

TEST NAME: **Math 2 Practice NCFE**
TEST ID: **2431595**
GRADE: **09 - Ninth Grade - 12 - Twelfth Grade**
SUBJECT: **Mathematics**
TEST CATEGORY: **Shared Classroom Assessments**

Answer Key

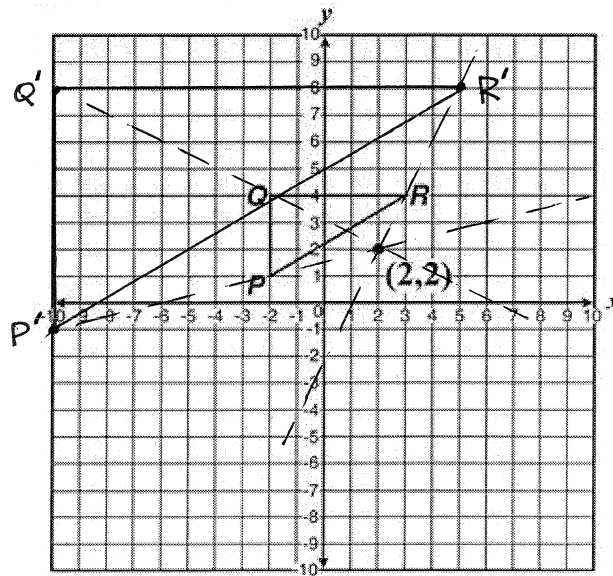
Student: Answer Key
 Class: _____
 Date: _____

1. Which expression is equivalent to $(\sqrt[5]{w})^2$ in exponential form?

- A. $w^{\frac{2}{5}}$
- B. $w^{\frac{5}{2}}$
- C. $\frac{w}{5^2}$
- D. $\frac{w}{2^5}$

$$(\sqrt[5]{w})^2 = (w^{1/5})^2 = w^{2/5}$$

2. A triangle is shown on the coordinate grid.



A dilation of $\triangle PQR$ will be performed with center $(2, 2)$ and scale factor

3. The result of the dilation will be $\triangle P'Q'R'$. What will be the coordinates of R' ?

- A. $(4, 6)$
- B. $(5, 8)$
- C. $(6, 7)$
- D. $(6, 10)$

3. The amount of time it takes for mail carriers to deliver the mail in a small town is inversely proportional to the number of mail carriers delivering the mail. With 8 mail carriers it takes 6 hours to deliver the mail. What is the number of hours it would take 4 mail carriers to deliver the town's mail?

- A. 2
 B. 3
 C. 10
 D. 12

$$y = \frac{k}{x} \rightarrow 6 = \frac{k}{8} \rightarrow k = 48$$

$$y = \frac{48}{4} = 12$$

4. The set of data in the table below shows the results of a survey on the number of messages that people of different ages text on their cell phones each month.

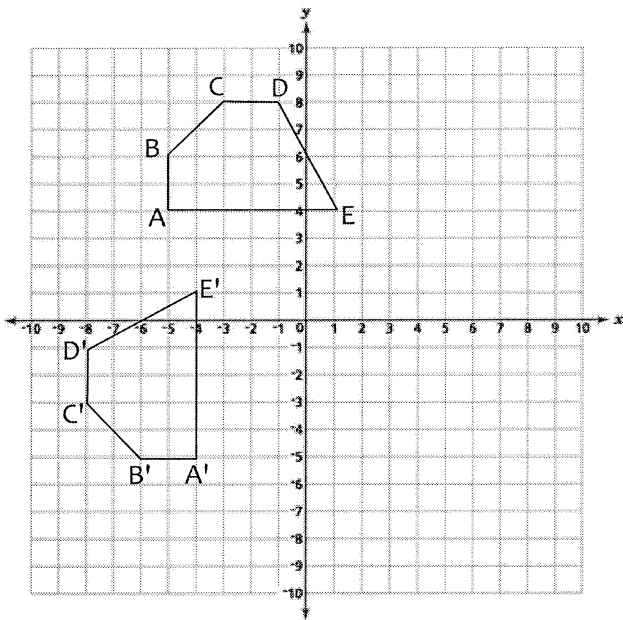
Age Group	Text Messages per Month		
	0-10	11-50	Over 50
15-18	4	37	68
19-22	6	25	87
23-60	25	47	157

229

If a person from this survey is selected at random, what is the probability that the person texts over 50 messages per month given that the person is between the ages of 23 and 60?

