Arizona's Instrument to Measure Standards (AIMS HS)

Mathematics

Released Items

November 15, 2008

Mathematics

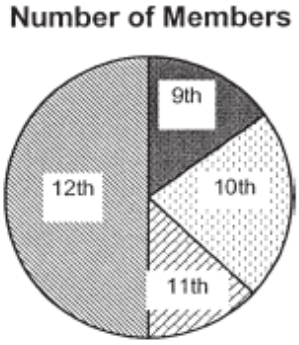
DIRECTIONS: Read each question and choose the best answer.

1 The table below shows information about the members of a concert choir at a high school.

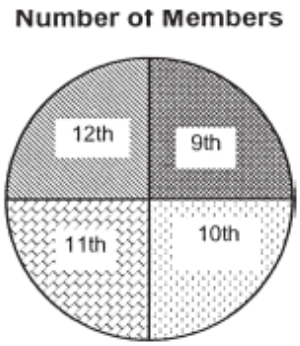
Grade	Number of Members
9^{th}	6
10^{th}	12
11^{th}	15
12^{th}	27

Which of the following graphs best describes the choir's membership data?

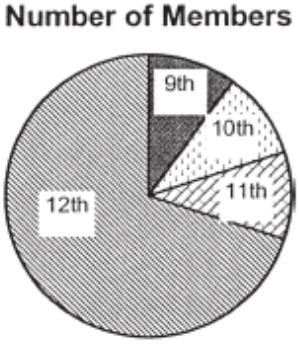
A



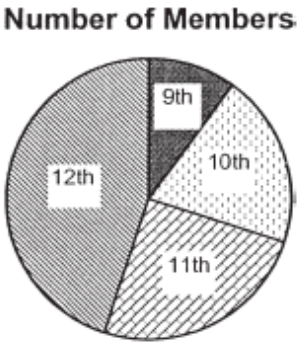
C



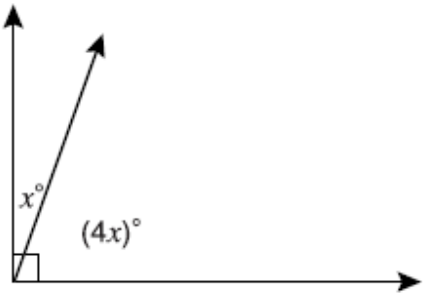
B



D



2 What is the value of x in the figure below?



A $x = 18$

B $x = 22$

C $x = 30$

D $x = 45$

3 The number cube shown is numbered 1 through 6 on its faces.

When the cube is tossed once, what is the probability a number divisible by three will be on the top face?

A $\frac{1}{3}$

B $\frac{1}{6}$

C $\frac{1}{2}$

D 1

4 Let n be any even integer. Which of the following is always true about $(n + 5)$?

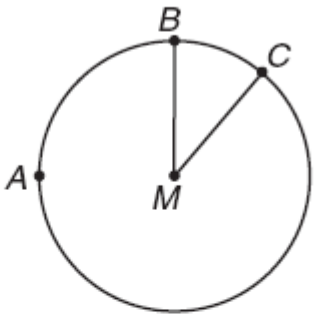
A $(n + 5)$ is an odd integer.

B $(n + 5)$ is an even integer.

C $(n + 5)$ is a prime integer.

D $(n + 5)$ is the same as $(n - 5)$.

5 Points A, B, and C lie on circle M, as shown below.



What is the measure of $\angle BMC$ if the measure of arc BAC is 320°?

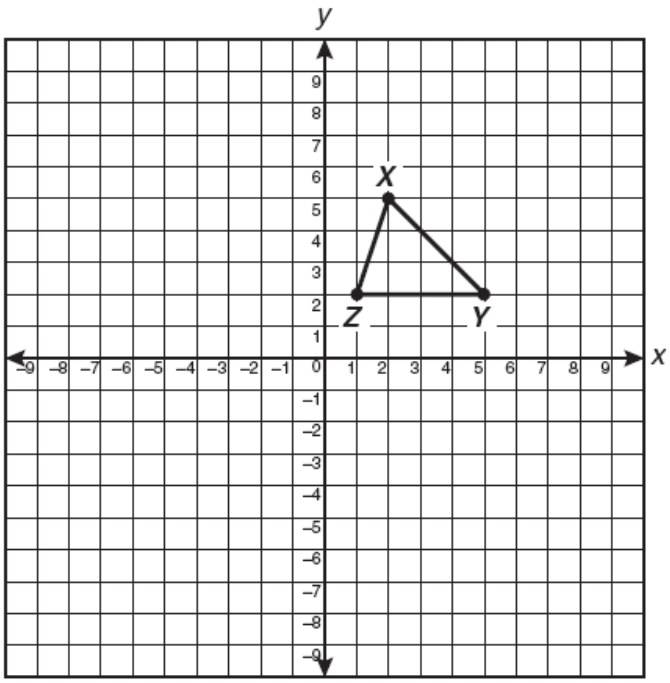
A 40°

B 80°

C 160°

D 320°

6 ΔXYZ is translated 3 units to the right and 2 units down.



