Master E

SOL G.2 DETERMINING & VERIFYING PARALLELISM

1. This figure has more than one transversal. Two angle measurements are shown. (Figure is not drawn to scale.)
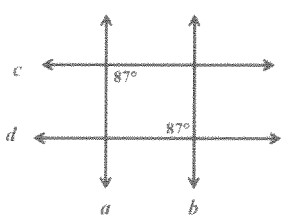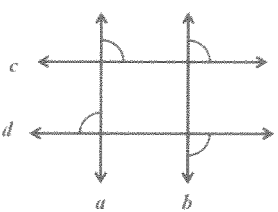
Based only on the information given, which statement about the figure shown must be true?

A. Only $a \parallel b$
B. Only $c \parallel d$
C. Both $a \parallel b$ and $c \parallel d$
D. No lines are parallel.

no transversal has 2 angles to compare!

2. This figure has more than one transversal and markings to indicate congruent angles.

Which statement about the figure shown must be true?

A. Only $a \parallel b$ *⟹ trans. c has corr. ∡s ≅ ☺*
B. Only $c \parallel d$
C. Both $a \parallel b$ and $c \parallel d$
D. No lines are parallel.

3. In the figure shown, line c and line d are cut by a transversal. (Figure is not drawn to scale.)

$(2x + 40)°$

$(6x + 20)°$

For what value of x will line c be parallel to line d?

A. 5
B. 15
C. 20
D. 30
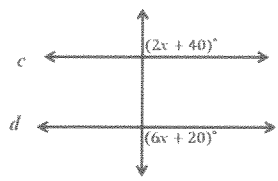
consec. ext. ∡s are supp.
$$2x + 40 + 6x + 20 = 180$$
$$8x + 60 = 180$$
$$8x = 120$$
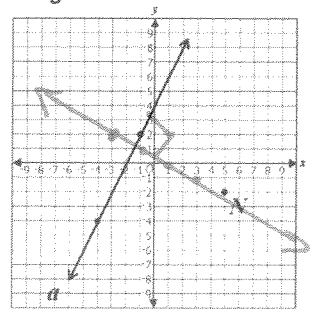$$x = 15$$

SOL G.3 IDENTIFYING PARALLEL AND PERPENDICULAR LINES

4. Students need additional practice applying the relationship between slopes of parallel and perpendicular lines to given situations.

Use this graph to answer the questions. All points have integral coordinates.

$m = \dfrac{6}{3} = 2$

1. Find the coordinates of a point on the graph that lies on a line which passes through point N and is parallel to line a.

slope = 2 from N : (6,0), (7,2), (8,4), (9,6), (10,8)
(4,-4), (3,-6), (2,-8), (1,-10)

2. Find the slope of a line which passes through point N and is perpendicular to line a.

$-\dfrac{1}{2}$

3. The coordinates of a point that lies on a line which passes through point N and is perpendicular to line a are represented by $(-3, y)$. What is the value of the y-coordinate?

(-3, 2)

SOL G.6 PROVING TRIANGLES CONGRUENT

5. Students need additional practice proving triangles congruent using algebraic methods.

Given: $\triangle MNO$ and $\triangle STV$ are isosceles.

$m\angle N = (2x - 28)°$
$m\angle T = (x + 22)°$

[handwritten: $2x - 28 = x + 22$; $x = 50$]

What measure of $\angle S$ could be used to prove $\triangle MNO \cong \triangle STV$?

A 50°
B 54° *(circled)*
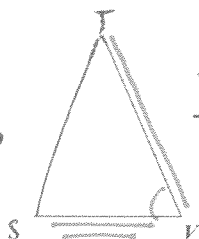C 65°
D 72°

SOL G.7 PROVING TRIANGLES SIMILAR

6. Students need additional practice proving triangles similar when specific measurements are not given.

Given: $\triangle MNO$ and $\triangle VTS$

Select two relationships that together would prove $\triangle MNO \sim \triangle VTS$ by the Side-Angle-Side (SAS) Similarity Theorem.

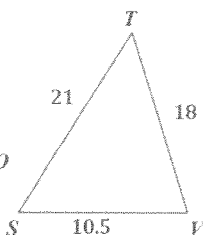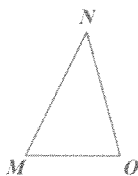$\angle N \cong \angle T$ $\angle M \cong \angle S$ $\angle M \cong \angle V$ *(circled)*

$\dfrac{MN}{ST} = \dfrac{SV}{MO}$ *(crossed out)* $\dfrac{MN}{VT} = \dfrac{MO}{VS}$ *(circled)*

7. Students need additional practice using the ratios of the sides of similar triangles.

Given: $\triangle MNO \sim \triangle STV$

[handwritten: $a + b > c$]

Select each set of numbers that could represent the side lengths of $\triangle MNO$.

