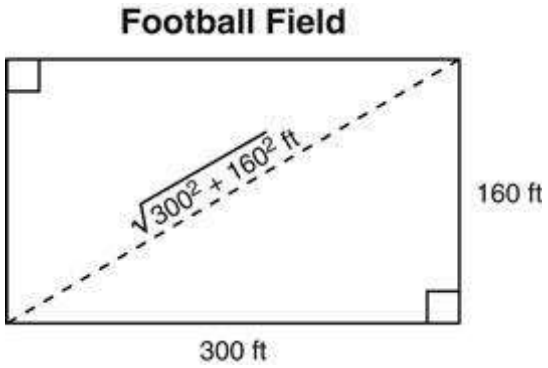
TEST NAME: **Math II Final Study Guide**
TEST ID: **2485861**
GRADE: **10 - Tenth Grade**
SUBJECT: **Mathematics**
TEST CATEGORY: **My Classroom**

Student: _____

Class: _____

Date: _____

1. **The dimensions of a football field are shown below.**



The length of a diagonal of the field is $\sqrt{300^2 + 160^2}$ feet. Which value is equivalent to $\sqrt{300^2 + 160^2}$?

A. 340

B. 460

C. $100\sqrt{289}$

D. $400\sqrt{17}$

2. **Which expression shows $\frac{\sqrt{12x^2y}}{\sqrt{18x^3y^2}}$ in simplified form?**

A. $\frac{2\sqrt{3y}}{3\sqrt{2x}}$

B. $\frac{2x\sqrt{3y}}{3y\sqrt{2x}}$

C. $\frac{\sqrt{6xy}}{3xy}$

D. $\frac{2x\sqrt{6xy}}{6x^2y}$

3. **A skydiver falls at a rate of $t = 0.75\sqrt{x}$ seconds to freefall *x* feet. How long, in seconds, does it take the skydiver to freefall 1200 feet?**

A. $20\sqrt{3}$

B. $15\sqrt{3}$

C. $9\sqrt{3}$

D. $3\sqrt{3}$

4. **What is the value of the expression $64^{\frac{1}{4}} \times 64^{\frac{1}{12}}$?**

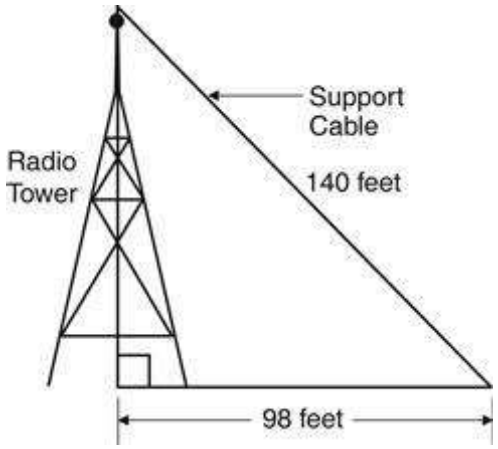
A. 2

B. 4

C. 8

D. 16

5. **A radio tower has a support cable attached to its top. The support cable is 140 feet long and it is anchored in the ground 98 feet from the base of the radio tower.**



How tall is the tower? Give your answer to the nearest foot.

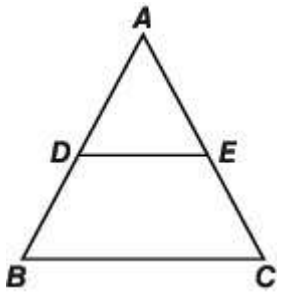
A. 42 feet

B. 100 feet

C. 119 feet

D. 171 feet

6. In $\triangle ABC$, $AD = DB$ and $AE = EC$.



Given the information above, which statement can be proved to be true?

A. Triangle ABC is isosceles.

B. $\overline{DE}$ is perpendicular to $\overline{AC}$.

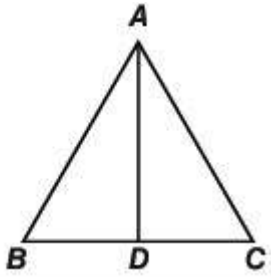
C. The length of $\overline{DE}$ is half the length of $\overline{BC}$.

D. Triangle ABC is congruent to triangle ADC.

7. The statements of a two-column proof are listed below.

Given: $\overline{AB} \cong \overline{AC}$, $\overline{AD} \perp \overline{BC}$

Prove: $\angle B \cong \angle C$



Proof

Statements	Reasons
1. $\overline{AB} \cong \overline{AC}$, $\overline{AD} \perp \overline{BC}$	1.
2. $m\angle ADB = m\angle ADC = 90°$	2.
3. $\overline{AD} \cong \overline{AD}$	3.
4. $\triangle ADB \cong \triangle ADC$	4.
5. $\angle B \cong \angle C$	5.

What should the corresponding reasons be?

A. 1. Given; 2. Definition of congruency; 3. Definition of congruency; 4. SAS theorem; 5. CPCTC

B. 1. Given; 2. Definition of congruency; 3. Reflexive property; 4. Hypotenuse-leg theorem; 5. CPCTC

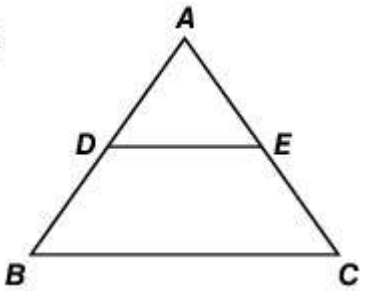
C. 1. Given; 2. Definition of perpendicular lines; 3. Definition of congruency; 4. SAS theorem; 5. CPCTC

D. 1. Given; 2. Definition of perpendicular lines; 3. Reflexive property; 4. Hypotenuse-leg theorem; 5. CPCTC

8. James is practicing proving geometric theorems. He writes the statements needed for the proof below in different boxes and mixes them up so they are not in order.