What will be the apparent coordinates of the image of point X?

A (0, 8)

B (3, 5)

C (5, 3)

D (8, 0)

7 Which of the following are inverse operations?

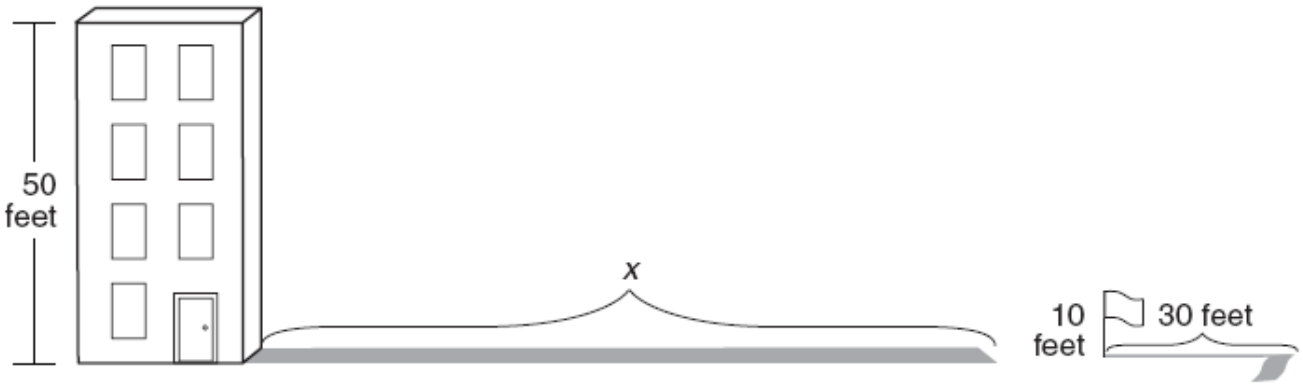
A multiplication and addition

B square root and division

C subtraction and taking square root

D addition and subtraction

8 The diagram below shows a building, a nearby flagpole, and their shadows.



Based on the information in the diagram, what is *x*, the length of the shadow of the building?

A 50 feet

B 150 feet

C 300 feet

D 1500 feet

9 In the pattern below, each term is found by doubling the immediately preceding term and adding 1.

3, 7, 15, 31, 63, . . .

What is the 7th term in the pattern?

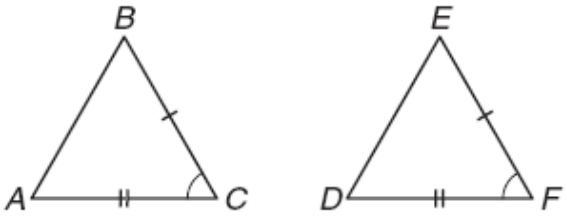
A 127

B 128

C 255

D 258

10 Based on the diagram below, which of these arguments is valid?



A The triangles are congruent by side-side-side (SSS).

B The triangles are congruent by side-angle-side (SAS).

C The triangles are congruent by angle-side-angle (ASA).

D The triangles are congruent by angle-angle-side (AAS).