- A. $\frac{157}{229}$
 B. $\frac{157}{312}$
 C. $\frac{157}{384}$
 D. $\frac{157}{456}$

5. Given the transformation below of $ABCDE$ to its image $A'B'C'D'E'$.



$$\begin{array}{ll} A(-5, 4) & A'(-4, -5) \\ B(-5, 6) & B'(-6, -5) \\ C(-3, 8) & C'(-8, -3) \\ D(-1, 8) & D'(-8, -1) \\ E(1, 4) & E'(-4, 1) \\ f(x, y) & \rightarrow (-y, x) \end{array}$$

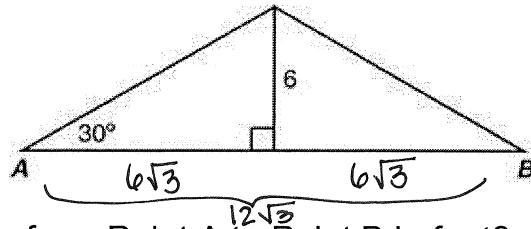
Which of the following rules expresses the transformation?

- A. $f(x, y) \rightarrow f(x, -y)$
- B. $f(x, y) \rightarrow f(-x, -y)$
- C. $f(x, y) \rightarrow f(-y, x)$
- D. $f(x, y) \rightarrow f(-y, -x)$
6. A regular pentagon has rotational symmetry. What is the minimum number of degrees a regular pentagon must be rotated about its center in order to prove this?

- A. 90°
- B. 72°
- C. 60°
- D. 45°

$$\frac{360^\circ}{5} = 72^\circ$$

7. The drawing below represents the frame for an isosceles triangle-shaped roof. The height of the roof is 6 feet.



What is the distance from Point A to Point B in feet?

- A. $4\sqrt{3}$
 B. 12
 C. $12\sqrt{3}$
 D. 24
8. Complete the square for the expression $x^2 - 10x + 21$. Which of the following includes an equivalent expression and the vertex of the function it defines.

A. $(x - 5)^2 - 4$; $(-5, 4)$

B. $(x - 5)^2 - 4$; $(5, -4)$

C. ~~$(x + 5)^2 + 4$; $(5, -4)$~~

D. ~~$(x - 5)^2 + 4$; $(-4, 5)$~~

$$x^2 - 10x + 21$$

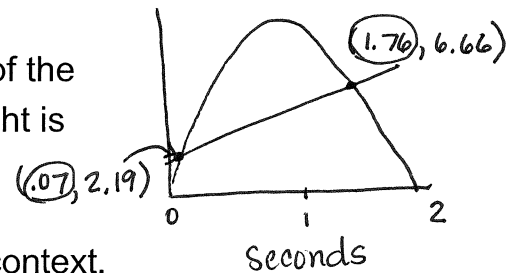
$$(x^2 - 10x + \underline{25}) + 21 - \underline{25}$$

$$(x - 5)^2 - 4$$

vertex $(5, -4)$

9. A model rocket is launched from the ground. Its height can be modeled by the function $h(x) = -16x^2 + 32x$ where x is the number of seconds since the launch.

A laser is 2 feet above the ground and pointed in the path of the rocket. The function that represents the path of the laser light is $g(x) = 2.64x + 2$.



Solve $h(x) = g(x)$ and interpret what the solutions mean in context.

