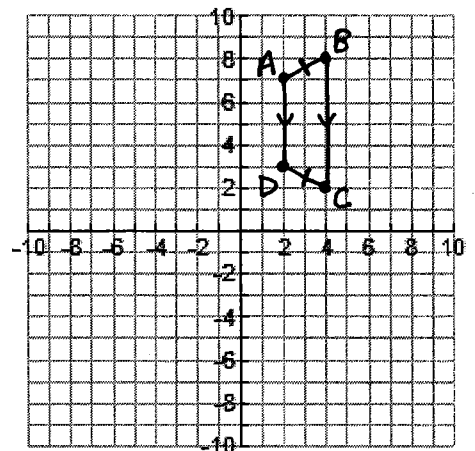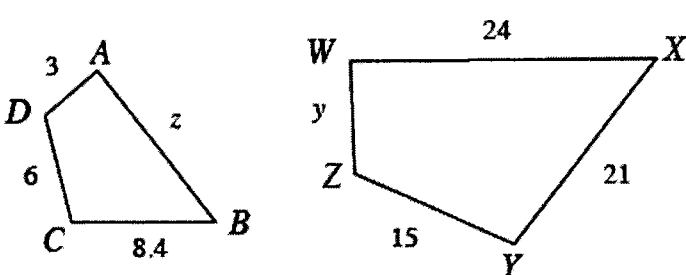
**16.** Solve for the indicated side lengths. Show all work.

a. $\triangle GHI \sim \triangle PQR$

$H$ $P$ $7$ $n$ $112$ $G$ $R$ $Q$ $2$ $I$

$$n = 32$$

b. $\triangle ABC \sim \triangle XYZ$

$X$ $m$ $Y$ $B$ $7$ $A$ $23$ $C$ $49$ $Z$

$$m = \frac{343}{23}$$

**17.** The shapes below are similar. Find $y$ and $z$.

$3$ $A$
$D$ $z$
$6$
$C$ $8.4$ $B$

$24$
$W$ $X$
$y$
$Z$ $21$
$15$
$Y$
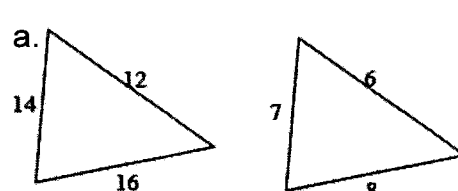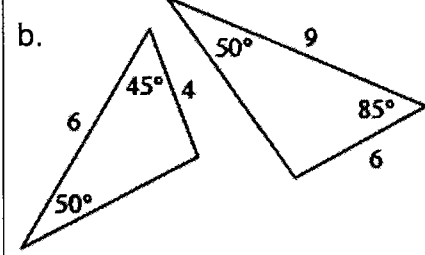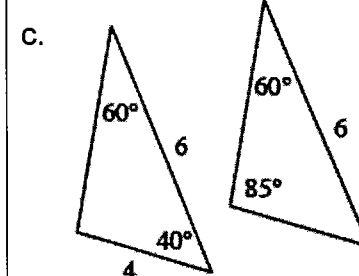
$$y = \frac{15}{2} \text{ or } 7.5$$

$$z = \frac{48}{5} \text{ or } 9.6$$

**18.** Determine which of the following pairs of triangles are similar.

Show work to justify, and explain your answers using: $SSS\sim, AA\sim, or\ SAS\sim$.

a.
$12$
$14$ $6$
$7$
$16$ $8$

$$SSS\sim$$

b.
$50°$ $9$
$45°$ $4$
$6$ $85°$
$6$
$50°$

$$AA\sim$$

c.
$60°$ $60°$
$60°$ $6$
$6$ $85°$
$40°$
$4$

not $\sim$.
corresponding
$\angle$'s not $\cong$.

**19.** Misty is building a triangular planting bed. Two of the sides have lengths of eight feet and five feet. What are the possible lengths for the third side?

$$3\,ft < x < 13\,ft$$

**20.** Find the equation of $\overleftrightarrow{AB}$ on the graph to the right.

$$y = -\frac{3}{5}x + 3$$
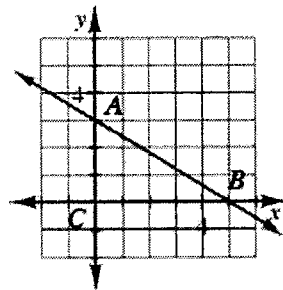


**21.** Frank and Alice are penguins. At birth, Frank's beak was 1.95 inches long, while Alice's was 1.50 inches long.

a. Frank's beak grows by 0.25 inches per year and Alice's grows by 0.40 inches per year. Write an equation to represent the length of each penguin's beak in $x$ years.