11 Which statement is true?

A $7 < \sqrt{65} < 8$

B $4 < \sqrt{13} < 5$

C $6 < \sqrt{33} < 7$

D $9 < \sqrt{91} < 10$

12 Which expression below has been simplified using the correct procedure?

A $2 + 4(x + 2)$
$2 + 4x + 8$
$4x + 10$

B $2 + 5(x - 7)$
$7(x - 7)$
$7x - 49$

C $4 - 7(x + 5)$
$4 - 7x + 5$
$-7x + 9$

D $7 - 3(x - 5)$
$7 - 3x - 15$
$-3x - 8$

13 Which procedure correctly simplifies the expression below?

$$-(x + 3) - 2(4x - 3)$$

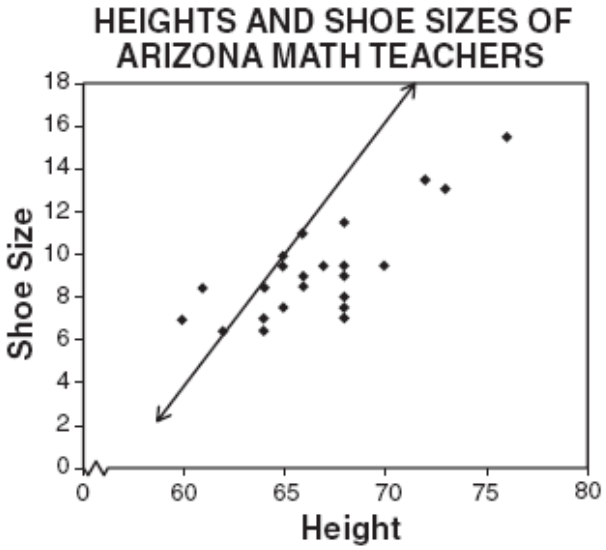
A $-x - 3 - 8x + 6$
$-9x + 3$

B $-x - 3 - 8x - 6$
$-9x - 9$

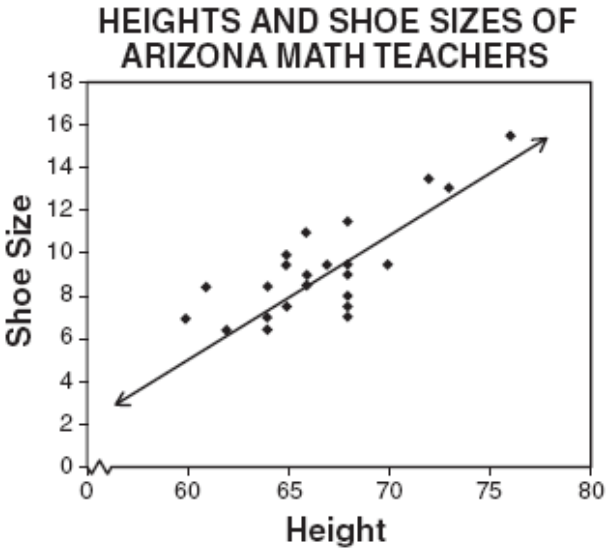
C $-x + 3 - 8x + 6$
$-9x + 9$

D $-x - 3 - 8x - 3$
$-9x - 6$

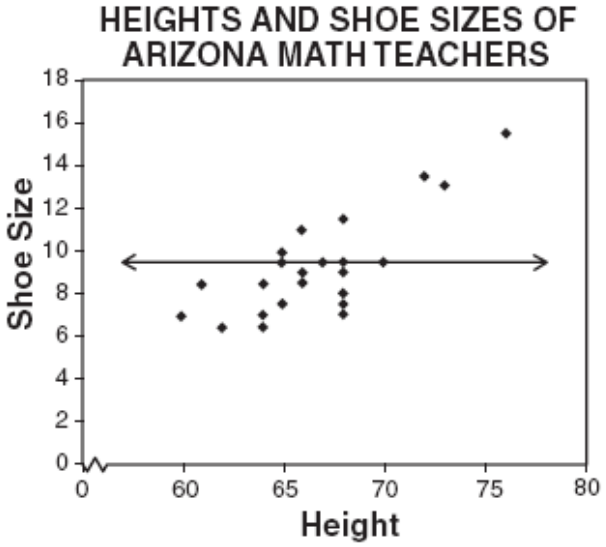
14 Which of the graphs below contains a line of best fit that best represents the data?



