ملخص قوانين وتمارين لمنهج ريفيل

تم تحميل هذا الملف من موقع المناهج الإماراتية

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المزيد من مادة رياضيات: ملفات ا كتب للمعلم ا كتب للطالب ا اختبارات الكترونية ا اختبارات ا حلول ا عروض بوربوينت ا أوراق عمل منهج انجليزي ا ملخصات وتقارير ا مذكرات وبنوك ا الامتحان النهائي ا للمدرس

إعداد: محمد زياد

التواصل الاجتماعي بحسب الصف العاشر المتقدم

صفحة المناهج الإماراتية على فيسبوك

المواد على تلغرام | التربية الاسلامية | اللغة العربية | اللغة الانجليزية | الرياضيات

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MATH GARDEN
EDUCATION

EOT

EXAM COVERAGE EXPLANATION

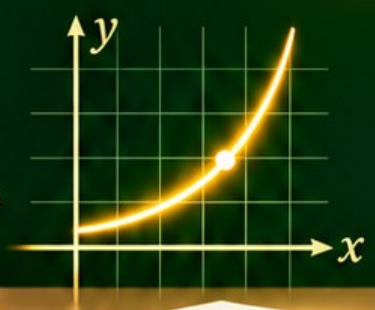
STUDY BOOKLET

GRADE 10 ADVANCED REVEAL

MATHEMATICS

ACADEMIC YEAR 2026 – 2027 | TERM 1





$y = a^x$

$\log_b x$



$c^2 = a^2 + b^2$





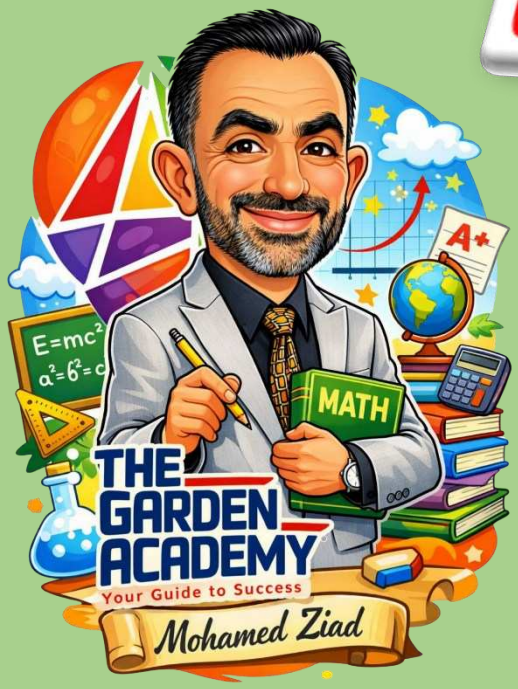
Mr. Mohammed Ziad

Mr. Mohammed Ziad

اكتشف جميع قنواتنا

https://t.me/mathgarden10advreveal

https://www.youtube.com/@MathGarden-ds7kg



MATH GARDEN
EDUCATION

FORMULA SHEET

Grade 10 ADV • REVEAL • EOT 1 | Academic Year 2026 – 2027

Prepared by **Mr. Mohammed Ziad**

POLYNOMIALS & FACTORING

- **Standard form:** terms written in descending exponents.
- **Add/Subtract polynomials:** combine like terms.
- **FOIL:** $(a+b)(c+d) = ac + ad + bc + bd$
- **Distributive Property / GCF:** $ax + ay = a(x+y)$

$$(a+b)(c+d) = ac + ad + bc + bd$$

- **Grouping:**

$$ax + ay + bx + by = a(x+y) + b(x+y) = (a+b)(x+y)$$

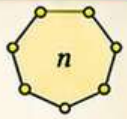
- **Factor trinomials:** $x^2 + bx + c = (x+m)(x+n)$, where $m+n=b$ and $mn=c$

$$x^2 + bx + c \rightarrow (x+m)(x+n),\ m+n=b,\ mn=c$$

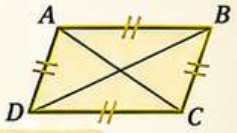
- **Difference of squares:** $a^2 - b^2 = (a-b)(a+b)$
- **Perfect square trinomials:**
  - $a^2 + 2ab + b^2 = (a+b)^2$
  - $a^2 - 2ab + b^2 = (a-b)^2$

POLYGONS & QUADRILATERALS

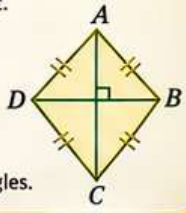
- **Sum of interior angles:** $S = (n-2)180°$
- **One interior angle of a regular n-gon:** $\frac{(n-2)180°}{n}$
- **Sum of exterior angles of any polygon:** $360°$



- **Parallelogram Properties:**
  - Opposite sides are parallel and congruent.
  - Opposite angles are congruent.
  - Consecutive angles are supplementary.
  - Diagonals bisect each other.

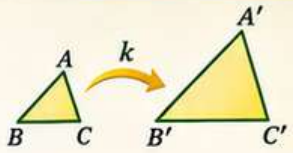


- **Conditions for a Quadrilateral to be a Parallelogram:**
  - Both pairs of opposite sides parallel.
  - Both pairs of opposite sides congruent.
  - One pair of opposite sides both parallel and congruent.
  - Diagonals bisect each other.
  - Both pairs of opposite angles congruent.
- **Kite Properties:**
  - Two pairs of adjacent congruent sides.
  - One pair of opposite angles congruent.
  - Diagonals are perpendicular.
  - One diagonal bisects the other and bisects a pair of angles.



DILATIONS, SIMILARITY & PROPORTIONALITY

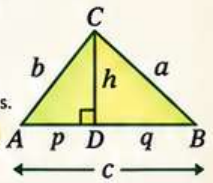
- **Scale factor:** $k = \frac{\text{image side}}{\text{preimage side}}$
- **Similar polygons:**
  - Corresponding angles congruent.
  - Corresponding sides proportional.



- **Perimeter ratio:** $\frac{P_{\text{image}}}{P_{\text{preimage}}} = k$
- **Area ratio:** $\frac{A_{\text{image}}}{A_{\text{preimage}}} = k^2$
- **AA Similarity:** If two angles of one triangle are congruent to two angles of another, then the triangles are similar.
- **Corresponding side ratio in similar triangles:**

$$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$$

Corresponding medians, altitudes, and angle bisectors in similar triangles are proportional to the corresponding sides.



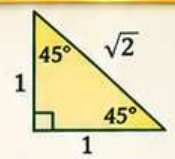
- **Triangle proportionality / right-triangle similarity facts:** If an altitude to the hypotenuse divides it into segments p and q, with hypotenuse c and altitude h, then:

$$h^2 = pq, \quad a^2 = cp, \quad b^2 = cq$$

- **Geometric mean:** $x = \sqrt{ab}$

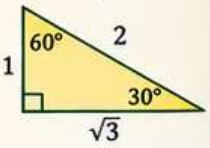
RIGHT TRIANGLES & TRIGONOMETRY

- **Pythagorean Theorem:** $a^2 + b^2 = c^2$
- **Converse:** If $a^2 + b^2 = c^2$, then the triangle is right.
- **45° – 45° – 90° triangle:** side ratio $1 : 1 : \sqrt{2}$.
- **30° – 60° – 90° triangle:** side ratio $1 : \sqrt{3} : 2$.



- **SOH-CAH-TOA:**

$$\sin\theta = \frac{opp}{hyp}, \quad \cos\theta = \frac{adj}{hyp}, \quad \tan\theta = \frac{opp}{adj}$$

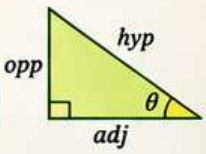


- **Reciprocal ratios:**

$$\csc\theta = \frac{1}{\sin\theta}, \quad \sec\theta = \frac{1}{\cos\theta}, \quad \cot\theta = \frac{1}{\tan\theta}$$

- **Finding angles:**

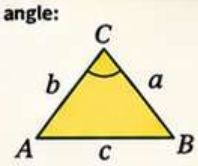
$$\theta = \sin^{-1}\left(\frac{opp}{hyp}\right), \quad \theta = \cos^{-1}\left(\frac{adj}{hyp}\right), \quad \theta = \tan^{-1}\left(\frac{opp}{adj}\right)$$



AREA, SPACE & LAW OF SINES

- **Area of a triangle with two sides and included angle:**

$$A = \frac{1}{2}ab\sin C$$



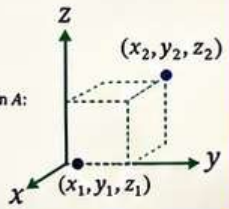
- **Distance in space:**

$$d = \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2 + (z_2-z_1)^2}$$

- **Midpoint in space:**

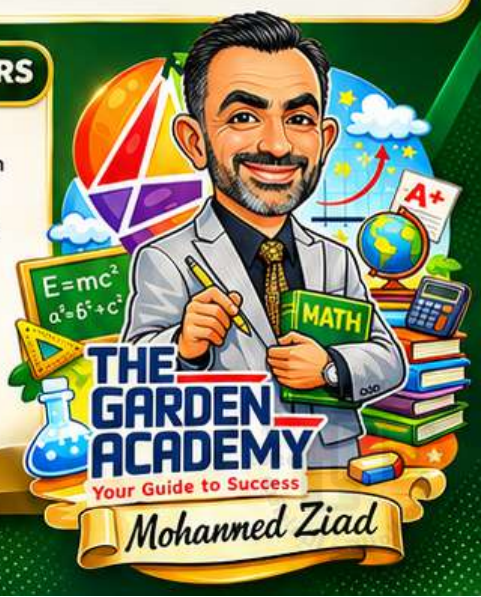
$$M\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}, \frac{z_1+z_2}{2}\right)$$

- **Law of Sines:** $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
- **Ambiguous Case (SSA),** given A, a, b and $h = b\sin A$:
  - If $a < h$: no triangle.
  - If $a = h$: one right triangle.
  - If $h < a < b$: two triangles.
  - If $a \geq b$: one triangle.