Frank: $y = 1.95 + 0.25x$     Alice: $y = 1.50 + 0.40x$

b. How old will they be when their beaks are the same length? How long will their beaks be then?

$$\text{In 3 years}$$

$$2.7\,in$$

**22.** On the graph, graph line $\overleftrightarrow{LD}$ if $L(-2, 1)$ and $D(4, -4)$.

a. Find the slope of $\overleftrightarrow{LD}$.   $m = -\frac{5}{6}$

b. Find $LD$ (the distance from $L$ to $D$).

$$LD = \sqrt{61}$$
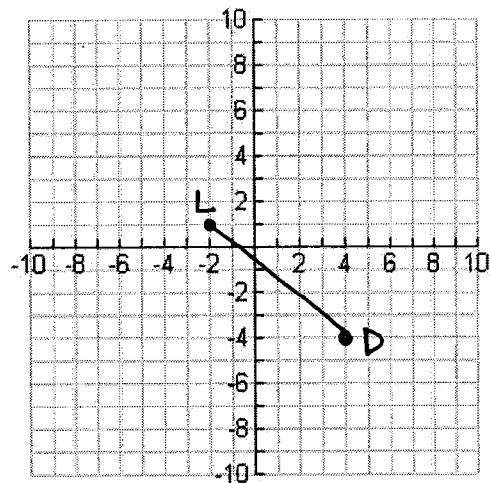


**23.** Write an equation for a line perpendicular to the line at right and passing through the point $(-1, -3)$.

$$y = 2x - 1$$
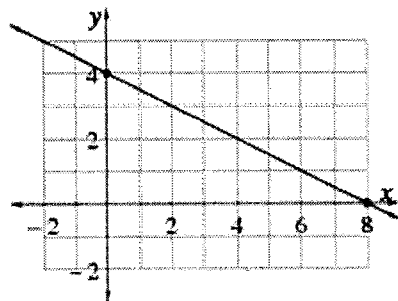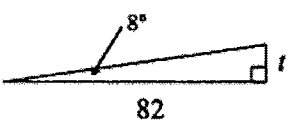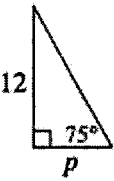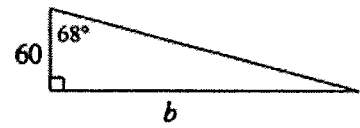
**24.** When she was younger, Mary had to look up at a 68° angle to see into her father's eyes whenever she was standing 15 inches away. How high above the flat ground were her father's eyes if Mary's eyes were 32 inches above the ground? Round your answer to the nearest hundredth.

$$h \approx 69.13 \text{ in}$$

**25.** Find the missing side length for each triangle. Round your answers to the nearest hundredth.

| a. | b. | c. |
|---|---|---|
| | | |
| $t \approx 11.52$ | $P \approx 3.22$ | $b \approx 148.51$ |

**26.** Find $x$ and $y$ in the diagram below. Show all work and round your answers to the nearest hundredth.
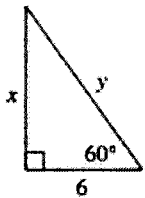
with special △'s and zf:

$$x = 6\sqrt{3} \qquad y = 12$$

↑ radical form!

with trig:

$$x \approx 10.39 \qquad y = 12$$

**27.** Find the probability that the rat will go into room B in the diagram below.
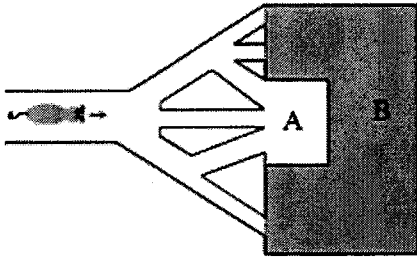


$$P\left(\text{room } B\right) = \frac{7}{18}$$

**28.** Find the perimeter of each shape below. Assume the diagram in part (b) is a parallelogram. Give your answer in exact form **and** rounded to the nearest hundredth, if needed.

| a. | b. | c. |
|---|---|---|
| 7 mm, 45° | 18 m, 9 m, 30 m | 7", 6", 60°, 11" |
| exact! | | exact! |
| $P = 14 + 7\sqrt{2}$ mm | $P = 66\,m$ | $P = 26 + 4\sqrt{3}$ in |
| or $14 + \sqrt{98}$ mm | | |
| rounded: | | rounded: |
| $P \approx 23.90$ mm | | $P \approx 32.93$ in |

**29.** Use the triangles to the right to answer the following questions.

a. Are the triangles at right similar? How do you know? Show your reasoning in a flowchart.