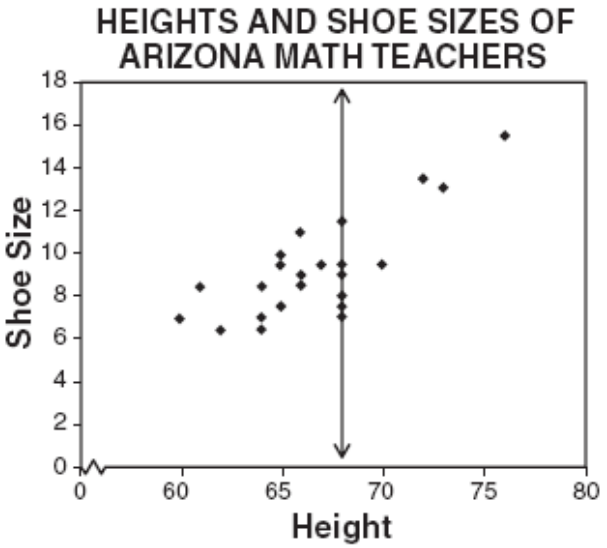
A



C

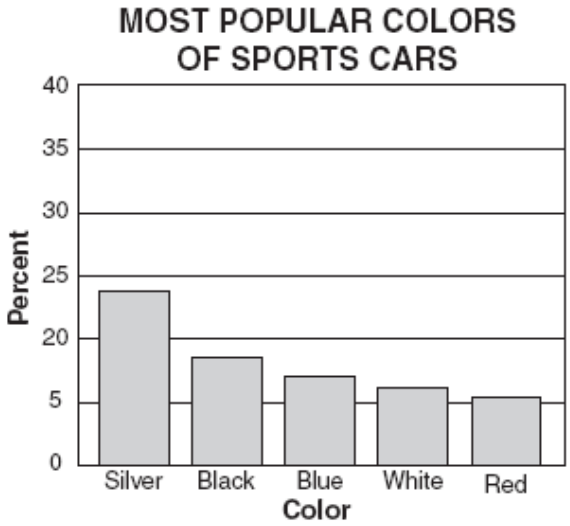


B



D

15 The table below shows the percentage of the most popular colors of sports cars made during 2002.



Which component causes the data to seem distorted?

A horizontal scale

B vertical scale

C bar width

D color

16 Sam began a pattern with 4 and 7. He added them to get 11, the third term. To get each term after the third, he added the two preceding terms.

4, 7, 11, 18, 29, . . .

What is the 9th number in this sequence?

A 47

B 123

C 199

D 322

17 The set of real numbers shown below is a subset of which of the following?

$$\left\{\frac{2}{3}, 3, -\frac{2}{5}, 0.57\right\}$$

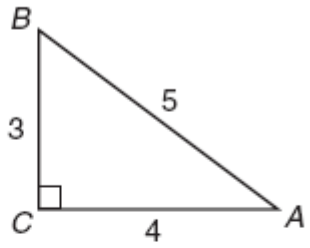
A rationals

B irrationals

C integers

D whole numbers

18 Triangle *ABC* is shown below.



What is the cosine of angle *B*?

A $\frac{3}{5}$

B $\frac{4}{5}$

C $\frac{5}{4}$

D $\frac{5}{3}$

19 A 4th degree polynomial expression has the form below.

$$a_4x^4 + a_3x^3 + a_2x^2 + a_1x + a_0$$

In the polynomial expression $5x^4 - 7x^3 - 3x^2 + 8x - 4$, what is the value of a_3?

A -7

B -3

C 5

D 8

20 The formula for the surface area of a cube is $A = 6s^2$.

What is the formula for s in terms of A?

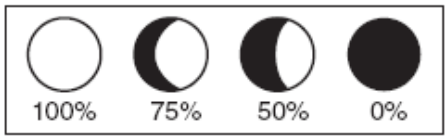
A $s = \sqrt{\frac{A}{6}}$

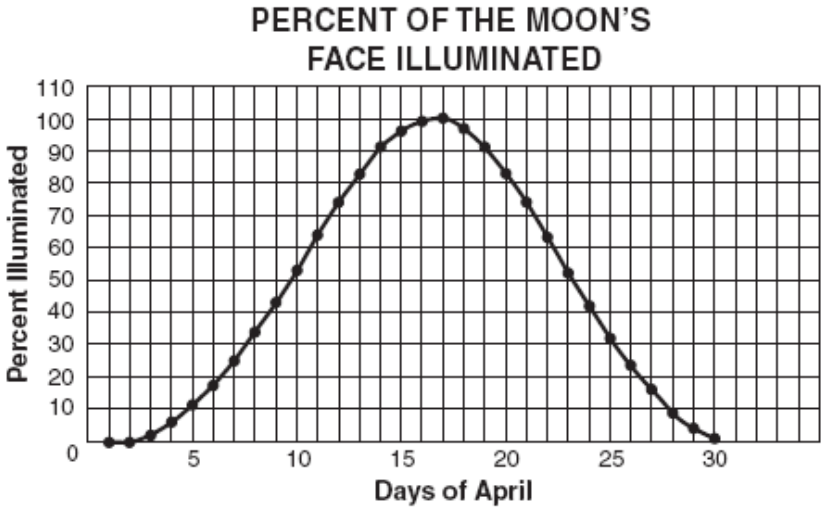
B $s = \sqrt{6A}$

C $s = \sqrt{A - 6}$

D $s = 6A$

21 The graph below shows the percent of the moon's face illuminated for the month of April.





On what day in April did the moon reach its maximum illumination?

