

Pre-Algebra to Geometry Samples

1 A car stereo that normally goes for \$199 is on sale for 25% off. What is the sale price?

2 Express 0.087 as a percent.

3 Rewrite 7^{-2} using positive exponents only and evaluate the result.

4 A section of a roller-coaster track falls 24 m in a horizontal distance of 18 m. What is the slope of this section of track?

5 Looking at the following list of used cars, if Mr. Linn wanted to buy a car for less than \$10,000, what would be the range of the set of cars he could choose?

| | |
|----------|-------------|
| Camry | \$9,000.00 |
| Taurus | \$6,500.00 |
| Accord | \$5,600.00 |
| Jeep | \$20,000.00 |
| Explorer | \$12,680.00 |
| Prelude | \$4,500.00 |
| Malibu | \$2,200.00 |

6 Given this set of data:

5.4, 6.8, 3.6, 5.4, 2.5, 6.8, 5.2

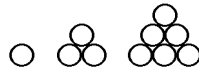
Which statements are true for the data?

- median is 5.2
- mode is 6.1
- mean is 5.1

7 Find the probability of choosing an apple then another apple from a bowl of 3 bananas and 2 apples, without replacing the first piece of fruit selected.

8 y varies directly as x , and $y = 8$ when $x = 32$. Write y as a function of x .

9 What comes next in this sequence?



10 One *joule* is about 0.000 947 81 British Thermal Units. What is this number in scientific notation?

11 Find the value of $\sqrt[5]{1} + \sqrt[4]{16}$.

12 Problem: "During football practice, the coach had the team run around the perimeter of the practice field 4 times. Then each team member had to do push-ups."

What other information is needed to determine how far the team ran?

13 On a United States map, 1 inch represents 240 miles. Using this scale, find the distance represented by $3\frac{1}{2}$ inches.

14 It is 08:54 on Oct 13, in Kamloops, British Columbia. Select correct time and day in Sydney, Australia, given that Kamloops is 16 h behind Sydney.

15 A four digit code is to be made, using numbers from 0 through 9 (ten choices). But the four-digit code cannot be a number greater than 6999, can't start with zero, and it must be an odd number. How many different codes are there?

16 An insurance company insures 1,600,000 homes against loss from fire and theft. The maximum amount payable is \$500,000. The probability that a homeowner makes a claim in a particular year is 0.5%. The average amount paid out in claims is approximately \$18,000. How much does the company expect to pay out in claims?

17 Show that the following statement is true.

“Given any two consecutive integers, the square of the smaller subtracted from the square of the larger is one more than twice the smaller.”

18 How many kilograms of cashew nuts worth \$6.60/kg should be combined with 10 kilograms of pecans worth \$8.50/kg to get a mixture worth \$7.10/kg?

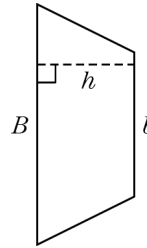
19 Jamie and Kendra earn \$42 for shoveling snow. If Jamie works 3 hours and Kendra works 4 hours, how should they split the money so each receives the correct share?

20 At the last school dance, 142 people were in attendance. There were 10 more boys than girls at the dance. Write a system of equations that you could use to set up this problem where b is the number of boys and g is the number of girls at the dance. Use this system of equations to solve for g , the number of girls at the dance.

21 Find the approximate solution of the given system of equations.

$$\begin{aligned} \frac{5}{4}x - y &= -8 \\ -3x - y &= -5 \end{aligned}$$

22 The given figure is an isosceles trapezoid. If $b = 4x + 7$, $B = 6x - 3$, $h = 9$ and the area is $20x^2 - 7x - 6$, what is the numerical value of the area?



23 Simplify this expression:

$$-5a^3 + ab - 3a^2b^2 + 5ab + 11a^2b + 5a^3 - a^2b^2$$

24 Find the following sums:

1. $2b^2 - 2bc - c^2$ and $c^2 + bc - b^2$

2. $9b^2 - 3c^2$ and $2b^2 + bc - 2c^2$

What is the second sum subtracted from the first?

25 What is wrong with the following definition?

A *circle* is defined to be the set of all points in a plane that are a given distance from a given line.

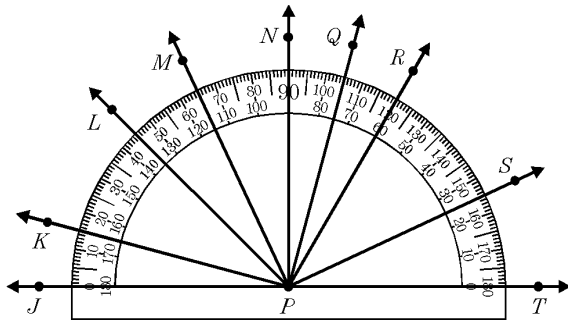
26 Which of the following are characteristics of a point?