- A. The laser hits the rocket 0.07 second and 1.76 seconds after the launch.
- B. The laser hits the rocket at a height of .07 feet and 1.76 feet after the launch.
- C. The laser hits the rocket at 2.19 feet and 6.66 feet.
- D. The laser hits the rocket at 0 seconds and 2 seconds after the launch.
10. Data were collected on 100 students regarding their class and major. The data are summarized in the following table:

		Class			
		Sophomore	Junior	Senior	
Major	Undeclared	19	5	6	30
	Business	5	17	16	38
	Science	5	6	21	32
		29	28	43	100

What is the probability of randomly selecting a sophomore or an undeclared student?

- A. 0.19
- B. 0.59
- C. 0.40
- D. 0.29

$$P(\text{sophomore}) = \frac{29}{100}$$

$$P(\text{sophomore} \cap \text{undeclared}) = \frac{19}{100}$$

$$P(\text{undeclared}) = \frac{30}{100}$$

$$\begin{aligned} P(\text{sophomore or undeclared}) &= \frac{29}{100} + \frac{30}{100} - \frac{19}{100} \\ &= \frac{40}{100} = .40 \end{aligned}$$

11. Which expression is equivalent to $x(x^3 + 3x^2 - 4x) + 2x^2$?

A. $x^3 + 5x^2 - 4x$

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

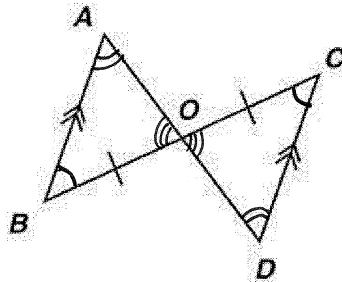
C. $x^4 + 3x^3 - 2x^2$

D. $x^4 + 4x^3 - x^2$

$$x^4 + 3x^3 - 4x^2 + 2x^2$$

$$x^4 + 3x^3 - 2x^2$$

12. In the diagram below, $\overline{AB} \parallel \overline{CD}$ and $\overline{BO} \cong \overline{CO}$.



Which reason justifies that $\triangle AOB \cong \triangle DOC$?

A. Angle-Side-Angle

B. Side-Angle-Side

C. Hypotenuse-Leg

D. Side-Side-Side

13. What are the solutions to $2x^2 + 3x + 4 = 0$?

A. $-\frac{3}{4} \pm \frac{i\sqrt{23}}{4}$

B. $-\frac{3}{4} \pm \frac{\sqrt{41}}{4}$

C. $\frac{3}{4} \pm \frac{i\sqrt{23}}{4}$

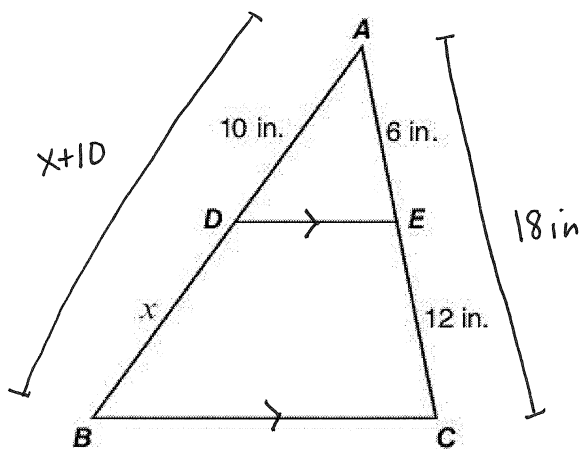
D. $\frac{3}{4} \pm \frac{\sqrt{41}}{4}$