Given: $\overline{AD} \cong \overline{DB}$ and $\overline{AE} \cong \overline{EC}$

Prove: $\overline{DE} \parallel \overline{BC}$



1 $\angle A \cong \angle A$

2 $\angle ADE \cong \angle ABC$

3 $\overline{AD} \cong \overline{BD}, \overline{AE} \cong \overline{EC}$

4 $\triangle ABC \sim \triangle ADE$

5 $AD + DB = AB, AE + EC = CA$

6 $2AD = AB, 2AE = AC$

7 $\frac{AD}{AB} = \frac{AE}{AC}$

8 $\overline{DE} \parallel \overline{BC}$

In what order could James arrange the statements to make the proof correct?

A. 1, 3, 5, 6, 4, 7, 2, 8

B. 1, 3, 5, 6, 2, 4, 7, 8

C. 3, 5, 6, 7, 1, 4, 2, 8

D. 3, 1, 5, 6, 7, 2, 4, 8

9. Mike wants to prove that the diagonals of parallelogram *JORD* bisect each other. To do he labels the intersection of the diagonals as point *N* and composes the proof shown below.

	Step	Justification
1	*JORD* is a parallelogram.	Given
2	$\overline{JD} \cong \overline{RO}$	Opposite sides of a parallelogram are congruent.
3	?	Definition of a parallelogram

4	$\angle JDN \cong \angle RON$ and $\angle DJN \cong \angle ORN$	?
5	$\triangle JDN \cong \triangle RON$	?
6	$\overline{JN} \cong \overline{RN}$ and $\overline{ON} \cong \overline{DN}$	Corresponding parts of congruent triangles are congruent.
7	$JN = RN$ and $ON = DN$	Definition of congruent line segments
8	N is the midpoint of $\overline{JR}$ and $\overline{DO}$.	Definition of midpoint
9	$\overline{JR}$ bisects $\overline{DO}$ and $\overline{DO}$ bisects $\overline{JR}$.	Definition of segment bisector

The statement of step 3, and the justifications for steps 4 and 5, are missing from thi copy. Which set of statements correctly completes Mike's proof?

A. 3. $\overline{JO} \parallel \overline{RD}$ Definition of a parallelogram

4. $\angle JDN \cong \angle RON$, $\angle DJN \cong \angle ORN$ If 2 parallel lines are cut by a transversal, then alternate interior angles are con

5. $\triangle JDN \cong \triangle RON$ AAS

B. 3. $\overline{JO} \parallel \overline{RD}$ Definition of a parallelogram

4. $\angle JDN \cong \angle RON$, $\angle DJN \cong \angle ORN$ If 2 parallel lines are cut by a transversal, then alternate interior angles are con

5. $\triangle JDN \cong \triangle RON$ ASA

C. 3. $\overline{JD} \parallel \overline{RO}$ Definition of a parallelogram

4. $\angle JDN \cong \angle RON$, $\angle DJN \cong \angle ORN$ If 2 parallel lines are cut by a transversal, then alternate interior angles are con

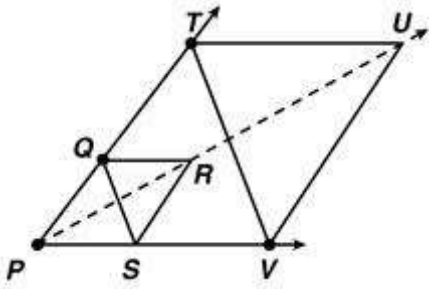
5. $\triangle JDN \cong \triangle RON$ AAS

D. 3. $\overline{JD} \parallel \overline{RO}$ Definition of a parallelogram

4. $\angle JDN \cong \angle RON$, $\angle DJN \cong \angle ORN$ If 2 parallel lines are cut by a transversal, then alternate interior angles are con

5. $\triangle JDN \cong \triangle RON$ ASA

10. **A dilation with Center *P* and a scale factor of 2 is shown below.**



Given that $\angle RQS \cong \angle UTV$, **which additional statement is sufficient to prove** $\triangle QRS \sim \triangle TUV$?

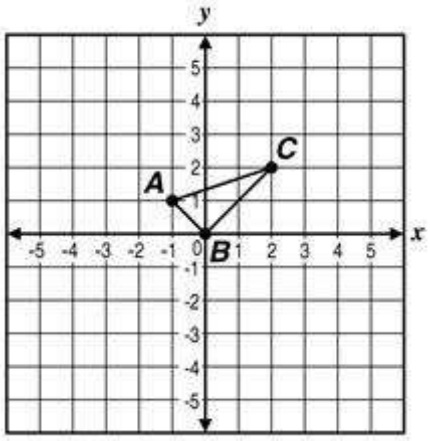
A. $QR = \frac{1}{2}TU$

B. $\angle QSR \cong \angle TVU$

C. $PQ = QT$

D. $m\angle QPR = \frac{1}{2}m\angle QPS$

11. **Triangle *ACB* with** $A(-1, 1), C(2, 2),$ **and** $B(0, 0)$ **is shown in the figure below.**



A dilation of $\triangle ACB$ **is centered at the origin and has a scale factor of 3. The image of** $\triangle ACB$ **under this dilation is** $\triangle PRB$. **Which statement is sufficient to prove** $\triangle ACB \sim \triangle PRB$?