- A) length
- B) width
- C) height
- D) volume
- E) position

27 Name the argument form (if any) used:

“If I study, I will pass the test. I pass the test. Therefore, I studied.”

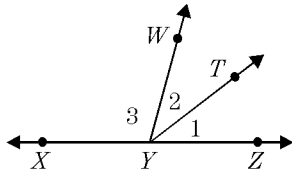
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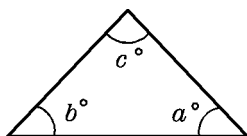
Determine the measure of each angle.

- a) $\angle JPR$
- b) $\angle JPS$
- c) $\angle TPM$
- d) $\angle NPQ$

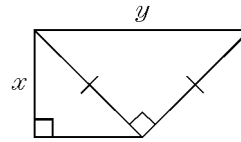
- 29 In the diagram, \overrightarrow{YT} bisects $\angle WYZ$ and $m\angle XYT$ is five times as large as $m\angle 1$. What is the measure of $\angle 3$?



- 30 In isosceles $\triangle RST$ with vertex angle S , $RT = 12$. If the legs of this isosceles triangle are twice as long as the base, what is the perimeter of the triangle?
- 31 If $a = 4x + 5$, $b = 4x$ and $c = 6x$, solve for x and give the measure of each angle.

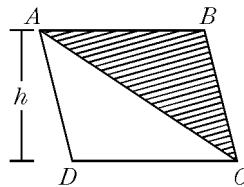


- 32 In the diagram, y is 12. What is x ?

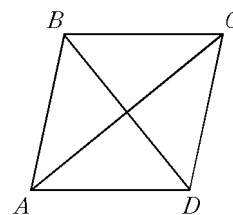


- 33 In a right triangle, the hypotenuse is 5.25 feet. If one leg is 3.5 feet, approximately how long is the other leg?

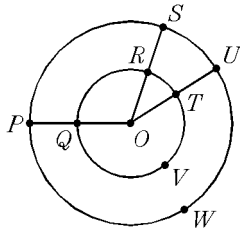
- 34 In the diagram, $\square ABCD$ is a parallelogram with $BC = 20$ and the area of the shaded region equal to 150 units². What is the height of the parallelogram with respect to \overline{AD} ?



- 35 In the diagram, quadrilateral $ABCD$ is a rhombus with $BC = 15$ and $BD = 18$. What is the area of the rhombus?

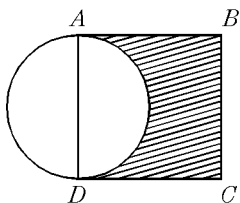


- 36 In circle O , \overline{OP} , \overline{OS} , and \overline{OU} are radii, $m\angle POS = 104$, and $m\widehat{SOU} = 39$. Find the following measures.



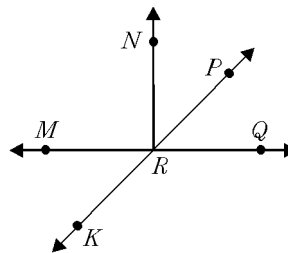
- $m\angle QOR$
- $m\widehat{RT}$
- $m\widehat{QT}$
- $m\widehat{PWU}$
- $m\widehat{RVQ}$

- 37 In the diagram, square $ABCD$ is overlapped by a circle with diameter AD . The side lengths of the square are 12 units. Find the area of the shaded region.



- 38 The coordinates of quadrilateral $ABCD$ are $A(0, 2)$, $B(2, 6)$, $C(6, 4)$, and $D(4, 0)$. Determine if $ABCD$ is a special quadrilateral. If so, justify your answer with the appropriate measurements.

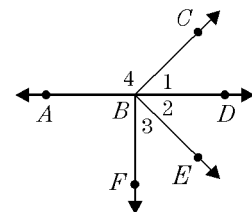
- 39 In the diagram, all points are coplanar. State whether each of the following *can* or *cannot* be assumed (or proven)?



- M is in the interior of $\angle KRQ$.
- $\angle PRQ \cong \angle KRM$
- \overrightarrow{RM} and \overrightarrow{RQ} are opposite rays.
- $\angle NRP$ and $\angle PRQ$ are complementary.
- R is between K and P .