$$x = \frac{-3 \pm \sqrt{9 - 4(2)(4)}}{2 \cdot 2}$$

$$x = \frac{-3 \pm \sqrt{-23}}{4}$$

$$x = \frac{-3 \pm i\sqrt{23}}{4}$$

14. In the given $\triangle ABC$, $\overline{DE} \parallel \overline{BC}$.



$$\frac{x+10}{10} = \frac{18}{6}$$

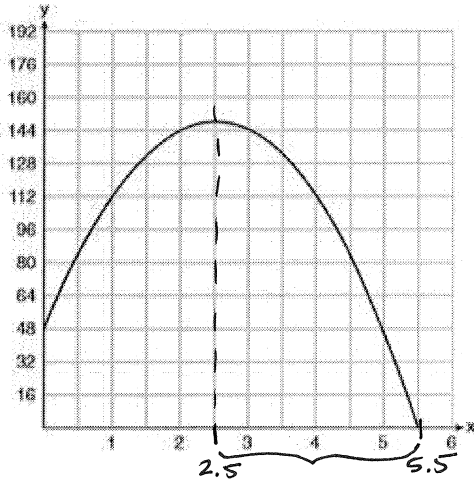
$$x+10 = 30$$

$$x = 20$$

What is the value of x ?

- A. 12 in.
- B. 16 in.
- C. 20 in.
- D. 30 in.

15. A ball is thrown into the air from the edge of a 48-foot-high cliff so that it eventually lands on the ground. The graph on the right shows the height, y , of the ball from the ground after x seconds.



For which interval is the ball's height always decreasing?

- A. $[0, 2.5]$
 B. $(0, 5.5)$
 C. $(2.5, 5.5)$
 D. $[2, \infty)$
16. Drink preferences for teachers in a high school are given in the table below.

	Coffee	Tea	Soda	Total
Math	6	6	4	16
English	8	7	7	22
Science	11	7	2	20
Social Studies	5	8	9	22
Total	30	28	22	80

Which ^{of} the following are independent events?

A. Teacher prefers tea; Teacher teaches English

B. Teacher prefers coffee; Teacher teaches math

C. Teacher prefers soda; Teacher teaches science

D. Teacher prefers coffee; Teacher teaches social studies

$$P(\text{tea}) = \frac{28}{80} \quad P(\text{tea} | \text{English}) = \frac{7}{22}$$

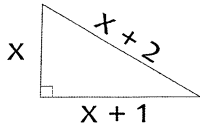
$$P(\text{coffee}) = \frac{30}{80} \quad P(\text{coffee} | \text{math}) = \frac{6}{16}$$

$$P(\text{math}) = \frac{16}{80} \quad P(\text{math} | \text{coffee}) = \frac{6}{30}$$

$$P(\text{soda}) = \frac{22}{80} \quad P(\text{soda} | \text{science}) = \frac{2}{20}$$

$$P(\text{coffee}) = \frac{30}{80} \quad P(\text{coffee} | \text{social studies}) = \frac{5}{22}$$

17. Given that $x > 0$, what is the perimeter of the right triangle below



- A. 3
B. 6
C. 12
D. 18

$$x^2 + (x+1)^2 = (x+2)^2$$

$$x^2 + x^2 + 2x + 1 = x^2 + 4x + 4$$

$$x^2 - 2x - 3 = 0$$

$$(x-3)(x+1) = 0$$

$$x = 3 \text{ OR } \cancel{x = -1}$$

$$\begin{aligned} x &= 3 \\ x+1 &= 4 \\ x+2 &= 5 \end{aligned}$$

perimeter is
 $3+4+5 = 12$

18. What are the zeros of the function $f(x) = (x-4)^2 + 25$?

- A. -9 and 1
B. -1 and 9
C. $4+5i$ and $4-5i$
D. $-4+5i$ and $-4-5i$

$$(x-4)^2 + 25 = 0$$

$$(x-4)^2 = -25$$

$$x-4 = \pm\sqrt{-25}$$

$$x = 4 \pm 5i$$

19. A box contains 18 blue chips, 6 red chips, 4 green chips and 2 yellow chips that are identical in size and shape. If one chip is chosen at random, what is the probability that the chip will be either blue or yellow?