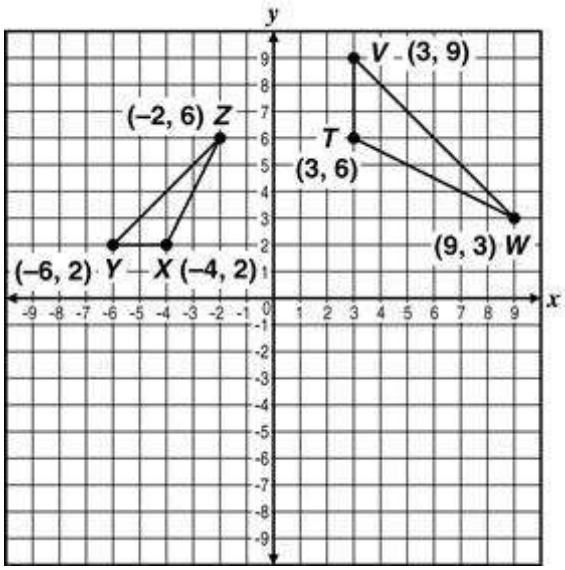
A. $PB = 3(AB)$ and $BR = 3(BC)$

B. $\angle BAC \cong \angle BPR$ and $AB = 3(PB)$

C. $PB = 3(AB)$ and $\angle BAC \cong \angle BPR$

D. $\angle BAC \cong \angle BPR$ and $\angle CBA \cong \angle RBP$

12. **On the coordinate grid below, $\triangle TVW$ and $\triangle XYZ$ are shown.**



Which statement can be used to prove that $\triangle TVW \sim \triangle XYZ$?

A. $\triangle XYZ$ is the result of a reflection and dilation of $\triangle TVW$, and all angle measures are preserved within these transformations.

B. $\triangle XYZ$ is the result of a rotation and dilation of $\triangle TVW$, and all angle measures are preserved within these transformations.

C. $\triangle XYZ$ is the result of a translation and rotation of $\triangle TVW$, and all side lengths are preserved within these transformations.

D. $\triangle XYZ$ is the result of a reflection and rotation of $\triangle TVW$, and all side lengths are preserved within these transformations.

13. **The number of possible string sections (s) to be cut from a 4-inch piece of string varies inversely with the length (l) of each of these string sections. Which equation models this relationship?**

A. $s = \frac{l}{4}$

B. $s = \frac{4}{l}$

C. $s = 4l$

D. $s + l = 4$

14. **The following table is an example of inverse variation.**

x	y
4	48
6	32
8	24
16	12

Which equation models the relationship between *x* and *y*?

A. $y = 12x$

B. $x = \frac{4}{3}y$

C. $y = \frac{192}{x}$

D. $x = \frac{y}{192}$

15. **It costs $4.50 per person for 2 people and $3.00 per person for 3 people to go on a horse carriage ride. Using *c* to represent the cost per person and *n* to represent the number of people, which equation models this relationship?**

A. $cn = 9.00$

B. $9.00n = c$

C. $c + n = 7.50$

D. $2n + 3n = 7.50$

16. **Which of the following equations could represent the relationship between *x* and *y* in the table below?**

x	1	2	3	4	5
y	2	5	10	17	26

A. $y = 2x$

B. $y = 2x + 1$

C. $y = \sqrt{x - 1}$

D. $y = x^2 + 1$

17. **The table shows selected ordered pairs for a particular function, $f(x)$.**

x	$f(x)$
–1	–24
2	–30
5	–18

The values shown in the table correspond to which function?

A. $f(x) = x^2 - 4x - 29$

B. $f(x) = x^2 - 3x - 28$

C. $f(x) = x^2 + x - 48$

D. $f(x) = x^2 + 2x - 38$

18. When Brendan kicks a football, its height in feet can be modeled by the equation $h = -16t^2 + 85t$, where t is the time, in seconds, after Brendan kicks the ball. What is the value of t when the football reaches its maximum height, rounded to the nearest tenth?

A. 0

B. 2.3

C. 2.7

D. 5.3

19. Let $p(x) = -x^2 + 5x - 4$. Which statement describes the graph of $p(x)$?

A. The graph has no x-intercepts and opens upward from its vertex, the minimum point.

B. The graph has 2 x-intercepts and opens downward from its vertex, the maximum point.

C. The graph has 2 x-intercepts and opens upward from its vertex, the minimum point.

D. The graph has no x-intercepts and opens downward from its vertex, the maximum point.

20. Which is equivalent to the expression below?

$$\frac{x^2\sqrt{y^3}}{y^2} \cdot \frac{\sqrt[3]{x^3z^5}}{\sqrt{z^4}}$$

A. x^5yz

B. $x^3y^{\frac{1}{2}}z^{\frac{1}{3}}$

C. $x^3y^{-\frac{4}{3}}z^{\frac{1}{10}}$

D. $x^3y^{-\frac{1}{2}}z^{-\frac{1}{3}}$

21. The table below shows the results of a survey carried out by a firm among its employees about the amount of time the employees spend on the Internet every day.

TIME SPENT ON INTERNET

		Age	
		Younger than 40 years of age	40 years of age or older
Time	Less than 30 minutes a day	15	25
	30 or more minutes a day	33	27

What is the probability that an employee chosen at random is younger than 40 years of age and spends less than 30 minutes a day on the Internet?