$\boxed{\angle A \cong \angle D}$   $\boxed{\angle B \cong \angle E}$

* Also $\cong$
because
$\frac{2f}{}= \frac{4}{4} = 1$

$\downarrow$   $\downarrow$

$\boxed{\triangle ABC \sim \triangle DEF}_{AA\sim}$
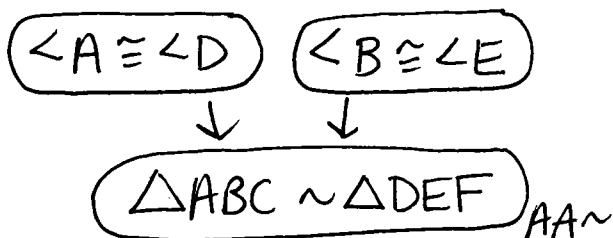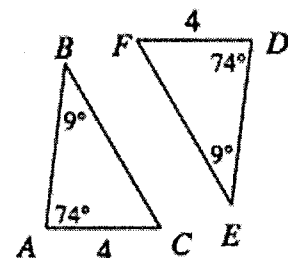
## Chapter 5

**30.** Examine the triangles below. For each one, solve for *x* and name which tool you used. Show all work. Round your answer to the nearest hundredth.

a.

15 / 32° \ 18

*x*
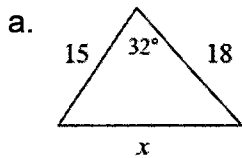
$$X \approx 9.54$$

Law of cosines

b.

16°     63°

10     *x*
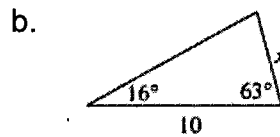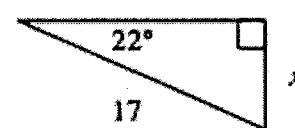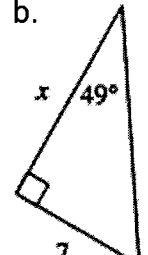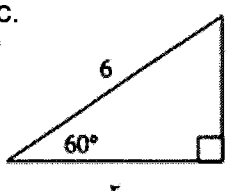
$$X \approx 2.81$$

Law of sines

**31.** For each triangle below, write an equation relating the reference angle (the given acute angle) with the two side lengths of the right triangle. Then solve your equation for *x*, rounded to the nearest hundredth.

a.

22°

17     *x*

$$X \approx 6.37$$

b.

*x* / 49°

7

$$X \approx 6.09$$

c.

6

60°

*x*

$$X = 3$$

**32.** While shopping at his local home improvement store, Chen noticed that the directions for an extension ladder state, "*This ladder is most stable when used at a 75° angle with the ground.*" He wants to buy a ladder to paint a two-story house that is 26 feet high. How long does his ladder need to be? Draw a diagram and set up an equation for this situation. Show all work. Round your answer to the nearest hundredth.

$$X \approx 26.92 \text{ ft}$$

**33.** Eugene wants to use the cosine ratio to find $y$ on this triangle.

a. Which angle should he use to write an equation and solve for $y$ using the cosine ratio? Why?

$29°$ y is its adjacent leg.
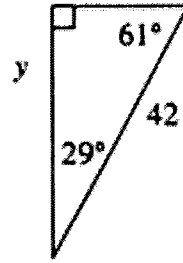
b. Set up an equation, and solve for $y$ using cosine. Round your answer to the nearest hundredth.

$y \approx 36.73$

**34.** For each diagram, write an equation and solve to find the value for each variable. Round each answer to the nearest hundredth, if needed.

| a. | b. | c. |
|---|---|---|
| 20 m<br>$x$   15°<br><br>$X \approx 5.18\,m$ | 5"<br>15°<br>$x$<br><br>$X \approx 18.66"$ | $\theta$<br>11'   10'<br><br>$\theta \approx 24.62°$ |
| d. | e. | f. |
| 9"<br>$y$<br>10"<br><br>$y \approx 25.84°$ | $x$<br>5 cm   8 cm<br><br>$X \approx 32.01°$ | 4 m<br>$\theta$<br>5 m<br><br>$\theta \approx 53.13°$ |

**35.** Find the trapezoid's perimeter. Give your answer in exact form **and** rounded to the nearest hundredth. (Note: The diagram is not drawn to scale.)

15'

4'

45°

22'
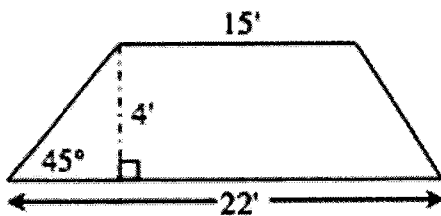
exact!