QUICK REMINDERS

- Use the scientific calculator in degree mode unless the question states otherwise.
- For similar figures, side lengths scale by k, areas scale by k^2.
- In right triangles, identify the side opposite the right angle as the hypotenuse.
- Check that factored forms multiply back to the original polynomial.



PART A / MULTIPLE CHOICE

Q1	Write polynomials in standard form. Add and subtract polynomials.	10–14 22–26	635

DIRECTION • Write each polynomial in standard form. Identify the leading coefficient. / Find each sum or difference.

10. $-y^3 + 3y - 3y^2 + 2$

A. $-y^3 - 3y^2 + 3y + 2$
B. $y^3 - 3y^2 + 3y + 2$
C. $-y^3 + 3y^2 - 3y + 2$
D. $-y^3 + 3y^2 + 3y + 2$

11. $11t + 2t^2 - 3 + t^5$

A. $t^5 + 11t^2 + 2t - 3$
B. $t^5 + 2t^2 + 11t - 3$
C. $5t + 2t^2 + 11t - 3$
D. $2t^5 + t^2 + 11t - 3$

12. $2 + r - r^3$

13. $\frac{1}{2}x - 3x^4 + 7$

14. $-9b^2 + 10b - b^6$

22. $(2h^2 - 5h) + (7h - 3h^2)$

A. $5h^2 + 12h$	**B.** $-h^2 - 12h$
C. $-h^2 + 2h$	**D.** $h^2 + 2h$

23. $(5f + g - 2) + (-2f + 3)$

24. $(6k^2 + 2k + 9) + (4k^2 - 5k)$

25. $(2c^2 + 6c + 4) + (5c^2 - 7)$

A. $7c^2 + 6c + 11$	**B.** $3c^2 + 6c - 3$
C. $7c^2 - 6c - 3$	**D.** $7c^2 + 6c - 3$

26. $(2x + 3x^2) - (7 - 8x^2)$

PART A / MULTIPLE CHOICE

Q2	Multiply binomials by using the FOIL method	1–6	649

DIRECTION • Find each product.

1. $(3c - 5)(c + 3)$

A. $3c^2 + 4c - 15$	**B.** $3c^2 - 4c - 15$
C. $3c^2 + 9c - 15$	**D.** $3c^2 + 4c + 15$

2. $(g + 10)(2g - 5)$

A. $2g^2 - 15g - 50$	**B.** $2g^2 + 15g - 50$
C. $2g^2 + 5g - 50$	**D.** $2g^2 + 15g + 50$

3. $(6a + 5)(5a + 3)$

A. $30a^2 + 33a + 15$	**B.** $30a^2 + 43a - 15$
C. $30a^2 + 43a + 15$	**D.** $11a^2 + 43a + 15$

4. $(4x + 1)(6x + 3)$

A. $24x^2 + 9x + 3$	**B.** $24x^2 + 18x - 3$
C. $10x^2 + 18x + 3$	**D.** $24x^2 + 18x + 3$

5. $(5y - 4)(3y - 1)$

6. $(6d - 5)(4d - 7)$

PART A / MULTIPLE CHOICE

Q3	Factor polynomials by using the Distributive Property and grouping.	11–20	665

DIRECTION • Factor each polynomial using the Distributive Property or grouping.

11. $fg - 5g + 4f - 20$

A. $(f-5)(g+4)$ B. $(f+5)(g-4)$

C. $(f-5)(g-4)$ D. $(f+4)(g-5)$

12. $a^2 - 4a - 24 + 6a$

13. $hj - 2h + 5j - 10$

A. $(h-5)(j-2)$ B. $(h+5)(j-2)$

C. $(h+2)(j-5)$ D. $(h+5)(j+2)$

14. $xy - 2x - 2 + y$

15. $45pq - 27q - 50p + 30$

A. $(5p-3)(9q+10)$ B. $(5p+3)(9q-10)$

C. $(5p-3)(9q-10)$ D. $(9p-10)(5q-3)$

16. $24ty - 18t + 4y - 3$

A. $(6t-1)(4y+3)$	**B.** $(6t-3)(4y+1)$
C. $(6t+1)(4y+3)$	**D.** $(6t+1)(4y-3)$

17. $3dt - 21d + 35 - 5t$

18. $8r^2 + 12r$

19. $21th - 3t - 35h + 5$

20. $vp + 12v + 8p + 96$

PART A / MULTIPLE CHOICE

Q4	Factor trinomials of the form x^2+bx+c.	1–6	671

DIRECTION • Factor each polynomial, if possible. If the polynomial cannot be factored using integers, write prime.

1. $x^2 + 17x + 42$

A. $(x+14)(x+3)$ B. $(x+21)(x+2)$

C. $(x-14)(x-3)$ D. $(x+7)(x+6)$

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2. $y^2 - 17y + 72$

A. $(y+8)(y+9)$ B. $(y-8)(y-9)$

C. $(y-6)(y-12)$ D. $(y-3)(y-24)$

3. $a^2 + 8a - 48$

A. $(a+8)(a-6)$ B. $(a-12)(a+4)$

C. $(a+12)(a-4)$ D. $(a+6)(a-8)$

حَدِيقَةُ الرِّيَاضِيَّات

4. $n^2 - 2n - 35$

A. $(n+7)(n-5)$ B. $(n-7)(n-5)$

C. $(n+7)(n+5)$ D. $(n-7)(n+5)$

5. $44 + 15h + h^2$

6. $40 - 22x + x^2$

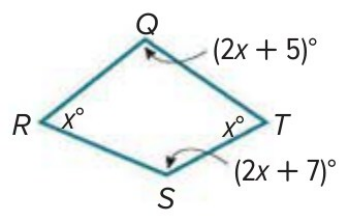
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PART A / MULTIPLE CHOICE

Q5	Find and use the sum of the measures of the interior angles of a polygon	1–4	63

DIRECTION • Find the measure of each interior angle. Find x

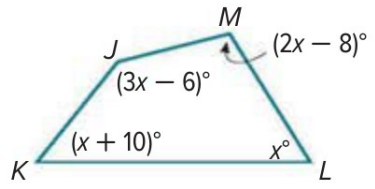
1.



A. 58° B. 50°

C. 62° D. 68°

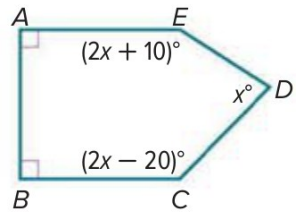
2.



A. 48° B. 52°

C. 56° D. 64°

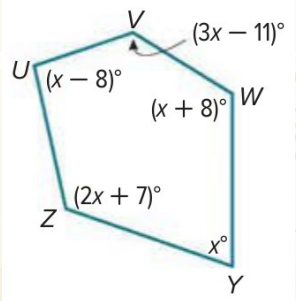
3.



A. 64° B. 70°

C. 74° D. 80°

4.



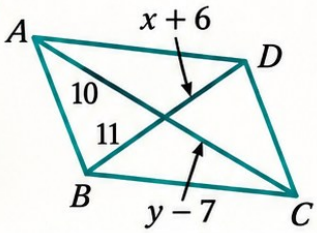
A. 60° B. 64°

C. 72° D. 68°

Q6	Recognize and apply the properties of the sides and angles of parallelograms.	9–12	72

DIRECTION • Find the value of each variable in each parallelogram.

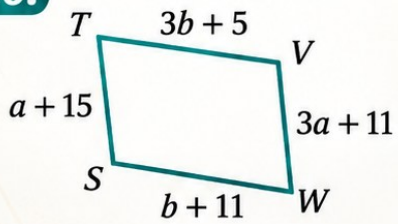
9.



Find the values of x and y.

A. $x = 17,\ y = 5$	**B.** $x = 5,\ y = 17$
C. $x = 11,\ y = 10$	**D.** $x = 6,\ y = 7$

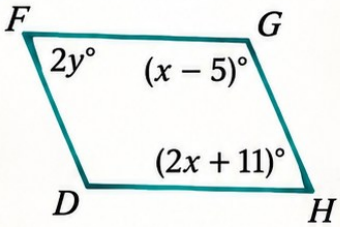
10.



Find the values of a and b.

A. $a = 3,\ b = 2$	**B.** $a = 4,\ b = 3$
C. $a = 2,\ b = 8$	**D.** $a = 2,\ b = 3$

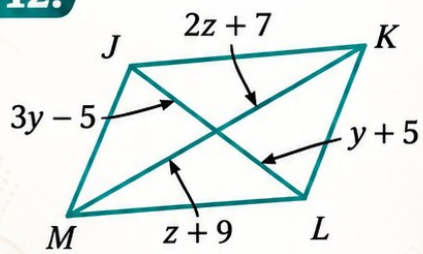
11.



Find the values of x and y.

A. $x = 58,\ y = 63.5$	**B.** $x = 53,\ y = 63.5$
C. $x = 58,\ y = 127$	**D.** $x = 63.5,\ y = 58$

12.