- A. $\frac{2}{3}$
B. $\frac{1}{3}$
C. $\frac{3}{5}$
D. $\frac{1}{2}$

$$18 + 6 + 4 + 2 = 30 \text{ chips}$$

$$P(\text{blue or yellow}) = P(\text{blue}) + P(\text{yellow})$$

$$= \frac{18}{30} + \frac{2}{30}$$

$$= \frac{20}{30} = \frac{2}{3}$$

20. What are the solutions of the quadratic equation below?

$$x^2 - 4x - 6 = 0$$

A. $x = 2 \pm \sqrt{2}$

B. $x = -2 \pm \sqrt{2}$

C. $x = 2 \pm \sqrt{10}$

D. $x = -2 \pm \sqrt{10}$

$$x = \frac{4}{2 \cdot 1} \pm \frac{\sqrt{16 - 4(1)(-6)}}{2 \cdot 1}$$

$$\sqrt{40} = \sqrt{4 \cdot 10} = 2\sqrt{10}$$

$$x = 2 \pm \frac{\sqrt{40}}{2}$$

$$x = 2 \pm \frac{2\sqrt{10}}{2}$$

$$x = 2 \pm \sqrt{10}$$

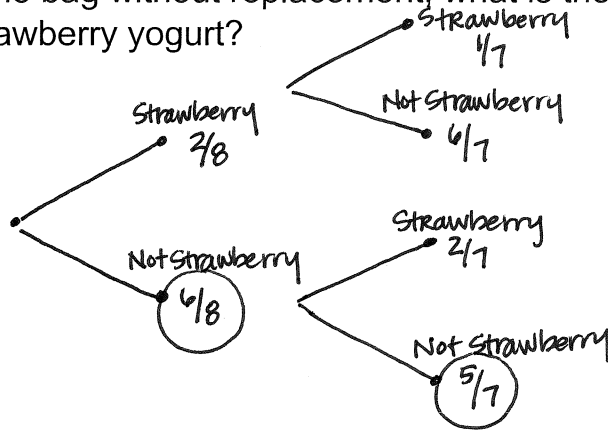
21. Brent has a shopping bag with 8 similar size containers of yogurt: 2 strawberry, 3 cherry, and 3 raspberry. If he randomly takes 2 yogurt containers from the bag without replacement, what is the probability that neither will be strawberry yogurt?

A. $\frac{1}{28}$

B. $\frac{13}{28}$

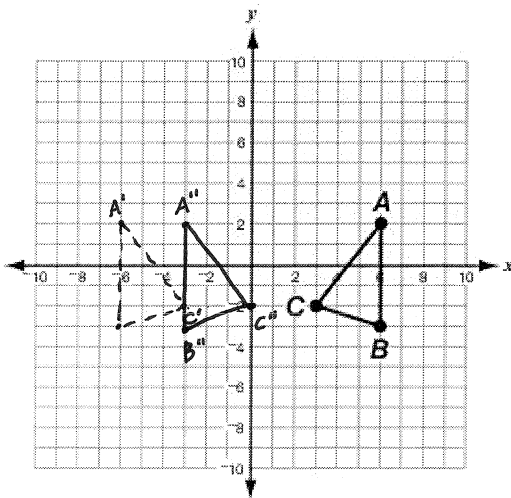
C. $\frac{15}{28}$

D. $\frac{27}{28}$



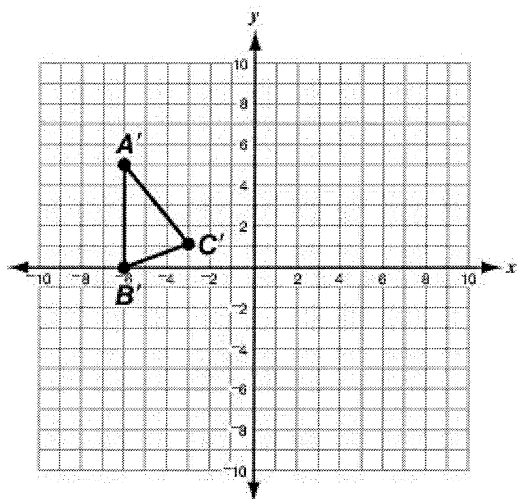
$$P(\text{neither strawberry}) = \frac{6}{8} \cdot \frac{5}{7} = \frac{30}{56} = \frac{15}{28}$$