$P = 42 + 4\sqrt{2}\ ft$

rounded:

$P \approx 47.66\,ft$

**36.** Find the area of △ABC below. Use 45-45-90 and 30-60-90 triangles to get the side lengths. Give your answer in exact (radical) form **and** rounded to the nearest hundredth.

B

4

A 45°  □  30° C
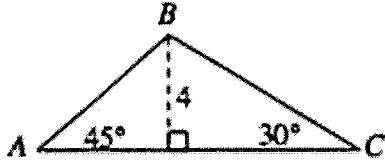
exact!

$$A = 8 + 8\sqrt{3} \ u^2$$

rounded:

$$A \approx 21.86 \ u^2$$

**37.** The spinner below has three regions: A, B, and C. To play the game, you must spin it *twice*. If the game were played 80 times, how many times would you expect to get A on both spins? Use a tree diagram or area model to help you answer the question.

135°

A   B

C
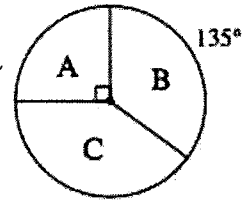
5 times

**38.** Use your knowledge of special right triangles to find the missing side lengths and angle measures **exactly**.

| a. | b. | c. |
|---|---|---|
| 45° 45° 2 cm   $2\sqrt{2}$ cm   2 cm | x  10  24   X = 26 | 6 m  60°  3 m   $3\sqrt{3}$m |

**39.** Multiply each polynomial. That is, change each product to a sum.

a. $(2x + 1)(3x - 2)$

$$6x^2 - 1x - 2$$

b. $(2x + 1)(3x^2 - 2x - 5)$

$$6x^3 - 1x^2 - 12x - 5$$

**40.** Solve the following equations for the given variable, if possible.  Remember to check your answers.
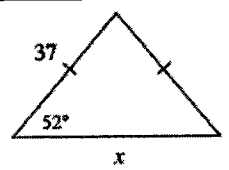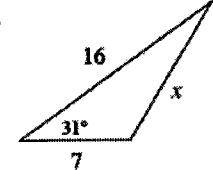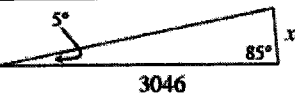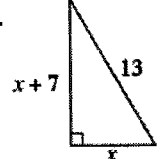
| | |
|---|---|
| a. $6x^2 = 150$ | b. $3p^2 + 10p - 8 = 0$ |
| $\boxed{X = 5 \text{ or } X = -5}$ | $\boxed{P = \frac{2}{3} \text{ or } P = -4}$ |
| c. $y^2 - 2y = 15$ | d. $x^2 + 8x - 33 = 0$ |
| $\boxed{Y = 5 \text{ or } Y = -3}$ | $\boxed{X = 3 \text{ or } X = -11}$ |

## Additional Review Problems – all chapters!

**41.** Use your triangle tools to solve for x in the triangles below.

a.
37
52°
x
$X \approx 45.56$

b.
16
31°
7
x
$X \approx 10.63$

c.
5°
3046
85°
x
$X \approx 265.48$

d.
$x+7$
13
x
$X = 5$

**42.** Penelope measured several sides and heights of $\triangle ABC$, as shown in the diagram at right. Find the area of $\triangle ABC$ *twice*, using two different methods.

$A = 9\ u^2$

B
2
E
3.6
3
4
A
C
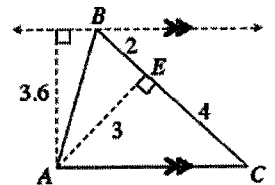
**43.** The shaded figures below are similar.

24 cm
10 cm
22 cm
5 cm
n
15 m
m

a.  Solve for *m* and *n*.

$M = 33$
$n = 36$
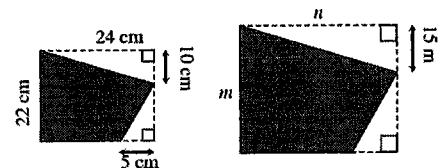
b.  Find the area and perimeter of each figure.