Find the values of y and z.

A. $y = 2,\ z = 5$	**B.** $y = 10,\ z = 2$
C. $y = 5,\ z = 2$	**D.** $y = 5,\ z = 9$

PART A / MULTIPLE CHOICE

Q7	Recognize the conditions that ensure a quadrilateral is a parallelogram.	Learn 1–6	75 79

LEARN / Tests for Parallelograms

DIRECTION • Determine whether each quadrilateral is a parallelogram. Justify your answer.

1.



A. One opposite-side pair is both parallel and congruent.

B. Two adjacent sides are congruent.

C. Only one pair of angles is equal.

D. Two diagonals have different lengths.

2.



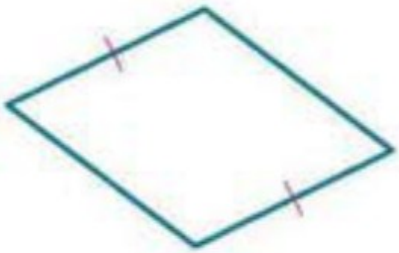
A. One pair of adjacent angles must be supplementary.

B. Both pairs of opposite angles are congruent.

C. Only the diagonals are perpendicular.

D. The shape is a trapezoid.

3.



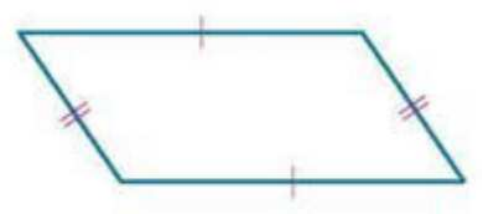
A. Yes, all quadrilaterals are parallelograms.

B. Yes, one equal adjacent-side pair is sufficient.

C. No, that information is not sufficient.

D. No, because parallel sides are impossible.

4.



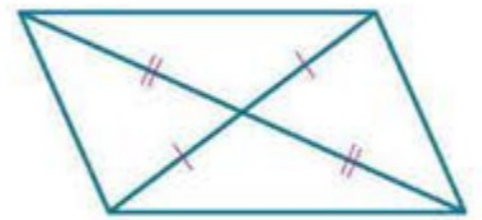
A. Exactly one right angle.

B. Only one equal side pair.

C. Two equal adjacent sides.

D. Both pairs of opposite sides are congruent.

5.



A. The diagonals are perpendicular.

B. Both diagonals bisect each other.

C. Only one pair of opposite sides is congruent.

D. The diagonals are congruent.

6.



A. Only one pair of opposite sides is parallel.

B. Two adjacent sides are congruent.

C. Both pairs of opposite angles are congruent.

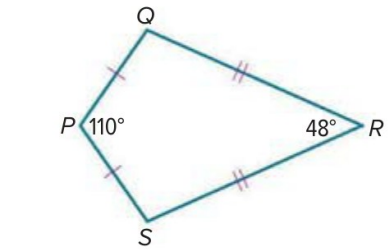
D. One pair of opposite sides is both parallel and congruent.

PART A / MULTIPLE CHOICE

Q8	Recognize and apply the properties of kites.	13–16	106

DIRECTION • Find each measure in the kites.

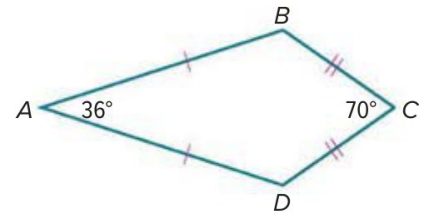
13. $m\angle Q$



A. $101°$ B. $96°$

C. $110°$ D. $112°$

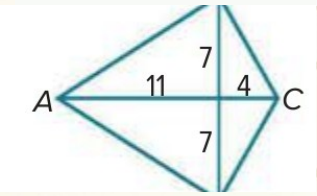
14. $m\angle D$



A. $117°$ B. $127°$

C. $134°$ D. $143°$

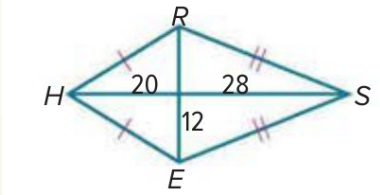
15. REASONING Quadrilateral ABCD is a kite. a. Find BC. Write your answer in simplest radical form. b. Find the perimeter of kite ABCD. Round your answer to the nearest



A. $\sqrt{11}$ B. $\sqrt{37}$

C. $\sqrt{65}$ D. 11

16. a. Find RH. Write your answer in simplest radical form. b. Find the perimeter of kite HRSE. Round your answer to the



حَدِيقَةُ الرِّيَاضِيَّات MATH GARDEN

PART A – MULTIPLE CHOICE

Q9	Find the scale factor of a dilation.	13–16 20	120 121

DIRECTION • Graph the image of each polygon with the given vertices after a dilation centered at the origin with the given scale factor.

13. $F(-10,4)$, $k = 0.25$

A. $(-2.5,1)$	**B.** $(-40,16)$
C. $(2.5,-1)$	**D.** $(-2.5,4)$

14. $X(2,-1)$, $k = 5/4$

A. $(2.25,-1.25)$	**B.** $(2.5,-1.25)$
C. $(1.6,-0.8)$	**D.** $(2.5,1.25)$

15. $N(-6,2)$, $k = 3/4$

A. $(4,4.5)$	**B.** $(4.5,1.5)$
C. $(3,4.5)$	**D.** $(16/3,8)$

16. $R(-2,6)\,,k\ =\ 1.5$

A. $(-3,6)$	**B.** $(-1,4)$
C. $(3,-9)$	**D.** $(-3,9)$

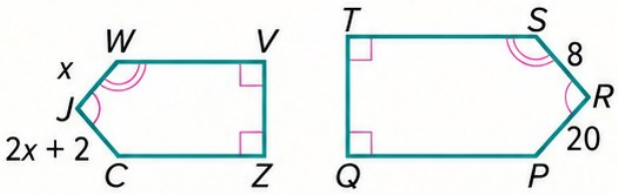
20. △ABC has vertices A(2, 2), B(3, 4), and C(5, 2). What are the coordinates of point C of the image of the triangle after a dilation centered at the origin with a scale factor of 2.5?

PART A / MULTIPLE CHOICE

Q10	Solve problems using the properties of similar polygons.	11–14	128

DIRECTION • Use the given similar polygons and their properties to find the value of the unknown(s).

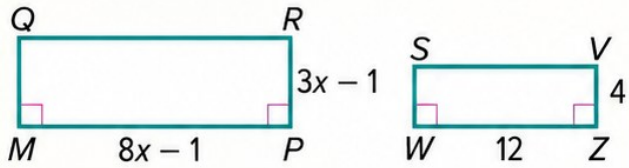
11. *Find x.*



A. $x = 2$ B. $x = 3$

C. $x = 4$ D. $x = 5$

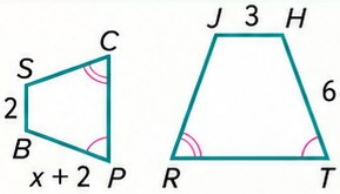
12. *Find x.*



A. $x = 1$ B. $x = 2$

C. $x = 3$ D. $x = 4$

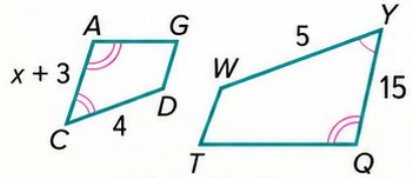
13. *Find x.*



A. $x = 1$ B. $x = 2$

C. $x = 3$ D. $x = 4$

14. *Find x.*



A. $x = 9$ B. $x = 6$

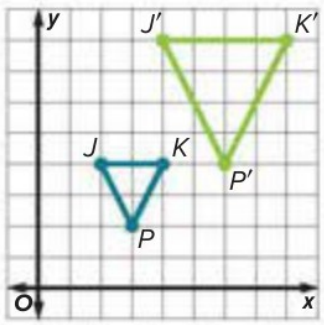
C. $x = 12$ D. $x = 3$

PART A / MULTIPLE CHOICE

Q11	Find the scale factor of a dilation.	10–12 17–18	120

DIRECTION • Find the scale factor of the dilation.

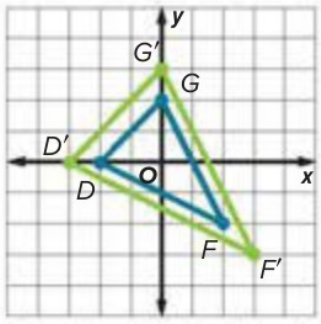
10. ΔJ'K'P' is the image of ΔJKP.



A. 3 **B.** 1/3

C. 4 **D.** 8

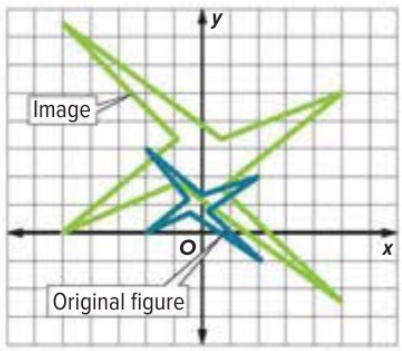
11. ΔD'F'G' is the image of ΔDFG.