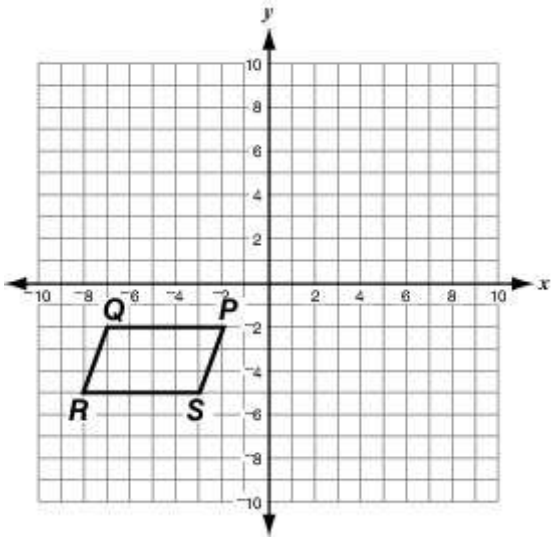
A. 0.15

B. 0.31

C. 0.38

D. 0.60

22. Parallelogram *PQRS* is shown on the coordinate plane below.



Which of these transformations will take parallelogram *PQRS* onto itself?

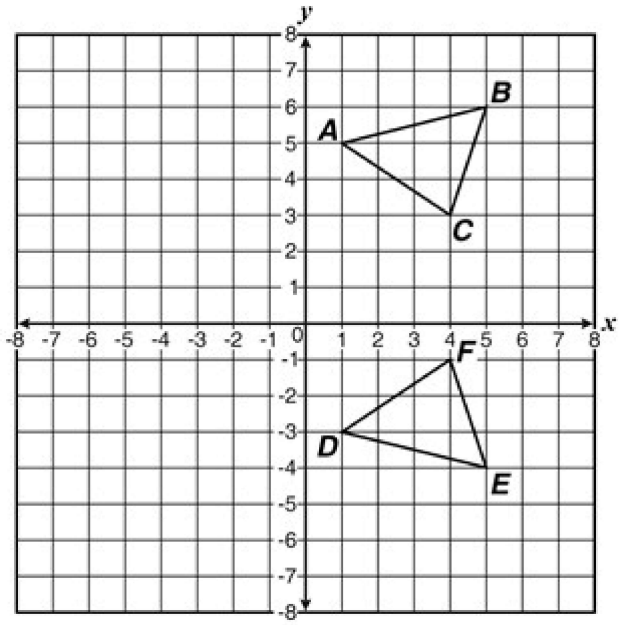
A. a reflection over the line $x = -5$

B. a reflection over the line $y = -5$

C. a 180° clockwise rotation about the center of the parallelogram

D. a 360° clockwise rotation about the center of the parallelogram

23. **Two triangles are shown on the coordinate grid.**



Which sequence of transformations shows that $\Delta ABC \cong \Delta DEF$?

A. Reflect ΔABC across the x-axis, then translate it 2 units up.

B. Reflect ΔABC across the x-axis, then translate it 2 units down.

C. Rotate ΔABC 90˚ clockwise about the origin, then translate it 2 units up.

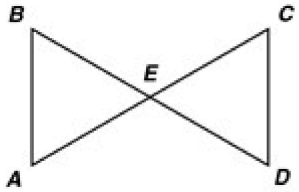
D. Rotate ΔABC 90˚ clockwise about the origin, then translate it 2 units down.

24. **Javier is writing the following proof:**

Given: E is the midpoint of $\overline{BD}$.
$\overline{AE} \cong \overline{EC}$

Prove: $\triangle ABE \cong \triangle CDE$

Proof:

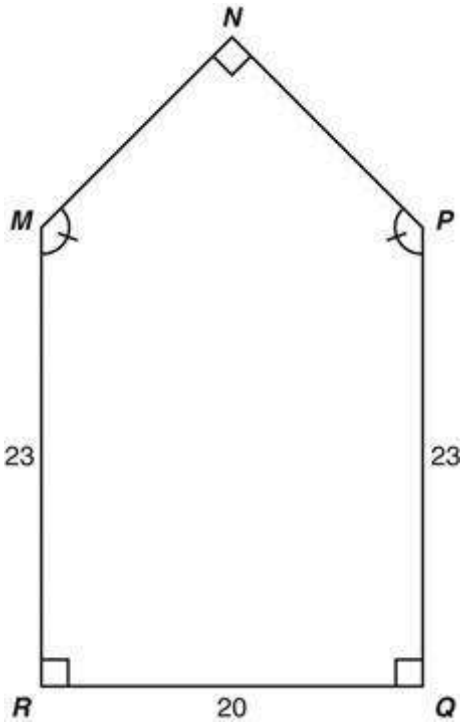


Statements	Reasons
1. E is the midpoint of $\overline{BD}$.	1. Given
2. $\overline{AE} \cong \overline{EC}$	2. Given
3. $\angle BEA \cong \angle DEC$	3. Vertical angles are congruent.
4. $\overline{BE} \cong \overline{ED}$	4. Definition of midpoint
5. $\triangle AEB \cong \triangle CED$	5.

Which of the following is the reason for Statement 5?

A. SSS
B. SAS
C. ASA
D. AAS

25. **Pentagon *MNPQR* is shown below.**



What is the length of $\overline{MN}$?