Small:  $A = 378\,cm^2$      Large:  $A = 850.5\ m^2$
$P = 80\ cm$                        $P = 120\ m$

**44.** On the graph below, graph the line $y = 3x + 1$.

a. What is the slope angle of the line? That is, what is the acute angle the line makes with the x-axis?

$$\boxed{\theta \approx 71.57°}$$

b. Find the equation of a new line that has a slope angle of 45° and passes through the point (0, 3). Assume that the slope is positive.

$$\boxed{y = x + 3}$$

c. Find the intersection of the two lines using any method. Write your solution as a point in the form (x, y).

$$\boxed{(1,4)}$$

**45.** Listed below are the measures of several different angles. Which angle is obtuse? Explain.

a. 0°          b. 52°          c. 210°          $\boxed{\text{d. } 91°}$
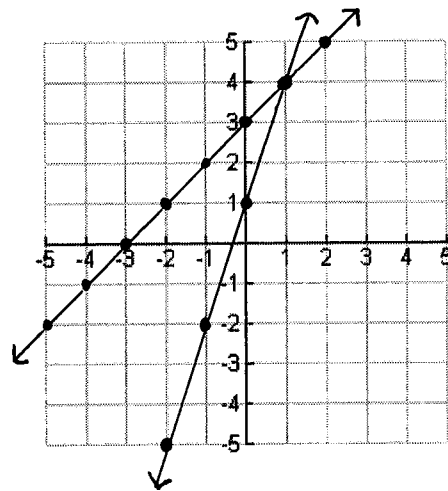
$$91 > 90 \text{ and } 91 < 180$$

**46.** Examine the diagram at right. Based on the information below, what statement can you make about the relationships between the lines? Be sure to justify each conclusion – use special angle pair names and their relationships. Remember: each part below is a separate problem.

a. $p = h$   $l \parallel m$   if alternate interior <'s are ≅ then $\parallel$.

b. $w = k$   $n \perp m$   if supplementary <'s are ≅ then they are both right <'s.

c. $r = q$   $n$ intersects $l$   if 2 lines intersect, then vertical <'s are ≅.

d. $z + k = 160°$   $l$ is not $\parallel m$   if $l \parallel m$, then $z + k = 180$
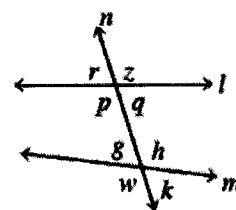
**47.** For the spinner below, find the expected value of one spin.

$$\boxed{EV = \frac{19}{4} \text{ or } 4.75}$$

**48.** Which equation below correctly represents the relationship of the sides given in the diagram below? Explain.

a. $3x - 2 + 2x + 17 = 360°$    b. $3x - 2 + 2x + 17 = 180°$

c. $3x - 2 + 2x + 17 = 90°$    d. $3x - 2 = 2x + 17$

*tick marks tell us they are ≅*

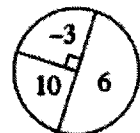**49.** On graph paper, plot and connect the points to form quadrilateral *WXYZ* if its vertices are W(3, 7), X(3, 4), Y(9, 1), and Z(5, 6).

a. What is the shape of quadrilateral *WXYZ*? Justify your conclusion.

*trapezoid   $\overline{WZ} \| \overline{XY}$ (same slopes)  $\overline{WX}$ not $\| \overline{ZY}$ (diff. slopes)*

b. Find the perimeter of quadrilateral *WXYZ*.
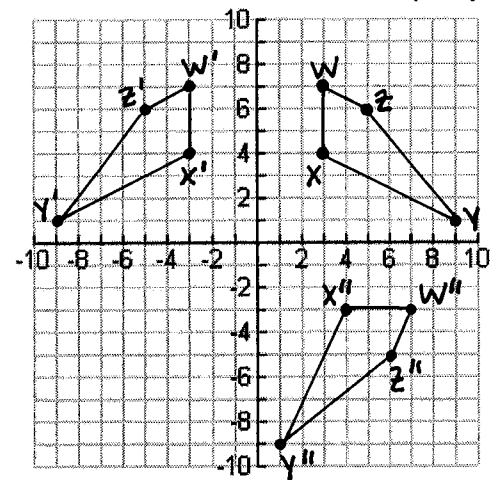
$P = 3 + 4\sqrt{5} + \sqrt{41} \approx 18.35\ u$

c. If quadrilateral *WXYZ* is reflected using the transformation function $(x \to -x, y \to y)$ to form quadrilateral *W'X'Y'Z'*, then where is *Y'*? Actually <u>SHOW</u> the reflection.

$Y'(-9, 1)$

d. Rotate quadrilateral *WXYZ* about the origin 90° clockwise to form quadrilateral *W"X"Y"Z"*. What is the slope of $\overline{W"Z"}$? Actually <u>SHOW</u> the rotation.

*Slope of $\overline{W"Z"} = 2$*

**50.** Refrigerators that are produced on an assembly line sometimes contain defects. The probability a refrigerator has a paint blemish is 4%. The probability that it has a dent is $\frac{1}{2}$%. The probability it has both a paint blemish and a dent is also $\frac{1}{2}$%. What is the probability a refrigerator has a paint blemish or a dent? What can you conclude about defects on these refrigerators?