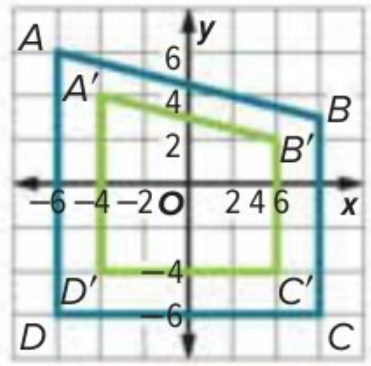
A. 3 **B.** 1/3

C. 4 **D.** 1/4

12. Tyrone drew a logo and a dilation of the same logo on the coordinate plane. What is the scale factor of the



17. A ' B ' C ' D' is the image of ABCD.then which of the following is correct



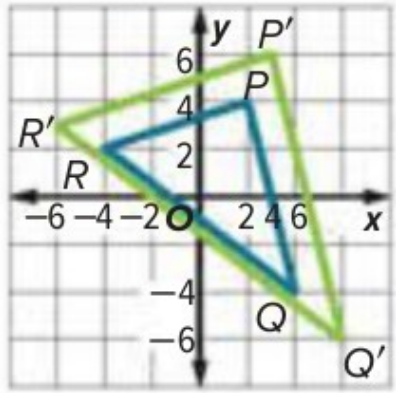
A. $k > 1$

B. $k = 0$

C. $0 < k < 1$

D. $k < 0$

18. ΔP'Q'R' is the image of ΔPQR.



A. $1/3$

B. 2

C. 4

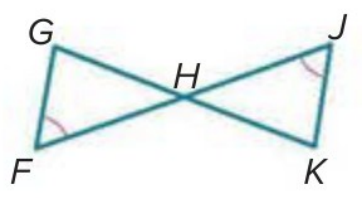
D. 3

PART A / MULTIPLE CHOICE

Q12	Identify similar triangles using the AA Similarity Postulate.	1–8	133

DIRECTION • Determine whether each pair of triangles is similar. Explain your reasoning.

1.



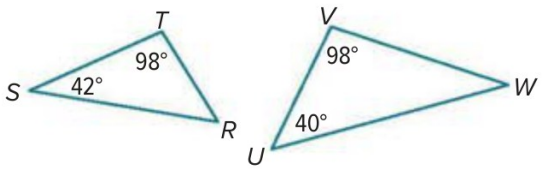
A. Vertical angles are congruent.

B. Adjacent angles are always congruent.

C. Angles sum to 360° in a triangle.

D. All lines are perpendicular.

2.



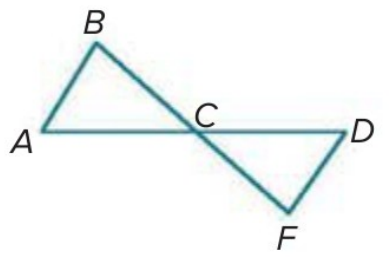
A. Yes, both have 98° only.

B. No, their remaining angle sets differ.

C. Yes, both have a 40° angle.

D. No triangle may contain 98°.

3.



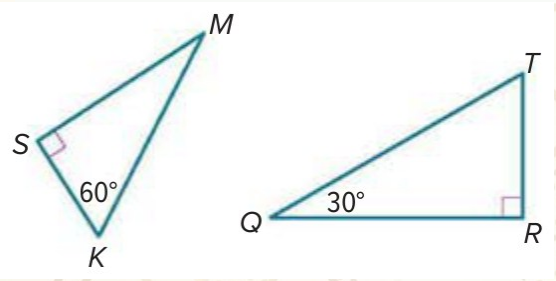
A. Yes, because vertical angles are congruent

B. Yes, because the triangles share a common vertex.

C. Cannot be determined; one pair of congruent angles is not sufficient

D. No, because the triangles have opposite orientations

4.



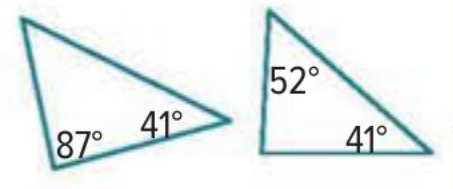
A. Not enough evidence

B. They are congruent only

C. They are similar by AA

D. Their sides must all be equal

5.



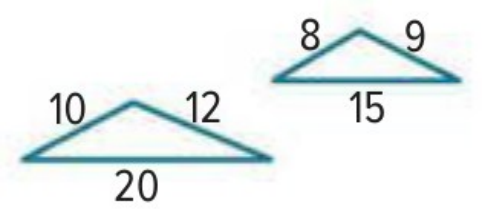
A. SAS only

B. SSS only

C. Pythagorean Theorem

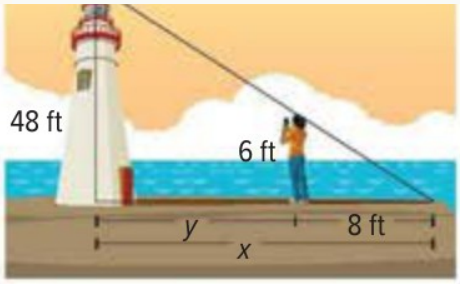
D. AA Similarity Postulate

6.



7. CELL TOWERS A cell phone tower casts a shadow that is 100 feet long. At the same time, Lia stands near the tower and casts a shadow that is 3 feet 4 inches long. If Lia is 4 feet 6 inches tall, how tall is

8. a lighthouse. The end of Maya's shadow coincides with the end a. What is the distance from the lighthouse to the end of the b. What is the distance from Maya to the lighthouse, y?

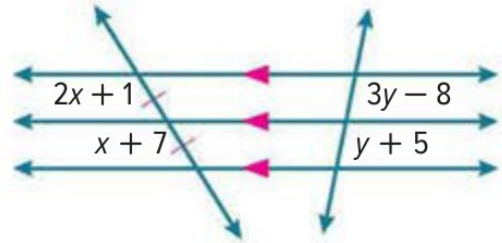


PART A. MULTIPLE CHOICE

Q13	Use proportional parts within triangles	11–16	146

DIRECTION • Find the values of x and y. / A segment is a midsegment of a triangle. Find x.

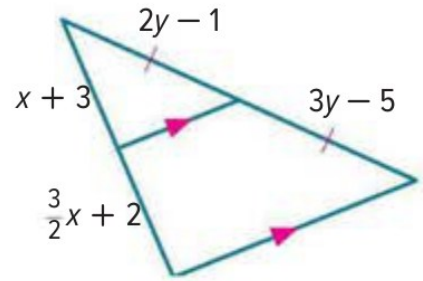
11.



A. 18 **B.** 9/2

C. 27 **D.** 36

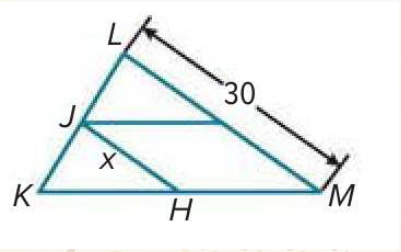
12.



A. $DE/AC = 2$ **B.** $DE/AC = 1/2$

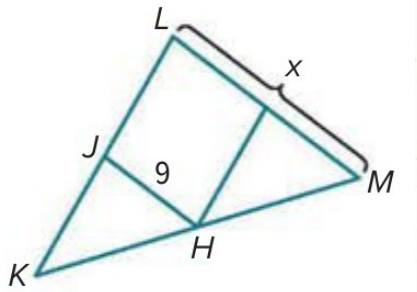
C. $DE/AC = 3$ **D.** $DE/AC = 1/3$

13. Find x

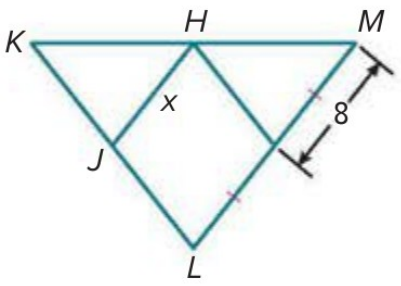


A. 60	**B.** 30
C. 15	**D.** 10

14. Find x



15. Find x



16. In △ABC, DE is parallel to AC and DE = 10. Find the length of AC if DE is a midsegment of △ABC.

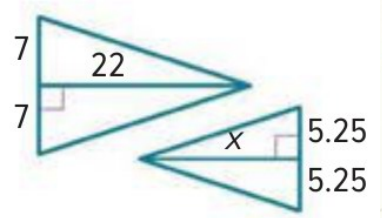
A. 5	**B.** 10
C. 15	**D.** 20

PART A / MULTIPLE CHOICE

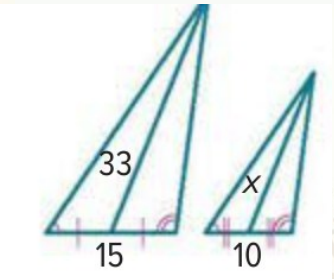
Q14	Recognize and use proportional relationships of corresponding angle bisectors, altitudes, and medians of similar triangles.	1–11	153

DIRECTION • Each pair of triangles is similar. Find the indicated value.

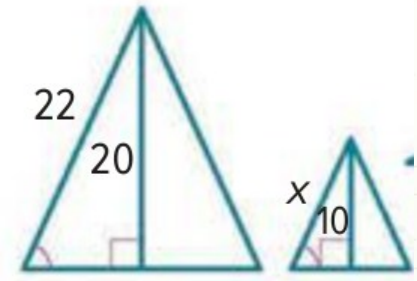
1.