7, 6, 2.5   16, 13, 5.5

14, 12, 7 *(circled)*   2.1, 1.8, 1.05 *(circled)*

10.5, 9.5, 5.5   4.2, 3.6, 2.1 *(circled)*

SOL G.9 VERIFYING PROPERTIES OF QUADRILATERALS

8. Students need additional practice with practical problems involving quadrilaterals.

Sasha built a window for her dollhouse in the shape of a quadrilateral. She knows the opposite sides of the window are parallel but she wants to be sure it is in the shape of a rectangle. Which of these can she use?
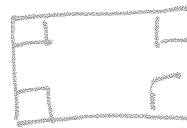
A. The consecutive angles of the window are supplementary.
B. The opposite sides of the window are congruent.
C. The diagonals of the window bisect each other.
D. The diagonals of the window are congruent. *(circled)* *[handwritten: prop. of a rect.!]*

9. Students need additional practice identifying the properties of a quadrilateral that is inscribed in a circle.

Andy inscribed quadrilateral $ABCD$ in a circle. Line segment BD is a diameter of the circle.
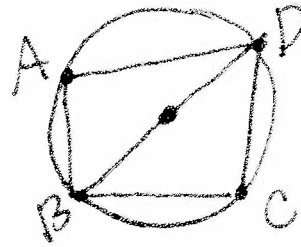
Based on this information, select each statement that must be true.

~~Line segment AC is a diameter of the circle.~~ — *not nece.*

(Angle C is a right angle.) *it intercepts 180°!*

(The sum of the measures of $\angle B$ and $\angle D$ is 180°.)

~~The sum of the measures of $\angle A$ and $\angle B$ is 180°.~~ — *it's not a ☐!*

SOL G.11 FINDING ARC LENGTHS & MEASURES OF CHORDS, TANGENTS, & SECANTS

10. Students need additional practice solving real-world problems involving chords.

This figure represents a design for a stained glass window. The window is divided by chords $\overline{MN}$ and $\overline{ST}$.
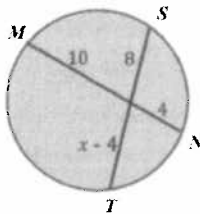
1. What is the value of x? *9*

$8(x-4)=10(4)$
$8x-32=40$
$8x=72$
$x=9$

2. What is the length of $\overline{ST}$?

$8+9-4 = \boxed{13}$

11. Students need additional practice solving real-world problems using properties of circles.

Circle M represents a circular race track. The radius of this race track is 120 feet. Juan will start at point A and run in a clockwise direction to point B. Angle AMB measures 55°.
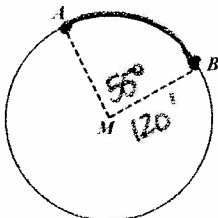
Which is closest to the number of feet Juan will run from point A to point B?

A. 55 ft
B. 58 ft
C. 115 ft
D. 120 ft

$\dfrac{55}{360} \cdot 2(\pi)(120)$

115.19

(C. 115 ft circled)

SOL G.12 WRITING AND USING EQUATIONS OF CIRCLES

12. Students need additional practice determining the equation of a circle when several steps are necessary.

$(x-h)^2+(y-k)^2=r^2$

Write the equation of a circle, in standard form, that has a diameter with endpoints at $(-4, 3)$ and $(0, -5)$.

see the last page!
Center = Mdpt. of diam. $(-2, -1)$

13. Students need additional practice determining points that lie on a circle when given the equation or enough information to find the equation.

Which of these points lie on the circle represented by this equation? $(x-4)^2 + (y+3)^2 = 10^2$
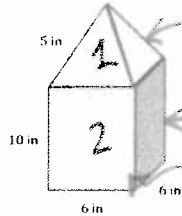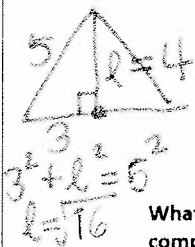
see last page!

$(-4, 3)$ $(-6, 3)$ $(4, 7)$

$(4, -3)$ $(10, 5)$

SOL G.13 SURFACE AREA AND VOLUME

14. Students need additional practice determining surface area and volume of three dimensional composite figures.

A statue consists of a square pyramid and a rectangular prism with congruent bases. Specific measurements of the statue are shown in this figure.

5 in

10 in

6 in   6 in

What is the total surface area of the statue represented by this composite figure? [Figure is not drawn to scale.]