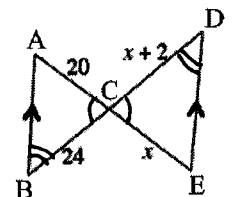*P(paint blemish or dent) = 4%. The defects are independent.*

**51.** Examine the triangles in the diagram at right.

a. Are the triangles similar? If you decide that they are, then justify your conclusion using a flowchart.
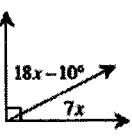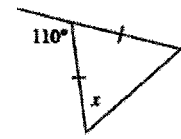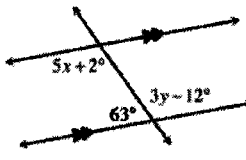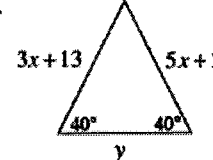
b. Solve for x. Show all work.

$\angle ACB \cong \angle ECD$    $\angle B \cong \angle D$
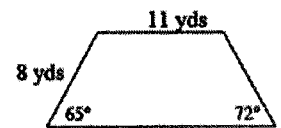
$\triangle ACB \sim \triangle ECD$   *AA ~*
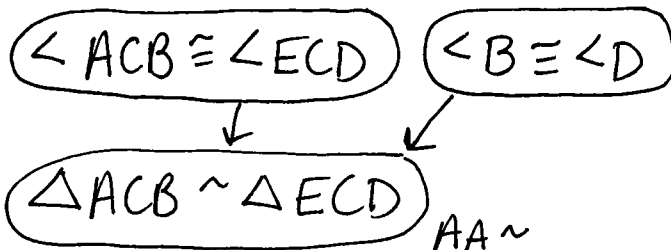
$x = 10$

**52.** For each diagram below, use geometric relationships to solve for the given variable(s). Check your answers.

a.

$18x - 10°$
$7x$

$X = 4$

b.

$110°$
$x$

$X = 55$

c.

$5x + 2°$
$3y - 12°$
$63°$

$X = 23$
$Y = 43$

d.

$3x + 13$   $5x + 2$
$40°$   $40°$
$y$

$X = \dfrac{11}{2}$
$Y \approx 45.20$

**53.** Find the area and perimeter of the trapezoid at right. You should not round until your final answer, and round it to the nearest hundredth.

11 yds
8 yds
$65°$   $72°$

$A \approx 100.55 \text{ yd}^2$   $P \approx 43.36 \text{ yd}$

**54.** A map of an island is shown at right. Each unit of length on the grid represents 32 feet.
a. Find the actual dimensions of the island (the <u>total</u> side-to-side and to-to-bottom distances on the actual island).

$256'$ side-to-side and $288'$ top-to-bottom

b. Find the area of the shape at right and the actual area of the island.
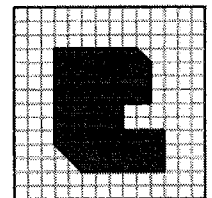
$A_{shape} = 55.5 \text{ u}^2$

$A_{Island} = 56832 \text{ ft}^2$

**55.** The length of a rectangle is three units shorter than twice its width. Which expression below could represent the area of the rectangle? Show your work to justify your answer.

a. $2x^2 - 3$

b. $2x^2 - 6x$

c. $2x^2 - 3x$

d. $(2x - 3)^2$

**56.** Examine the geometric relationships in each of the diagrams below. For each one, write and solve an equation to find the value of the variable. Name all geometric relationships or theorems that you use.
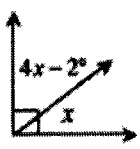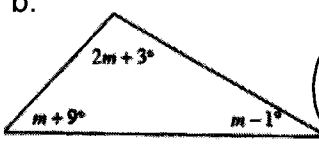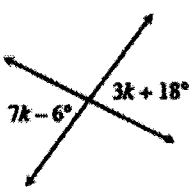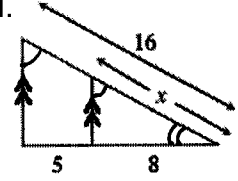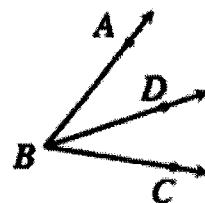
**a.**

$4x-2°$ $x$

$$X = \frac{92}{5} \text{ or } 18.4$$

rt ∠ pair is complementary

**b.**

$2m+3°$ $m+9°$ $m-1°$

$$M = \frac{169}{4} \text{ or } 42.25$$

∆∠ sum

**c.**

$3k+18°$ $7k-6°$

$$K = 6$$

vertical ∠'s are ≅

**d.**

16 $x$ 5 8

$$X = \frac{128}{13}$$

the ∆'s are ~

**57.** In the diagram at right, $\overrightarrow{BD}$ **bisects** $\angle ABC$. This means that $\overrightarrow{BD}$ divides the angle into two equal parts. If $m\angle ABD = 3x + 24$ and if $m\angle CBD = 5x + 2$, solve for x. Then find $m\angle ABC$.