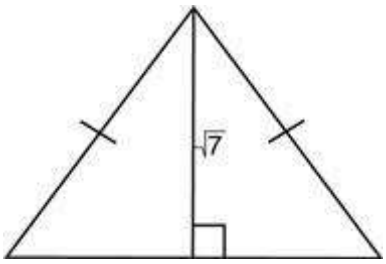
A. $\frac{20}{3}\sqrt{3}$ units

B. $10\sqrt{2}$ units

C. $10\sqrt{3}$ units

D. $20\sqrt{2}$ units

26. **The area of the triangle shown below is $3\sqrt{7}$ square units.**



What is the perimeter of this triangle?

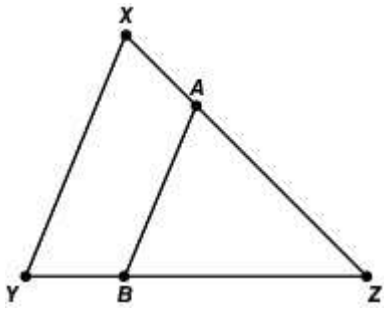
A. 6 units

B. 10 units

C. 12 units

D. 14 units

27. In the figure below, line segment $\overline{AB}$ is drawn in $\triangle XYZ$.



In each part, some additional information about the figure is given. Determine if the information in each part **alone** is enough to prove the two triangles observed in the figure are similar. If the information does prove that the triangles are similar, describe the sequence of transformations that helps prove the two triangles as similar. If the information does NOT prove the triangles are similar, explain why NOT.

Part A. $\frac{AB}{XY} = \frac{2}{3}$

Part B. $\angle ZAB \cong \angle ZXY$

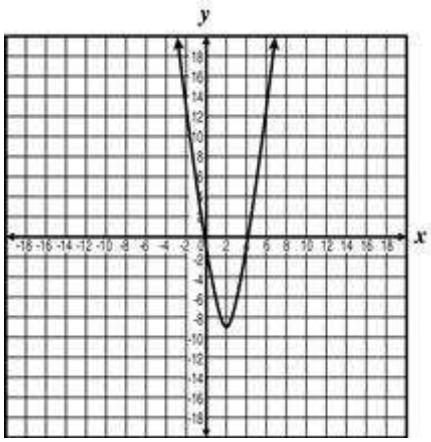
Part C. $\frac{AX}{ZA} = \frac{AB}{XY} = \frac{2}{3}$

Part D. $\overline{AB} \parallel \overline{XY}$

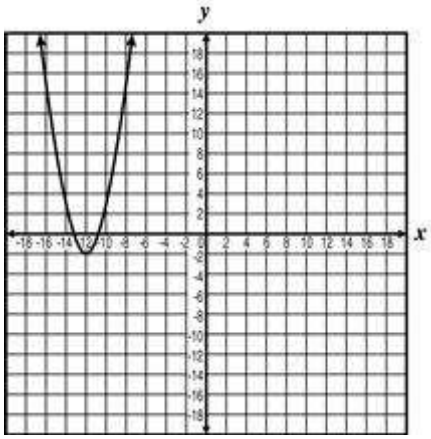
Use words, numbers, and/or pictures to show your work.

28. **Which graph BEST represents the equation** $y = 2x^2 + 12x - 1$?

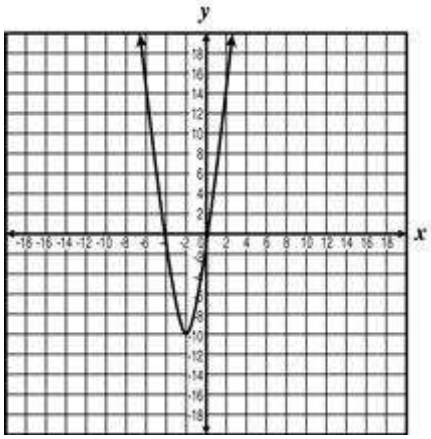
A.



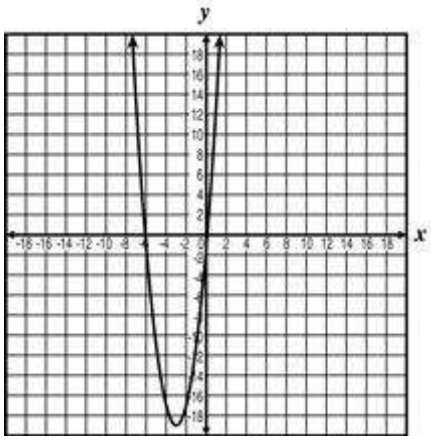
B.



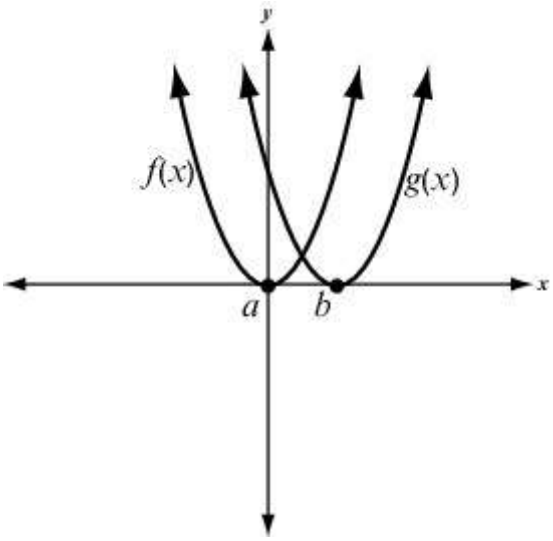
C.



D.