Handwritten work:

$5 \quad x=4 \quad 3^2+\ell^2=5^2 \quad \ell=\sqrt{16}$

$\frac{1}{2}\ell p$

$SA1: \frac{1}{2}(4)(24)=48$

$LA=p\cdot h$

$SA2 = 24\cdot10 = 240$

Base area = 36

$36+240+48 = \boxed{324\,in^2}$

15. What is the volume of the figure above rounded to the nearest cubic inch?

Handwritten work:

$4 \quad h \quad 3$
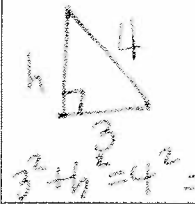
$V1 = \frac{1}{3}(36)(\sqrt{7}) \approx 31.7$

$V2 = 6\cdot6\cdot10 = 360$

$3^2+h^2=4^2 \Rightarrow h=\sqrt{7}$

$\begin{array}{r}31.7\\+360.0\\\hline 391.7\end{array} \Rightarrow \boxed{392\,in^3}$

SOL G.14 CHANGES IN LENGTH, AREA, AND VOLUME

16. Students need additional practice developing an understanding of the relationship between the linear, area, and volume ratios of similar geometric objects.

Given: Objects A and B are three-dimensional. Object A is similar to object B.

The height of object A is 24 inches and the height of object B is 36 inches.

1. What is the ratio of the surface area of object A to the surface area of object B in simplest form?

2. What is the ratio of their volumes in simplest form?

Handwritten work:

$\begin{array}{ccc}A &:& B\\24 &:& 36\\2 &:& 3 = a:b\end{array}$

$a^2:b^2 = \boxed{4:9}$

$a^3:b^3 = \boxed{8:27}$

17. Students need additional practice using any given ratio of a pair of similar figures (linear, surface area, or volume) to determine the other two ratios.

Pyramid S is similar to Pyramid T. If the ratio of the volume of Pyramid S to Pyramid T is 64:125, complete the table by finding the ratio of their side lengths and the ratio of their surface areas.

Handwritten work:

$\sqrt[3]{64} : \sqrt[3]{125} = a:b$

$a^2:b^2$

	Pyramid S		Pyramid T
Side Length	4	to	5
Surface Area	16	to	25
Volume	64	to	125

18. The ratio of the surface areas of two spheres is 1:9.

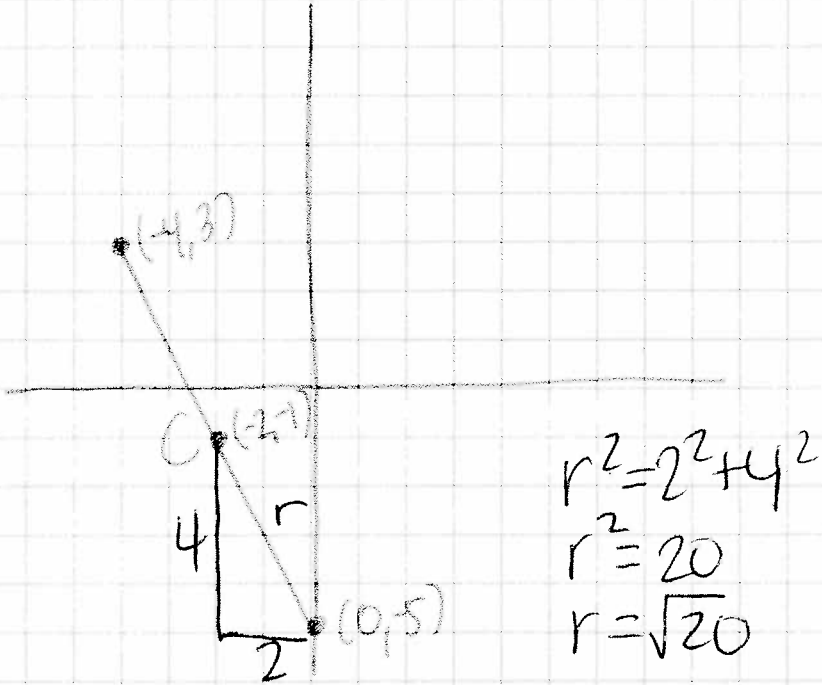1. What is the ratio of the lengths of their radii? What is the ratio of their volumes?

Handwritten work:

$a^2:b^2 = 1:9$

$\therefore a:b = 1:3$

$a^3:b^3 = \boxed{1:27}$ $a:b = \boxed{1:3}$

2. If the volume of the smaller sphere is 64 cubic inches, what is the volume of the larger sphere?

Handwritten work:

$1:27 = volumes$

$64(27) = \boxed{1728\,in^3}$

12.

$$r^2 = 2^2 + 4^2$$
$$r^2 = 20$$
$$r = \sqrt{20}$$

∴ Eq. of the ⊙ is $(x+2)^2 + (y+1)^2 = 20$

13.

(4,7)

(0,5)

(-4,3)

(-6,3)

(4,-3)