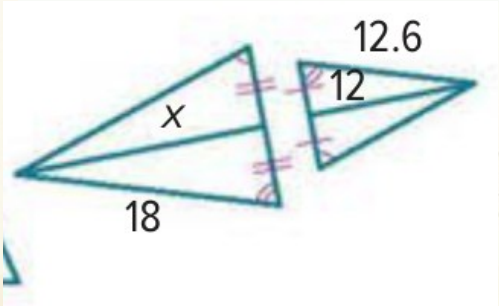
2.



3.



4.



5. If ΔRST ~ ΔEFG, S ΔRST, FJ is an altitude of ΔEFG, ST = 6, SH = 5, and FJ = 7, find FG.

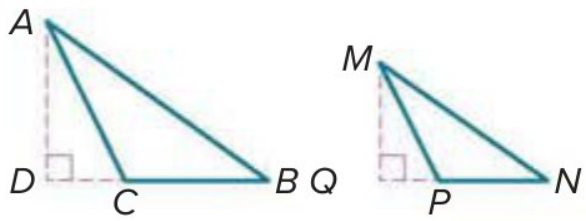
If $\triangle RST \sim \triangle EFG$, $S\overline{H}$ is an altitude of



A. 8.4	**B.** 7.2
C. 5.6	**D.** 10.5

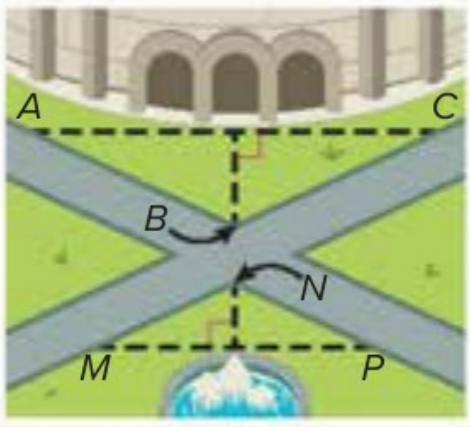
6. If □ABC ~ □MNP, A ¯D is an altitude of □ABC, M Q is an altitude of □MNP, AB = 24, AD = 14,

If $\triangle ABC \sim \triangle MNP$, $\overline{AD}$ is an altitude of $\triangle ABC$, $\overline{M}$ and $MQ = 10.5$, find MN.

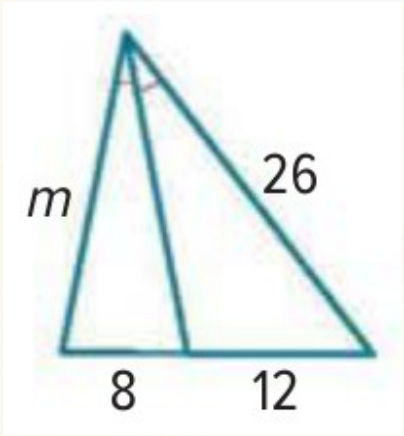


A. 16	**B.** 18
C. 21	**D.** 32

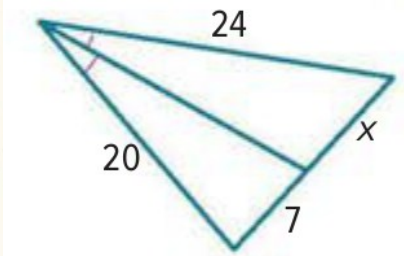
7. SCENERY The intersection of the two paths shown forms two similar triangles. If AC is 50 yards, MP is 35 yards, and the fountain is 5 yards from the intersection, about how far from the intersection is the stadium entrance? Round to the nearest yard.



8. Find m



9. Find x



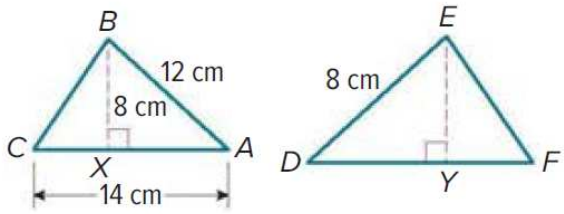
10

Mixed Exercises

For Exercises 10 and 11, $\triangle ABC \sim \triangle DEF$.

10. Find the length of $\overline{XC}$ to the nearest tenth.

11. Find the length of $\overline{EY}$ to the nearest tenth.



PART A / MULTIPLE CHOICE

Q15	Find the geometric mean between two numbers.	1–6 11–14	165

DIRECTION • Find the geometric mean between each pair of numbers. / Find the values of x, y, and z.

1. 4 *and* 6

A. $2\sqrt{6}$ B. 5

C. $\sqrt{10}$ D. $4\sqrt{6}$

2. ½ *and* 2

A. $1/2$ B. 1

C. 2 D. $\sqrt{2}$

3. 4 *and* 25

A. $\sqrt{29}$ B. 14.5

C. 10 D. 100

4. 12 *and* 20

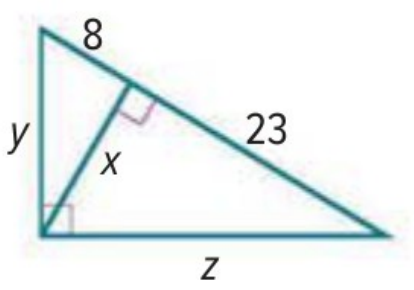
A. $8\sqrt{15}$ B. 16

C. $6\sqrt{15}$ D. $4\sqrt{15}$

5. 17 *and* 3

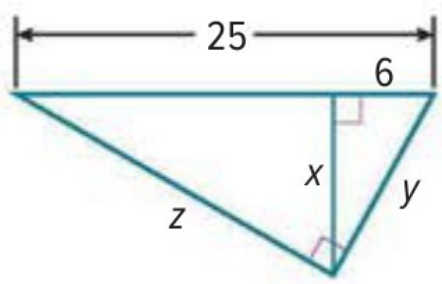
6. 3 *and* 24

11. Find x

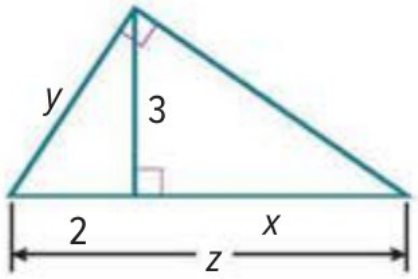


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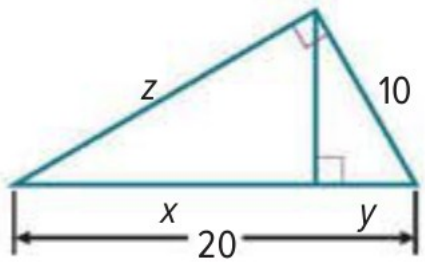
12. Find x,y,z



13. Find x,y



14. Find x,y,z

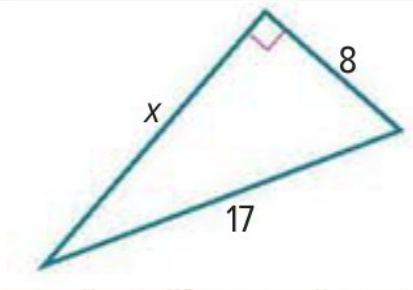


PART A / MULTIPLE CHOICE

Q16	Use the Pythagorean Theorem and its converse.	7–12 20–22	171 172

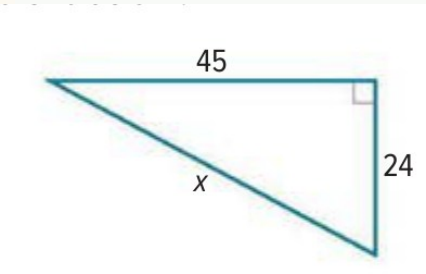
DIRECTION • Use the Pythagorean Theorem and its converse. Classify triangles when requested.

7. Find x

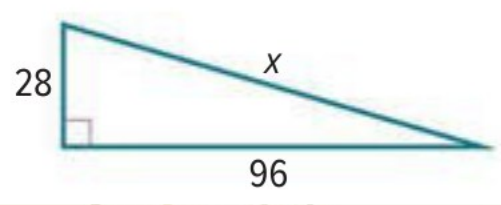


A. 15
B. 9
C. $\sqrt{353}$
D. 25

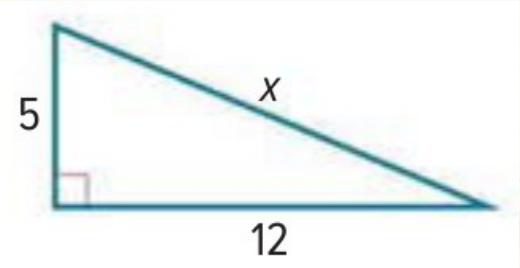
8. Find x



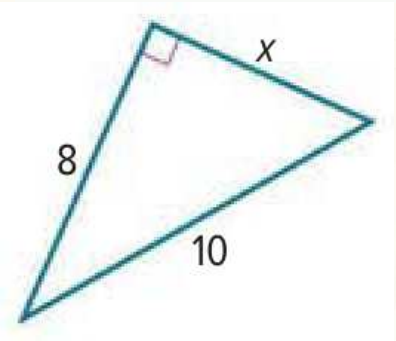
9. Find x



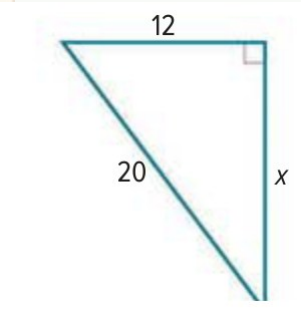
10. Find x



11. Find x



12. Find x



Determine whether each set of measures can be the measures of the sides of a triangle. If so, classify the triangle as acute, obtuse, or right. Justify your answer.