29. The graph below represents the function $f(x)$ and the translated function $g(x)$.



If $f(x)=x^2$, which of the following functions could be an algebraic representation of $g(x)$?

A. $g(x)=x^2+b$

B. $g(x)=x^2-b$

C. $g(x)=(x+b)^2$

D. $g(x)=(x-b)^2$

30. **The length of a rectangle can be represented by the expression $2x-1$. The width of the same rectangle can be represented by the expression x^2-x+3. Which of the following expressions can represent the area of the rectangle?**

A. x^2+x+2

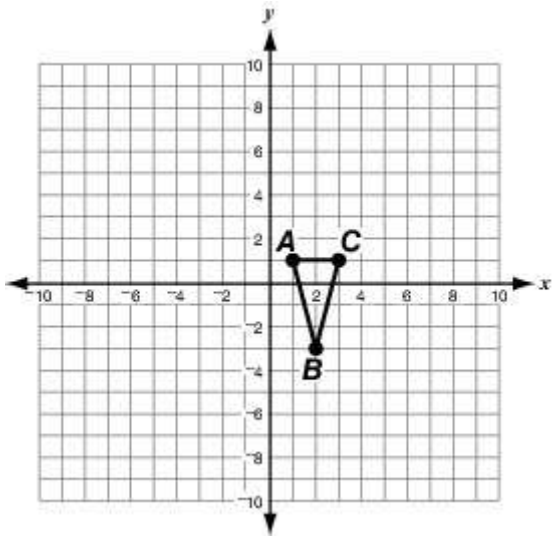
B. $2x^3-2x^2-3$

C. $2x^3+x^2+5x+3$

D. $2x^3-3x^2+7x-3$

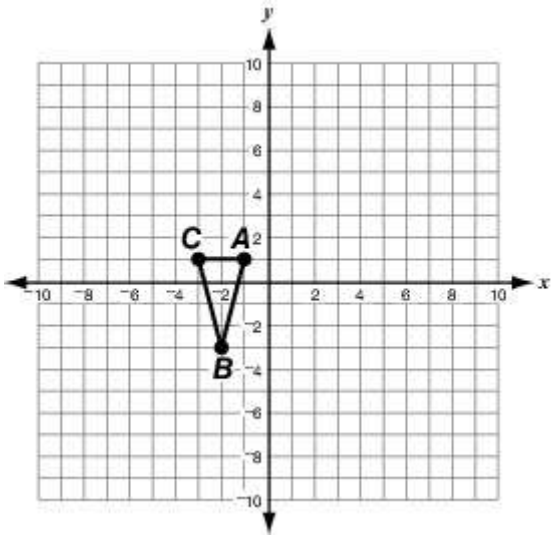
31. The figure below shows $\triangle ABC$ plotted on a coordinate plane. The triangle is first rotated by 90° counterclockwise about the origin and is then

reflected about the line $y = -x$.

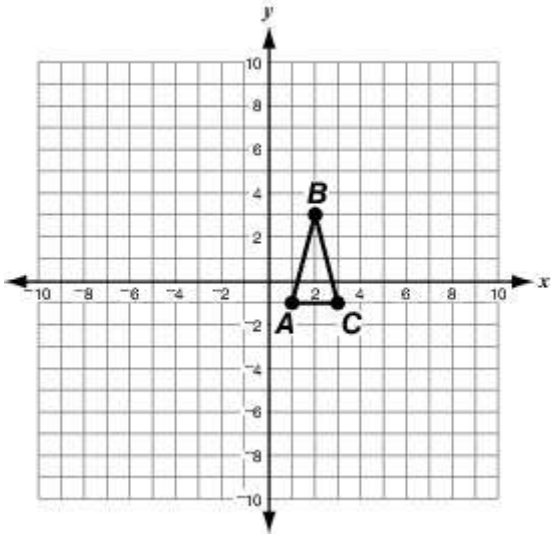


Which graph shows the transformed triangle?

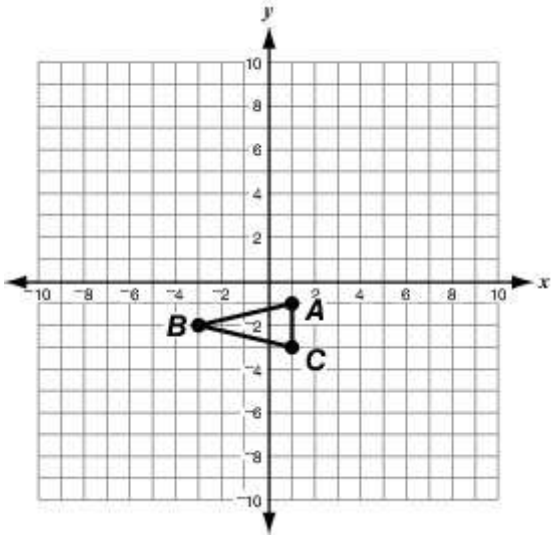
A.



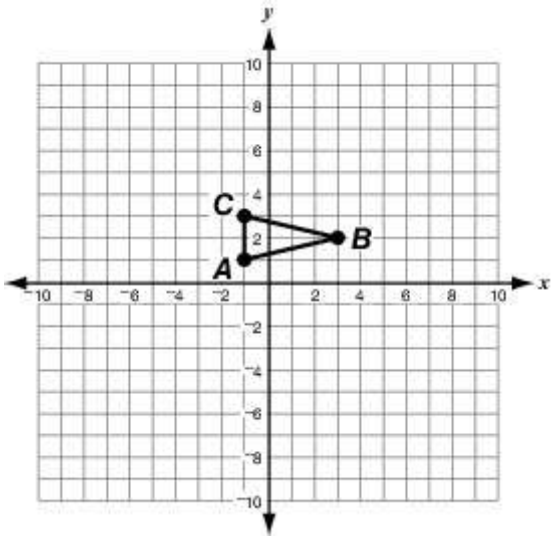
B.