A 100 **B** 30 **C** 17 **D** 15

22 Which is a correct procedure for solving the linear inequality below?

$$2y + 8 > 4 - 6y$$

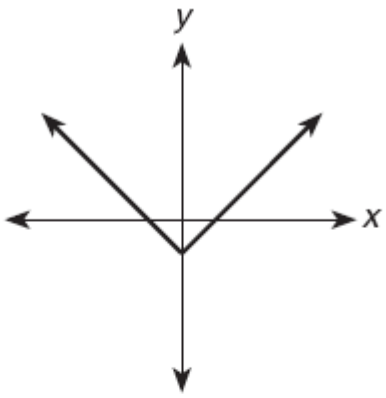
A
$$\begin{aligned} 2y + 8 &> 4 - 6y \\ -4y + 8 &> 4 \\ -4y &> -4 \\ y &> 1 \end{aligned}$$

B
$$\begin{aligned} 2y + 8 &> 4 - 6y \\ 8y + 8 &> 4 \\ 8y &> -4 \\ y &> -\frac{1}{2} \end{aligned}$$

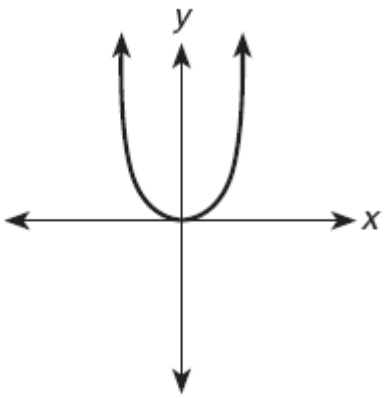
C
$$\begin{aligned} 2y + 8 &> 4 - 6y \\ -4y + 8 &> 4 \\ -4y &> -4 \\ y &< 1 \end{aligned}$$

D
$$\begin{aligned} 2y + 8 &> 4 - 6y \\ 8y + 8 &> 4 \\ 8y &> -4 \\ y &< -\frac{1}{2} \end{aligned}$$

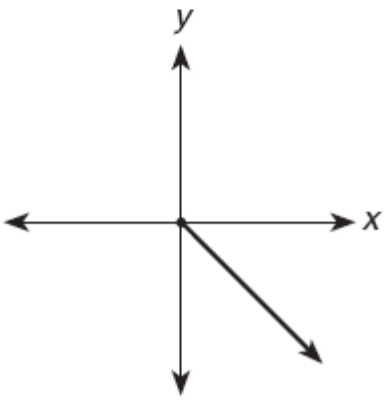
23 Which of the following functions of x has the apparent range of $\{y: y \geq 0\}$?



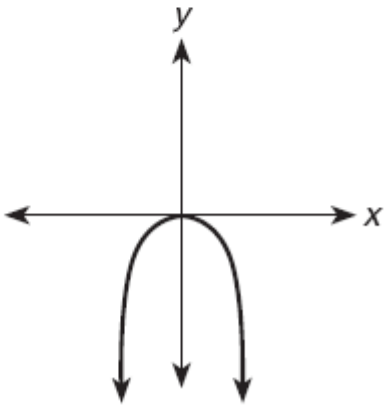
A



C



B



D

24 The Palmdale High School varsity basketball team's total points per game for this year's season are shown below.

Game Number	1	2	3	4	5	6	7	8	9	10	11	12
Number of Points	48	53	52	64	56	47	56	64	70	65	64	68

Which stem-and-leaf plot could be used to correctly display the data?

4	7 8
5	2 3 6
6	4 5 8
7	0

4|7 represents 47

A

4	47 48
5	42 43 56 56
6	64 64 64 65 68
7	70

4|47 represents 47

C

4	7 8
5	2 3 6 6
6	4 4 4 5 8
7	0

4|7 represents 47

B

4	47 48
5	52 53 56
6	64 65 68
7	70

4|47 represents 47

D

25 If $b \neq 0$, which equation is equivalent to the one shown?

$$ax + by = c$$

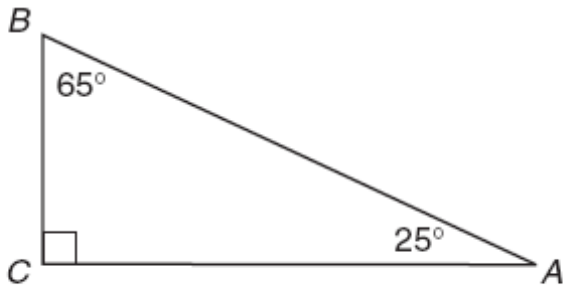
A $y = \frac{c}{b} - abx$

B $y = \frac{c}{b} + abx$

C $y = \frac{c}{b} - \frac{ax}{b}$

D $y = \frac{c}{b} + \frac{ax}{b}$

26 If the sum of the measures of two angles is 90°, then the angles are complementary. In triangle ABC, $m\angle A = 25°$, $m\angle B = 65°$, $m\angle C = 90°$.