20. 5 , 12, 13

A. Right	**B.** Obtuse
C. Acute	**D.** Not a triangle

21. 2, 8 , 12

A. Acute	**B.** Obtuse
C. Not a triangle	**D.** Right

22. 9, 40, 41

A. Acute	**B.** Obtuse
C. Not a triangle	**D.** Right

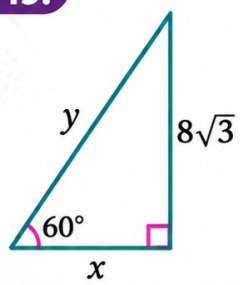
PART A / MULTIPLE CHOICE

Q17	Use the properties of 45°, 45°, 90° triangles and Use the properties of 30°, 60°, 90° triangles.	19–25 33–38	184 185

DIRECTION • Find the values of x and y using special right triangles.

DIRECTION ▶ Find the values of x and y using special right triangles.

19.

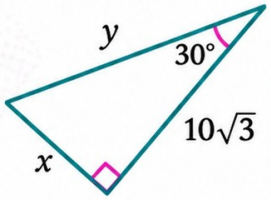


Find the values of x and y.

A. $x = 8,\ y = 16$ B. $x = 16,\ y = 8$

C. $x = 4\sqrt{3},\ y = 8$ D. $x = 8\sqrt{3},\ y = 16\sqrt{3}$

20.

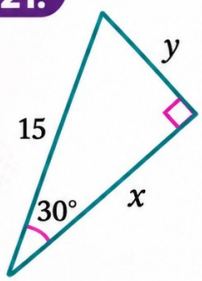


Find the values of x and y.

A. $x = 10,\ y = 20$ B. $x = 5,\ y = 20$

C. $x = 10\sqrt{3},\ y = 20\sqrt{3}$ D. $x = 5\sqrt{3},\ y = 10\sqrt{3}$

21.

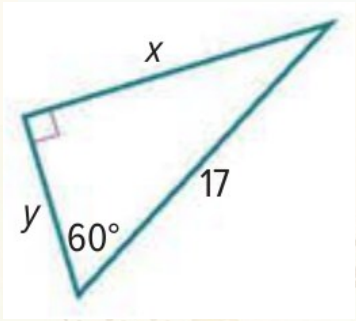


Find the values of x and y.

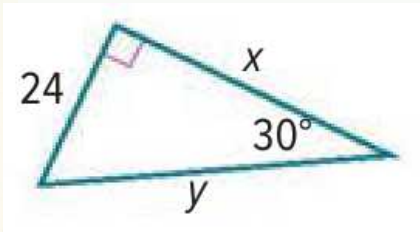
A. $x = 7.5,\ y = 7.5\sqrt{3}$ B. $x = 7.5\sqrt{3},\ y = 7.5$

C. $x = 15,\ y = 7.5\sqrt{3}$ D. $x = 7.5,\ y = 15\sqrt{3}$

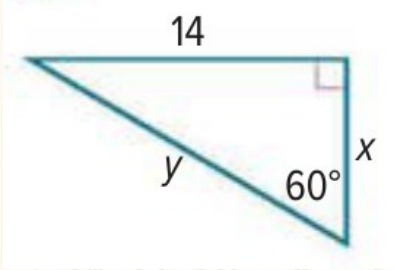
22.



23.



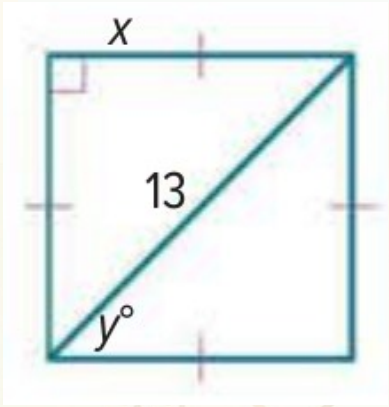
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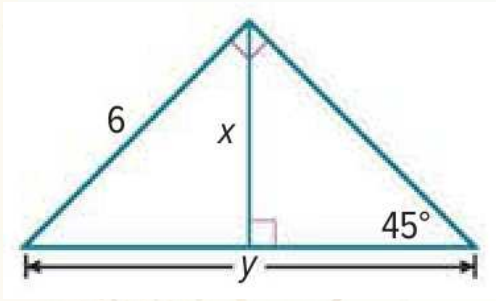
25. ESCALATORS A 40-foot-long escalator rises from the first floor to the second floor of a shopping mall. The escalator makes a 30° angle with the horizontal. How high above the first floor is



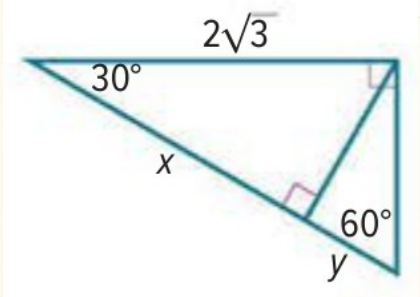
33.



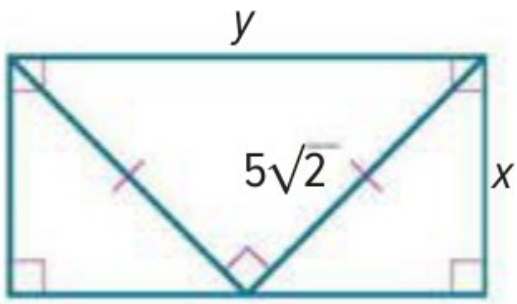
34.



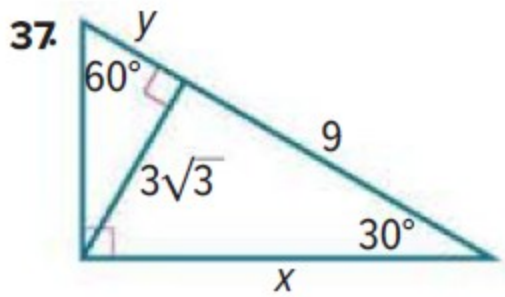
35.



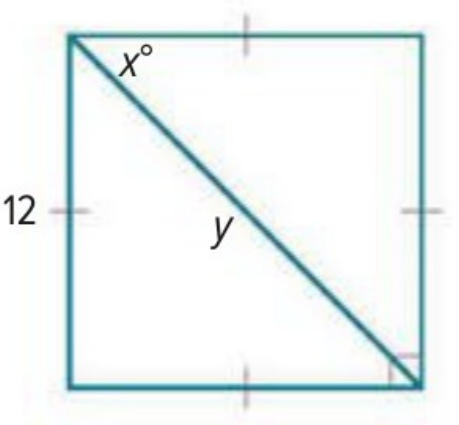
36. Find x,y



37. Find x,y



38. Find x,y

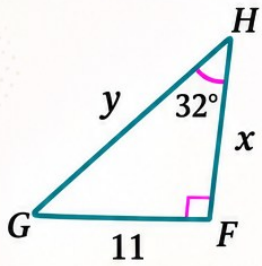


PART A / MULTIPLE CHOICE

Q18	Use trigonometric ratios to find side lengths and angle measures of right triangles.	22–27 30–32	192 193

DIRECTION • Use trigonometric ratios to find the indicated measures.

22. Find the values of x and y. Round to the nearest hundredth where necessary.

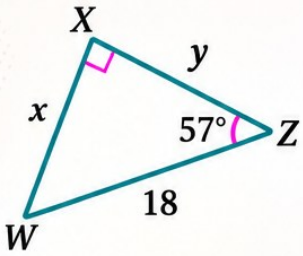


A. $x = 20.76, y = 17.60$ B. $x = 17.60, y = 20.76$

C. $x = 5.83, y = 12.96$ D. $x = 9.33, y = 20.76$

Work:

23. Find the values of x and y. Round to the nearest hundredth where necessary.

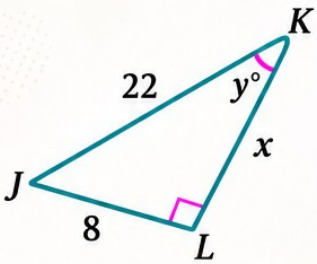


A. $x = 9.80, y = 15.10$ B. $x = 18, y = 9.80$

C. $x = 15.10, y = 9.80$ D. $x = 15.10, y = 18$

Work:

24. Find the values of x and y. Round to the nearest hundredth where necessary.

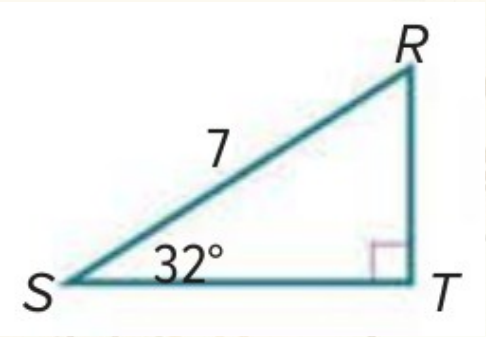


A. $x = \sqrt{548}, y = 21.3°$ B. $x = \frac{\sqrt{420}}{2}, y = 68.7°$

C. $x = \sqrt{420}, y = 21.3°$ D. $x = 14, y = 68.7°$

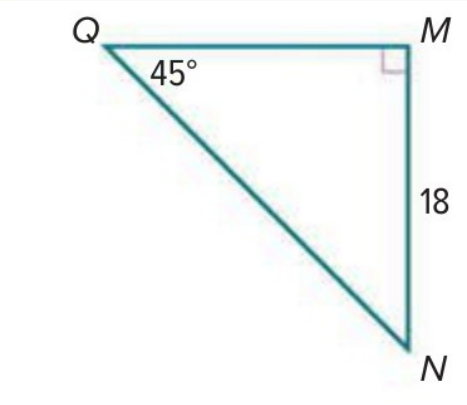
Work:

25. Find RT



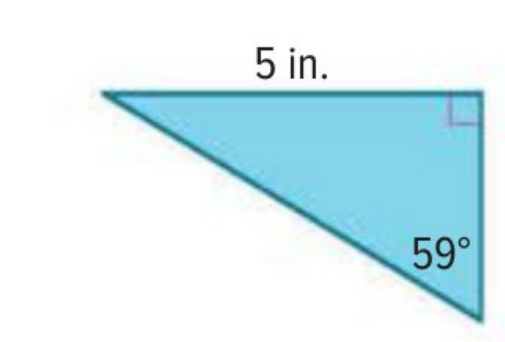
A. 7tan32°	**B.** 7sin32°
C. 7/cos32°	**D.** 7cos32°

27. Find QM

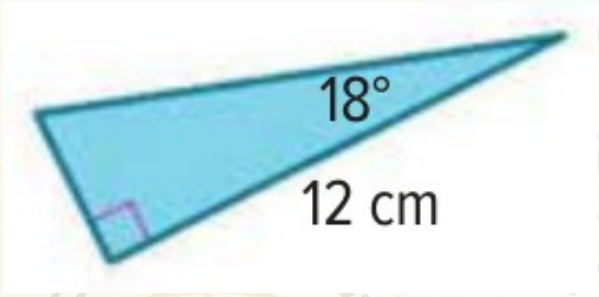


Find the perimeter and area of each triangle. Round to the nearest hundredth.

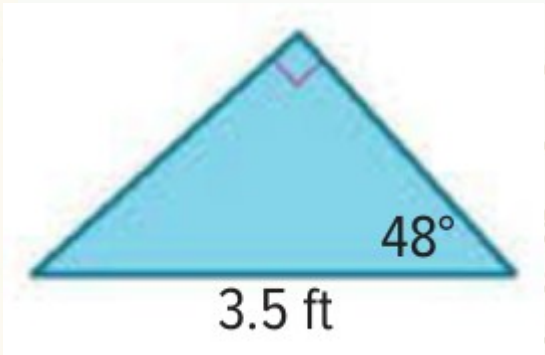
30.



31.



32.

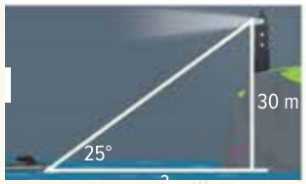


PART A / MULTIPLE CHOICE

Q19	Use trigonometric ratios to find side lengths and angle measures of right triangles	1–7	199

DIRECTION • Solve each applied trigonometry problem.

1. LIGHTHOUSES Sailors on a ship at sea spot the light from a lighthouse at an angle of elevation of 25°. The light of the lighthouse is 30 meters above sea level. How far from the shore is the ship? Round your answer to the nearest meter.



A. $64\,m$ B. $30\,m$

C. $71\,m$ D. $13\,m$

2. WATER TOWERS A student can see a water tower from the edge of a soccer field at San Lobos High School. The edge of the field is about 110 feet from the water tower, and the water tower stands at a height of 32.5 feet. What is the angle of elevation if the eye level of the student viewing the tower is 6 feet above the ground? Round your answer to the nearest tenth.

A. $16.5°$ B. $13.5°$

C. $20.2°$ D. $76.5°$

3. CONSTRUCTION A roofer props a ladder against a wall so the top of the ladder just reaches a 30-foot roof that needs repair. If the angle of elevation from the bottom of the ladder to the roof is 55°, how far is the ladder from the base of the wall? Round your answer to the nearest foot.

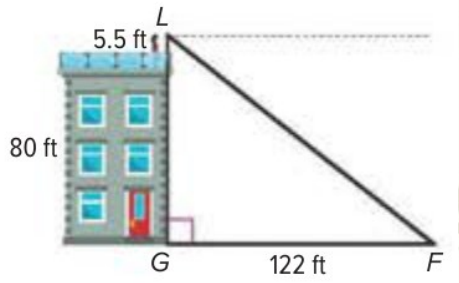
A. $43\,ft$ B. $30\,ft$

C. $21\,ft$ D. $17\,ft$

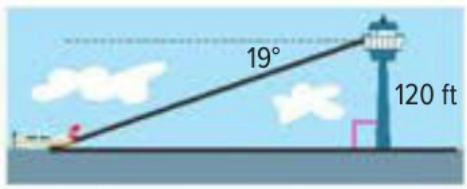
4. MOUNTAIN BIKING On a mountain bike trip along the Gemini Bridges Trail in Moab, Utah, Nabuko stopped on the canyon floor to get a good view of the twin sandstone bridges. Nabuko is standing about 60 meters from the base of the canyon cliff, and the natural arch bridges are about 100 meters up the canyon wall. If her line of sight is 5 meters above the ground, what is the angle of elevation to the top of the bridges? Round to the nearest tenth of a degree.

A. 59.0°	**B.** 31.5°
C. 62.4°	**D.** 57.7°

5. ROOFTOP Lucia is 5.5 feet tall. She is standing on the roof of a building that is 80 feet tall. She spots a fountain at ground level that she knows to be 122 feet away from the base of the building. What is the measure of the angle of depression formed by Lucia's horizontal line of sight and her line of sight to the fountain? Round your answer to the nearest degree.



6. AIR TRAFFIC From the top of the 120-foot-high tower, an air traffic controller observes an airplane on the runway at an angle of depression of 19°. How far from the base of the tower is the airplane? Round to the nearest tenth of a foot.



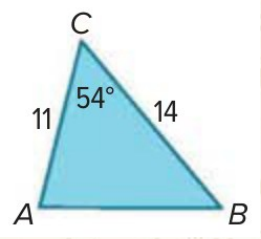
7. AVIATION Due to a storm, a pilot flying at an altitude of 528 feet has to land. If he has a horizontal distance of 2000 feet until he reaches the landing strip, what angle of depression should he use to land? Round to the nearest tenth of a degree.

PART A / MULTIPLE CHOICE

Q20	Find the area of a triangle using two sides and an included angle.	13–21	200–201

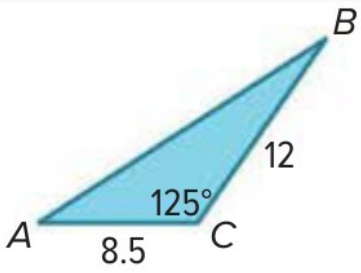
DIRECTION • Use trigonometry to find the area of each triangle.

13.



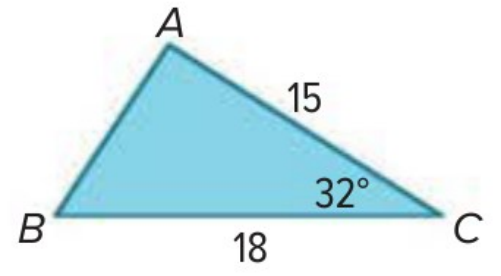
A. 62.3
B. 77.0
C. 54.4
D. 126.0

14.

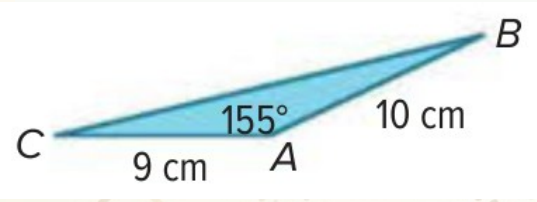


A. 39.3
B. 41.8
C. 50.1
D. 83.6

15.



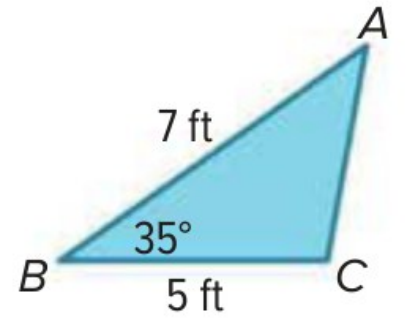
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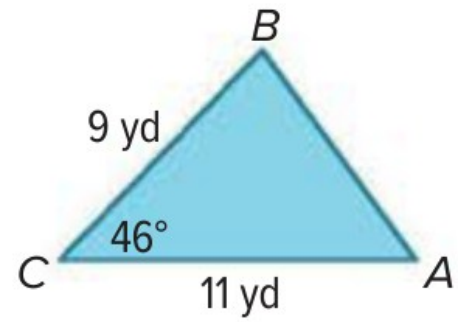
A. $34.4\ cm^2$ B. $45.0\ cm^2$

C. $19.0\ cm^2$ D. $38.0\ cm^2$

17.



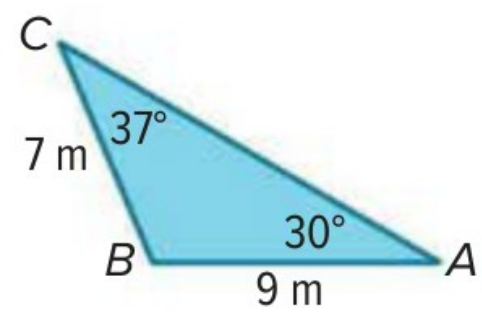
18.



A. $55.1\ yd^2$ B. $41.1\ yd^2$

C. $99.0\ yd^2$ D. $35.6\ yd^2$

19.