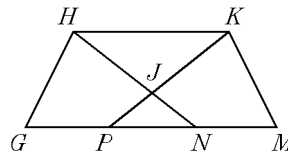
- 40 Given: $\overline{BC} \perp \overline{BE}$,
 $\overline{BD} \perp \overline{BF}$

Prove: $\angle 4$ is supplementary to $\angle 3$



41 Given: $GHKM$ is a trapezoid with bases \overline{HK} and \overline{GM}

Prove: $\frac{PN}{KH} = \frac{JN}{JH}$



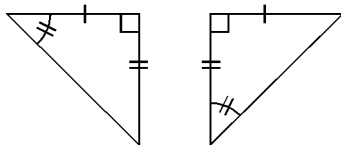
| statement | reason |
|---|---|
| 1. _____ | 1. Given |
| 2. _____ | 2. alt int $\angle s \cong$ iff \parallel lines |
| 3. _____ | 3. alt int $\angle s \cong$ iff \parallel lines |
| 4. $\angle PJN \cong \angle KJH$ | 4. _____ |
| 5. $\triangle ___ \sim \triangle ___$ | 5. _____ |
| 6. $\frac{PN}{KH} = \frac{JN}{JH}$ | 6. _____ |

42 Assuming the following statements are true, what can be logically deduced?

- i. If a is not a b , then a is a c
- ii. If a is a c , then a is not a d

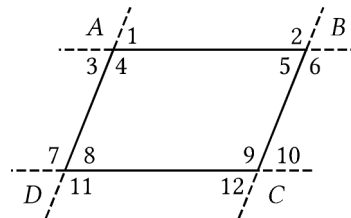
43 If two adjacent sides of a parallelogram have lengths 6 and 10, then the perimeter is _____.

44 Based on the markings, which of the following theorems can be used to prove the triangles congruent?



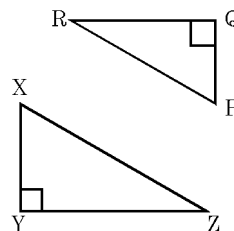
- Hypotenuse-Leg
- Leg-Leg
- Leg-Acute Angle
- Hypotenuse-Acute Angle

45 $ABCD$ is a parallelogram with sides extended as shown.

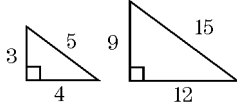
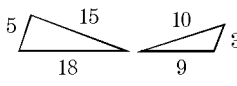
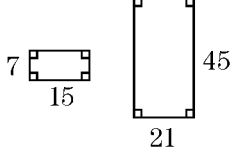
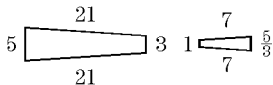
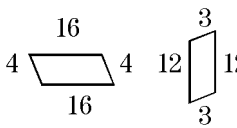


If $\angle 4 = 142^\circ$, what is the measure of $\angle 2$?

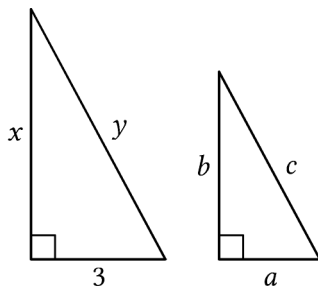
46 Given that $\triangle PQR$ is similar to $\triangle XYZ$, \overline{XZ} corresponds to which segment?



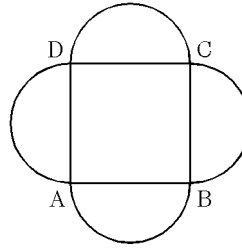
47 Determine which of the following pairs of polygons are similar.

- 
- 
- 
- 
- 

48 The two triangles in the picture are similar. What is the value of y in terms of a , b , and/or c ?

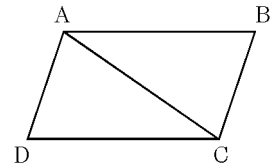


49 In the figure, $ABCD$ is a square with semicircles constructed on each side. If $AB = 6$ cm, what is the area of the entire figure to the nearest tenth of a square centimeter?



50 Given: $\overline{AB} \parallel \overline{DC}$
 $AB = DC$

Prove: $m\angle DAC =$
 $m\angle BCA$



| Statement | Reason |
|---|--------|
| $\overline{AB} \parallel \overline{DC}$ | (1) |
| $AB = DC$ | (2) |
| $m\angle BAC = m\angle DCA$ | (3) |
| $AC = AC$ | (4) |
| $\triangle ADC \cong \triangle CBA$ | (5) |
| $m\angle DAC = m\angle BCA$ | (6) |

In the above proof, what is reason (6)?