Which valid conclusion follows directly from the previous statements?

A $\angle C$ is a complementary angle.

B $\angle B$ and $\angle C$ are complementary angles.

C $\angle A$ and $\angle C$ are complementary angles.

D $\angle A$ and $\angle B$ are complementary angles.

27 What is the solution to the inequality below?

$$-3x - 1 \leq 5$$

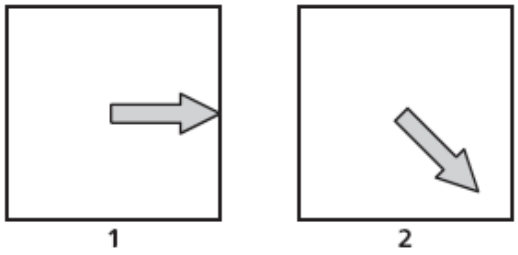
A $x \leq -2$

B $x \geq -2$

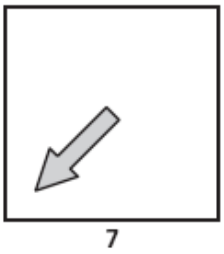
C $x \leq -\frac{4}{3}$

D $x \geq -\frac{4}{3}$

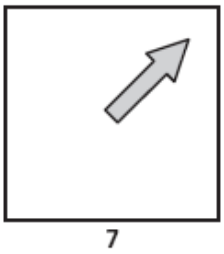
28 The first two terms in a sequence are shown below. Each term after the first is found by rotating the arrow 45° clockwise.



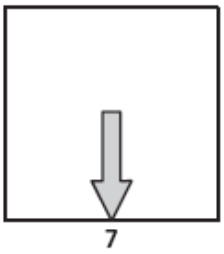
What will be the 7th term in the sequence?



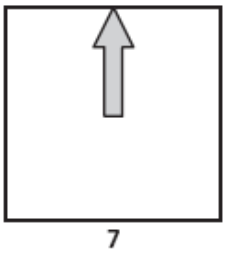
A



C



B



D

29 In a cafeteria survey, 300 students chose one favorite lunch from 4 choices. The probability that a randomly selected student chose pizza was 0.25. Which data set supports this conclusion?

A

Lunch	Burrito	Pizza	Salad	Sandwich
Number Choosing	100	25	75	100

B

Lunch	Burrito	Pizza	Salad	Sandwich
Number Choosing	75	30	100	95

C

Lunch	Burrito	Pizza	Salad	Sandwich
Number Choosing	60	75	60	105

D

Lunch	Burrito	Pizza	Salad	Sandwich
Number Choosing	50	120	60	70

30 Which rule could be used to find each term, after the second, in the recursive sequence shown below?

2, 3, 6, 18, 108, . . .

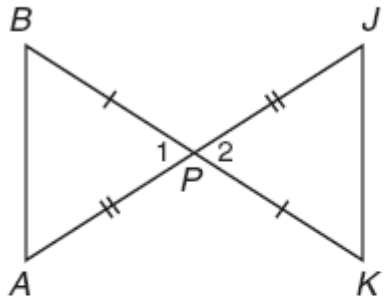
A Multiply the two immediately preceding terms.

B Multiply the immediately preceding term by 2.

C Add the two immediately preceding terms then add 1.

D Square the immediately preceding term and subtract 3.

31 In the diagram below $\overline{BP} \cong \overline{PK}$ and $\overline{AP} \cong \overline{PJ}$.



What additional information is sufficient to prove $\triangle APB \cong \triangle JPK$ by side-angle-side (SAS)?

A $\angle A \cong \angle K$

B $\angle B \cong \angle J$

C $\angle 1 \cong \angle K$

D $\angle 1 \cong \angle 2$

32 A pattern is defined by the following rules.

- The first term is 4.
- The second term is 7.
- Each term after the second is found by adding 3 to the immediately preceding term.

What is the fifth term in this pattern?

A 10

B 13

C 16

D 19