PART B / FREE RESPONSE

Q21	Factorize binomials that are the difference of squares and Factor perfect square trinomials.	35–41 51–56	680 681

DIRECTION • Factor each polynomial, if possible. / Determine whether each trinomial is a perfect square trinomial. Write yes or no. If so, factor it.

35. $8x^2 - 72p^2$

36. $20q^2 - 5r^2$

37. $32a^2 - 50b^2$

38. $16b^2 - 100$

39. $49x^2 - 64y^2$

40. $3n^4 - 42n^3 + 147n^2$

41. $8m^3 - 24m^2 + 18m$

51. $9z^2 - 6z + 1$

52. $36x^2 - 60x + 25$

53. $49r^2 + 14r + 4$

54. $a^2 + 14a + 49$

55. $t^2 - 18t + 81$

56. $4c^2 + 2cd + d^2$

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PART B / FREE RESPONSE

Q22	**a) Prove and use the Polygon Interior Angles Sum Theorem. b) Find and use the sum of the measures of the exterior angles of a polygon.**	**9–14** **15–18**	**64**

DIRECTION • The measure of an interior angle of a regular polygon is given. Find the number of sides. / Find x in each diagram.

9. 144°

10. 156°

11. 160°

12. 108°

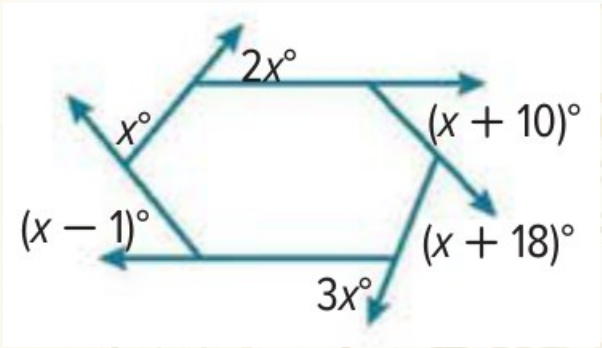
13. 120°

14. 150°

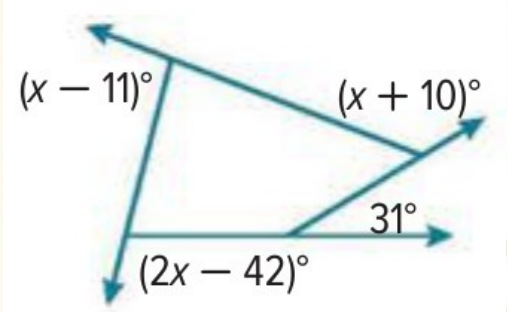
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Find the value of x in each diagram.

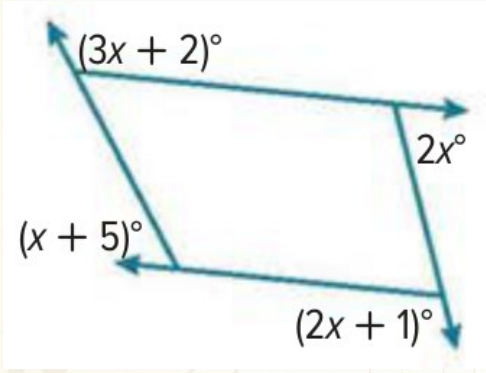
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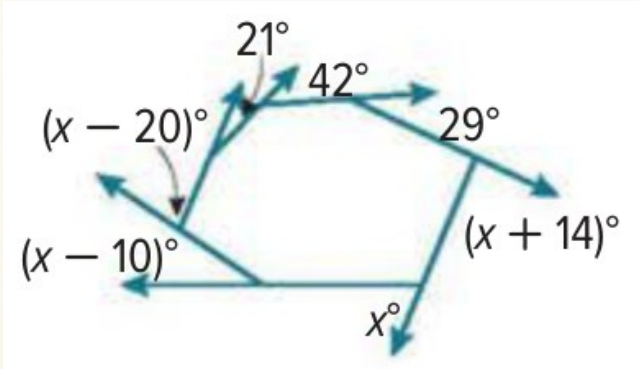
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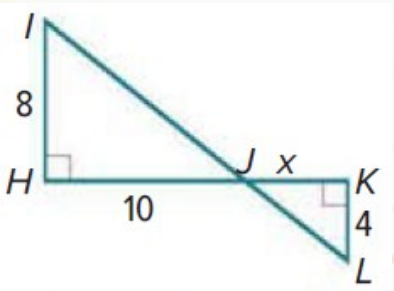


PART B / FREE RESPONSE

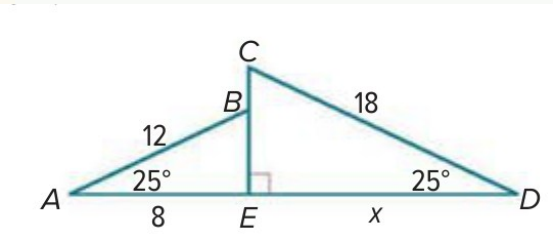
Q23	Use similar triangles to solve problems.	5–11	139

DIRECTION • Determine whether each pair of triangles is similar. Explain your reasoning. / Use similar triangles to solve problems.

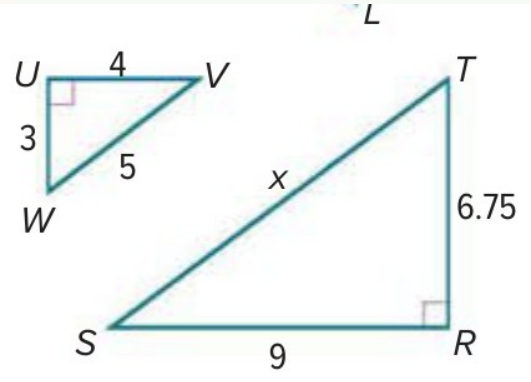
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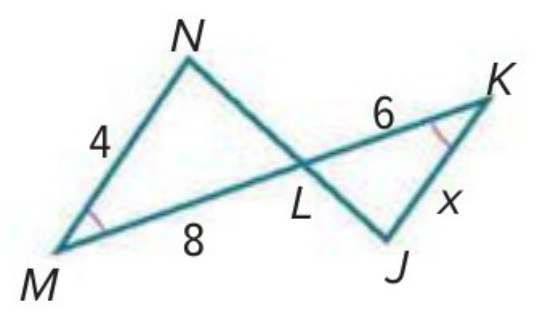
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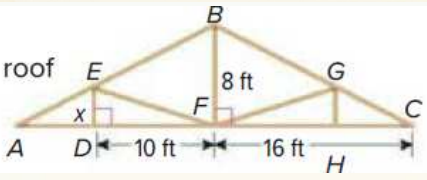
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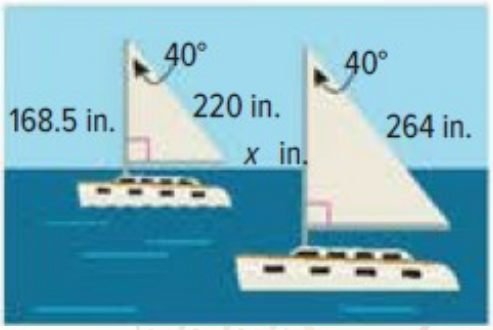


9. ROOFING The skeleton of a roof is shown. Find the value of x such that triangles DEF and FBC in the outline of the roof are similar



10. RADIO A radio tower casts an 8-foot-long shadow at the same time that a vertical yardstick casts a shadow one half inch long. If the triangles formed by the objects and their shadows are similar, how tall is the radio tower?

11. If the sails are similar, what is the value of x?



PART B / FREE RESPONSE

Q24	Distance and Midpoint Formulas in Space	13–18 19–24	177 178

DIRECTION • Find the indicated measures in space. / Determine the distance between each pair of points and the coordinates of midpoint M.

13. K(-2, -4, -4) and L(4, 2, 0)

14. W(-1, -3, -6) and Z(-1, 5, 10)

15. R(3, 3, 4) and V(5, 4, 13)

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16. A(4, 6, -8) and B(0, 0, 0)

17. C(8, 7, 11) and D(2, 1, 8)

18. T(-1, -7 , 9) and U(5, -1, -6)

19. P(-5, -2, - 1) and Q(-1, 0, 3)

20. J(1, 1, 1) and K(-1, -1, - 1)

PART B / FREE RESPONSE

Q25	Determine whether three given measures of a triangle define 0, 1, or 2 triangles by using the Law of Sines.	15–26	208

DIRECTION • Determine whether each triangle has no solution, one solution, or two solutions. Then solve the triangle. Round side lengths to the nearest tenth and angle measures to the nearest degree.

15. $m\angle A = 50°, a = 34, b = 40$

16. $m\angle A = 24°, a = 3, b = 8$

17. $m\angle A = 125°, a = 22, b = 15$

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18. $m\angle A = 30^\circ, a = 1, b = 4$

19. $m\angle A = 30^\circ, a = 2, b = 4$

20. $m\angle A = 30^\circ, a = 3, b = 4$

21. $m\angle A = 38^\circ, a = 10, b = 9$

22. $m\angle A = 78^\circ, a = 8, b = 5$

23. $m\angle A = 133^\circ, a = 9, b = 7$

24. $m\angle A = 127^\circ, a = 2, b = 6$

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25. $m\angle A = 109^\circ, a = 24, b = 13$

26. $m\angle A = 48^\circ, a = 11, and\ b = 16$

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