$$X = 11$$     $$m\angle ABC = 114°$$

A D B C

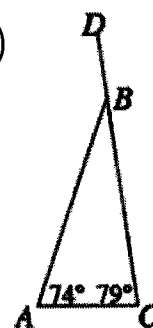**58.** A particular spinner only has two regions: green and purple. If the spinner is randomly spun twice, the probability of it landing on green twice is 16%. What is the probability of the spinner landing on purple twice?
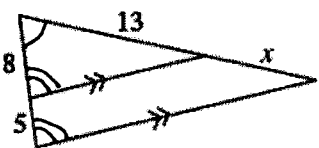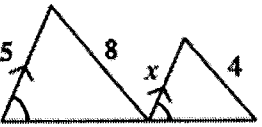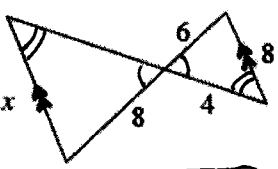
$$P(purple, purple) = 36\%$$

**59.** The measure of $\angle ABD$ at right is:     a. 27°     b. 161°     c. 118°     d. 153°
How do you know?

∠ABD is supplementary to ∠ABC (straight ∠ pair).

D B A 74° 79° C

**60.** For each part below, decide if the triangles are similar. If they are similar, use their similarity to solve for x. If they are not similar, explain why not.

| a. | b. | c. |
|---|---|---|
| 13<br>8<br>x<br>5<br><br>$X = \frac{65}{8}$<br><br>△'s ~ by AA~ | 5  8  x  4<br><br>△'s not ~.<br>only one pair<br>of corresponding<br>∠'s are ≅ | 6  8<br>x  8  4<br><br>$X = \frac{32}{3}$<br><br>△'s ~ by AA~ |

**61.** Examine the angles formed by parallel lines at right.
a. If $r = 5x + 3$ and $k = 4x + 9$, solve for x. Justify your answer by using special angle pair names and relationships.

$X = 6$  if ||, then alternate interior ∠'s
are ≅.

b. If c = 114, what is q? Justify your answer by using special angle pair names and relationships.

$q = 66$  if ||, then alternate interior ∠'s ≅
(or corresponding ∠'s ≅)
and if ||, then same side interior ∠'s are supplementary.

c. If g = 88, then what is q? Justify your answer by using special angle pair names and relationships.

$q = 92$  if ||, Same Side interior ∠'s are supplementary.
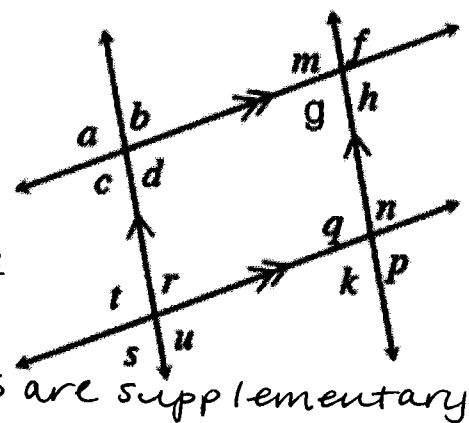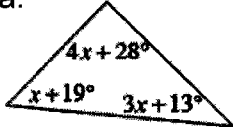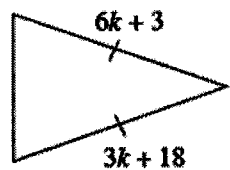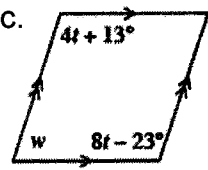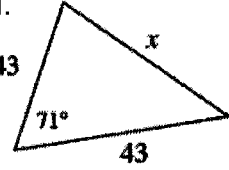
**62.** Write the equation of each line described below, in slope-intercept form (y = mx + b).

| a. $m = \frac{6}{5}$ and b = 3 | b. $m = -\frac{1}{4}$ and the line passes through the origin. |
|---|---|
| $y = \frac{6}{5}X + 3$ | $y = -\frac{1}{4}X$ |
| c. $m = \frac{1}{3}$ and the line passes through (-6, -12) | d. the line is perpendicular to $y = -\frac{3}{4}x + 5$ and the line passes through (-12, -10) |
| $y = \frac{1}{3}X - 10$ | $y = \frac{4}{3}X + 6$ |

**63.** What is the distance between the points (-2, -5) and (6, 3)? Show all work to justify your answer!

a. 8   b. $8\sqrt{2}$   c. 16.   d. 64

**64.** For each shape below, solve for the given variable(s). Show all work and justify your answers by naming any geometric relationships you used.

a.