C.



D.



32. Let $f(x) = 4x^2 - 20x + k$, for some constant *k*. What is *k*, if *f*(*x*) has a minimum value of 7?

A. -56

B. 2.5

C. 18

D. 32

33. The height in meters of a projectile involves the object's initial height, upward velocity, and acceleration because of gravity. If the equation $y = -9.8t^2 + 109.7t + 7.4$ models the number of meters, *y*, a toy rocket is above the ground *t* seconds after being launched, what does 7.4 represent?

A. initial height of the rocket

B. acceleration because of gravity

C. initial upward velocity of the rocket

D. total time the rocket travels after *t* seconds

34. Using the form $(x - p)^2 = q$, which of these is a solution to the equation $x^2 + 14x + 49 = 9$?

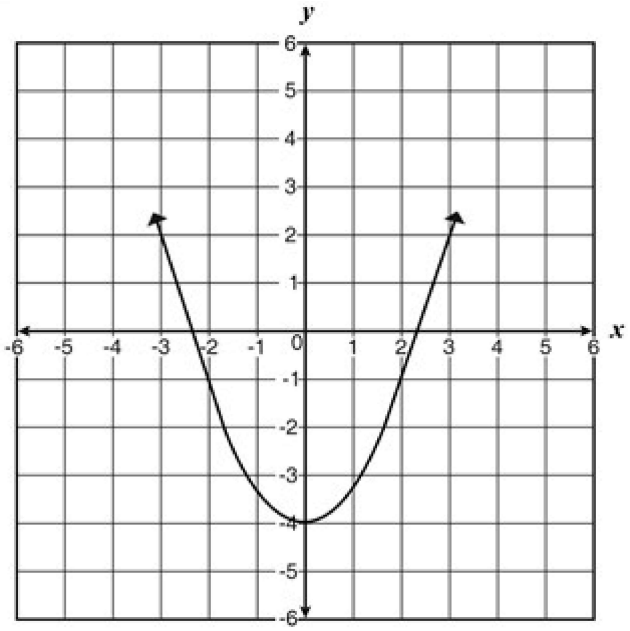
A. 10

B. 2

C. -4

D. -7

35. **The equation $y = \frac{2}{3}x^2 - 4$ is graphed in the coordinate plane.**



If 6 is added to the equation (like $y = \frac{2}{3}x^2 - 4 + 6$), which option describes the new graph?

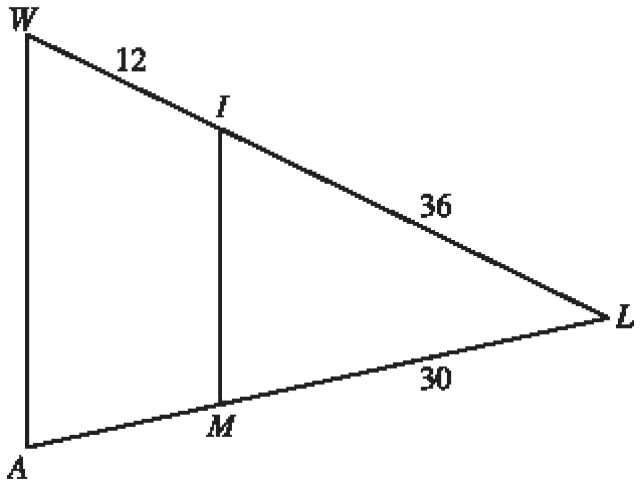
A. The vertex is now located at (2, 0).

B. The vertex is now located at (6, 0).

C. The vertex is now located at (0, 2).

D. The vertex is now located at (0, 6).

36. In the diagram below, $\overline{WA} \parallel \overline{IM}$, and the dimensions are in meters.



What is the length of $\overline{AL}$?

A. 34.4 meters

B. 40 meters

C. 43.2 meters

D. 45 meters

37. **Gerry plotted the equation $y = x^2$ on a coordinate grid. He wants to translate the graph 4 units to the left and 3 units up. What will be the equation of the translated graph?**

A. $y = (x+3)^2 + 4$

B. $y = (x+4)^2 + 3$

C. $y = (x+4)^2 - 3$

D. $y = (x+3)^2 - 4$

38. **¿Cuál expresión es el producto de $(2x-3)(3x^2+4x+5)$?**

A. $6x^3 - x^2 - 2x - 15$

B. $6x^3 - 9x^2 + 6x - 15$

C. $6x^3 + 8x^2 + 10x - 15$

D. $6x^3 - 17x^2 + 22x - 15$

39. **If the cost per person to rent a van varies inversely with the number of people sharing the cost, which table could represent this situation?**

A.

Number of People	Cost per Person for Van ($)
3	1,200
4	1,200
5	1,000
6	600

B.

Number of People	Cost per Person for Van ($)
3	500
4	700
5	900
6	1,100

C.

Number of People	Cost per Person for Van ($)
3	300
4	400
5	500
6	600

D.

Number of People	Cost per Person for Van ($)
3	200
4	150
5	120
6	100

40. **Walter budgeted $24 to buy bags of dog food. He could buy 2 bags for $12 each, 3 bags for $8 each, or 4 bags for $6 each. Which statement is true about the relationship between the number of bags (x) and the price of each bag (y) in this situation?**

A. It is an inverse variation because the ratio $\frac{x}{y}$ is always 24

B. It is an inverse variation because the product of x and y is always 24.

C. It is a direct variation because as x increases, the total price increases.

D. It is a direct variation because as y increases, the total price increases.

41. **Sina played basketball on a rectangular court that was 74 feet by 42 feet. After the game, she walked across the court diagonally from one corner to the opposite corner. Approximately what distance did Sina walk in feet?**

A. 58

B. 61

C. 85

D. 116

42. **A key ring has 12 keys, 3 of which open the house door. If two keys are randomly selected without replacement, what is the probability that neither key opens the door?**

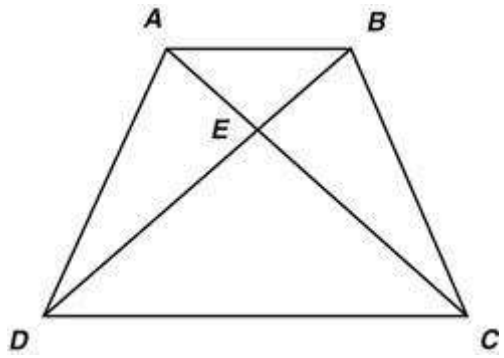
A. $\frac{1}{22}$

B. $\frac{6}{11}$

C. $\frac{9}{16}$

D. $\frac{21}{22}$

43. **In Quadrilateral $ABCD$ below, diagonal line segments AC and BD intersect at Point E inside the quadrilateral.**



Given information about Quadrilateral $ABCD$ is:

$$\overline{AD} \cong \overline{BC}$$
$$\angle ACB \cong \angle ADB$$

The table below shows an incomplete proof for the statement $\angle ADC \cong \angle BCD$. Four steps in the proof are missing.

Statement	Reason
1.	1.
2.	2.
3. $\triangle AED \cong \triangle BEC$	3. AAS
4. $AE = BE;\ EC = ED$	4. Corresponding parts of congruent triangles are congruent
5.	5.
6. $AE + EC = AC;$ $BE + ED = BD$	6. Segment addition
7. $AC = BD$	7. Substitution (step 5 and step 6)
8. $\overline{CD} \cong \overline{CD}$	8. Reflexive property
9.	9.
10. $\angle ADC \cong \angle BCD$	10. Corresponding parts of congruent triangles are congruent

• Fill in the missing statements and reasons in the table.

Note: Some statements can have two or more parts, as long as the parts have the same reason.

44. Solve $\sqrt{6-x} = x$.

A. $x = -3$

B. $x = 2$

C. $x = 2$ and $x = -3$

D. no solution

45. The table below shows how many seniors are currently taking physics and calculus.

SENIOR CLASS ENROLLMENT

	Calculus	Not Calculus
Physics	r	s
Not Physics	u	v

Which expression represents the probability that a student chosen at random who is in physics will also be in calculus?

A. $\frac{r}{r+s}$

B. $\frac{r}{r+u}$

C. $\frac{r}{r+s+u}$

D. $\frac{r}{r+s+u+v}$

46. Fifty-two percent of the visitors to a museum purchase tickets to the planetarium. Twenty-four percent of the visitors to a museum buy tickets for both the planetarium and the 3D theater. About what percent of visitors who buy tickets for the planetarium also buy tickets for the 3D theater?

A. 28%

B. 46%

C. 54%

D. 76%

47. Use the numbers 1 through 20 as a sample space for the sets of numbers described below.

X = {multiples of 3}

Y = {multiples of 4}

Z = {factors of 4}

Which statement is true?

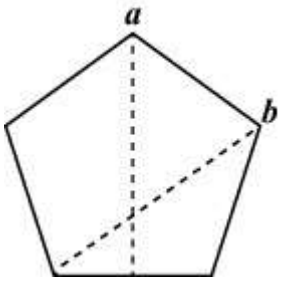
A. The union of X and Z is $\varnothing$.

B. The intersection of Y and Z is $\{1, 2, 4, 8, 12, 16, 20\}$.

C. The union of X and Y is $\{3, 4, 6, 8, 9, 12, 15, 16, 18, 20\}$.

D. The intersection of X, Y, and Z is $\{1, 2, 3, 4, 6, 8, 9, 12, 15, 16, 18, 20\}$.

48. The figure below shows line segments *a* and *b* passing through a regular pentagon.



Which statement describes **a series of transformations** that will result in a pentagon that is mapped onto the one shown?

A. rotating the pentagon 72° clockwise about its center and then reflecting it across segment *a*

B. rotating the pentagon 72° clockwise about its center and then reflecting it across segment *b*

C. rotating the pentagon 90° clockwise about its center and then reflecting it across segment *a*

D. rotating the pentagon 90° clockwise about its center and then reflecting it across segment *b*

49. **Which expression is equivalent to** $\frac{\sqrt{x^5}+\sqrt{x^5}}{x^3}$ **for all** $x > 0$**?**

A. x

B. $1+x$

C. $\frac{\sqrt{x}+x\sqrt{x}}{x^2}$

D. $\frac{\sqrt{x}+x^3\sqrt{x}}{x^2}$

50. **What is equivalent to the value of the complex number** $i^2 + i^2$ **?**

A. -2

B. $-2i^2$

C. 2

D. i^4