$4x + 28°$
$x + 19°$   $3x + 13°$

$X = 15$

$\triangle < \text{sum}$

b.

$6k + 3$
$3k + 18$

$K = 5$

legs of an isosceles
$\triangle$ are $\cong$

c.

$4t + 13°$
$w$   $8t - 23°$

$t = 9$   $W = 131$

if $\parallel$, then same-side
interior $<$'s supplementary.

d.

$43$
$71°$   $x$
$43$

$X \approx 49.94$

Law of cosines

**65.** Jinning is going to flip a coin. If the result is "heads," he wins $4. If the result is "tails," he loses $7.
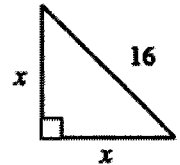
a. What is his expected value per flip?

$EV = -\$1.50$

b. If he flips the coin 8 times, how much should he win or lose?

he should lose $12

**66.** Examine the triangle shown at right. Solve for *x* *twice*, using two different methods. Show you work for each method clearly.

$$X = 8\sqrt{2}$$

(unsimplified, $X = \sqrt{128}$)

**67.** In Chapter 1, you learned that all rectangles are parallelograms because they all have two pairs of opposite sides parallel. Does that mean that all parallelograms are rectangles? Why or why not? Support your statements with reasons.

no. p-grams do not have to have right angles, which is required for a shape to be a rectangle

**68.** $\triangle ABC$ was reflected across the x-axis, and then that result was rotated 90° clockwise about the origin to result in $\triangle A'B'C'$, shown at right. Find the coordinates of points *A, B,* and *C* of the original triangle.

A (2,4)

B (6,2)

C (4,5)
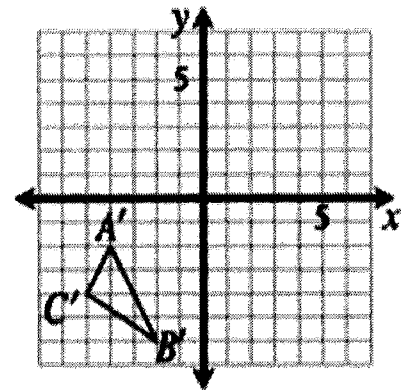
**69.** How many terms (total) are in the arithmetic sequence shown below?

15, 7, -1 , -9, ..., -225

$$n = 31$$

**70. Checkpoint 5B** is the checkpoint for writing equations for arithmetic and geometric sequences. There are more problems in Checkpoint 5B, if you need more practice (available in PDF form on the weebly).

a. Write an explicit or recursive rule for $t(n) = 1, 4, 7, 10, ...$

$$t(n) = 3n - 2 \quad \text{or} \quad 3(n-1) + 1$$

b. Write an explicit or recursive rule for $t(n) = 3, \frac{3}{2}, \frac{3}{4}, \frac{3}{8}, ...$

$$t(n) = 6 \cdot \frac{1}{2}^{n} \quad \text{or} \quad 3 \cdot \frac{1}{2}^{(n-1)}$$

c. If an arithmetic sequence has $t(7) = 1056$ and $t(12) = 116$, what is $t(4)$?

$$t(4) = 1620$$

For 70d and 70e, write an explicit rule for the sequence given in the tables.

**An arithmetic sequence**

d.

| $n$ | $t(n)$ |
|---|---|
| 1 | 17 |
| 2 | 10 |
| 3 | 3 |
| 4 | -4 |

$$t(n) = -7n + 24 \text{ or } -7(n-1) + 17$$

**A geometric sequence**

e.

| $n$ | $t(n)$ |
|---|---|
| 1 | 6 |
| 2 | 7.2 |
| 3 | 8.64 |
| 4 | 10.368 |

$$t(n) = 5(1.2)^n \text{ or } 6(1.2)^{(n-1)}$$

**71.** On the graph below, draw $\triangle ABC$ if $A(3, 2)$, $B(-1, 4)$, and $C(0, -2)$.

a. Find the perimeter of $\triangle ABC$.

$$P = 5 + 2\sqrt{5} + \sqrt{37} \ u$$

b. Dilate $\triangle ABC$ from the origin by a factor of 2 to create $\triangle A'B'C'$. What is the perimeter of $\triangle A'B'C'$?

$$P = 10 + 4\sqrt{5} + 2\sqrt{37} \ u$$

c. Rotate $\triangle ABC$ 90° clockwise about the origin to form $\triangle A''B''C''$. What are the coordinates of $C''$?

$$C'' (-2, 0)$$