22. Triangle ABC is shown on the coordinate plane below. The triangle is reflected across the y-axis and then translated 3 units to the right to form triangle A'B'C'.

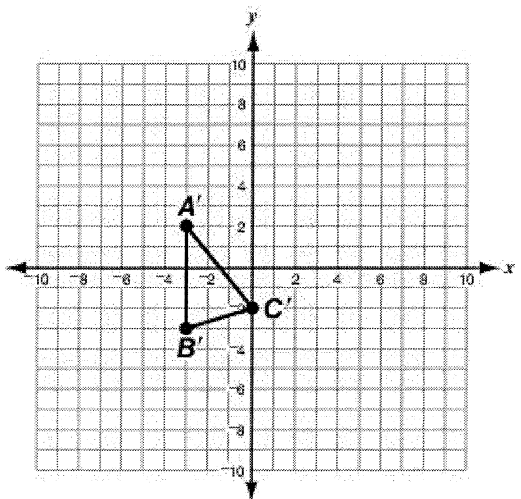


Which coordinate plane shows triangle A'B'C'?

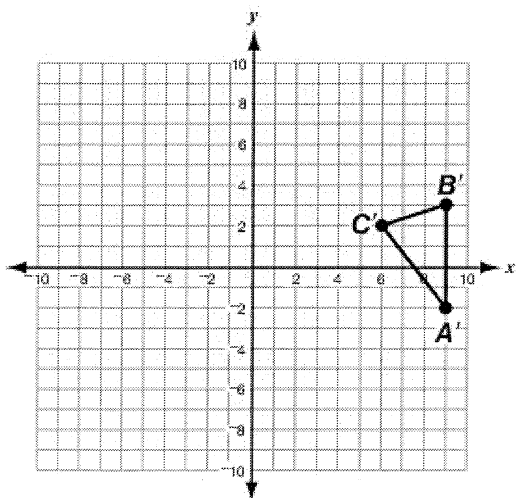
A.



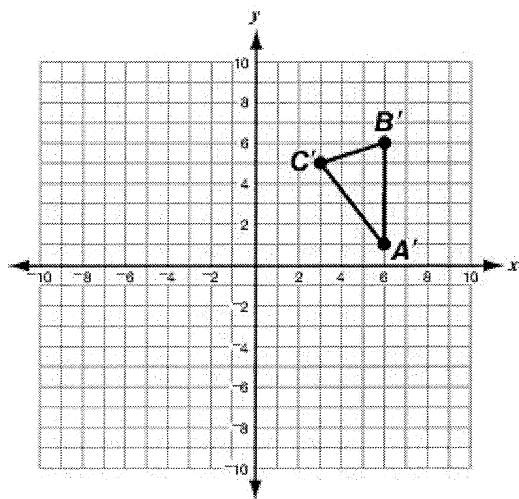
B.



C.

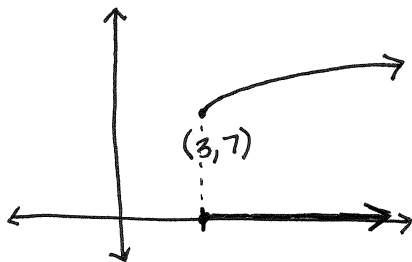


D.



23. What is the domain of the function $f(x) = \sqrt{x-3} + 7$?

- A $[0, \infty)$
- B $[3, \infty)$
- C $[7, \infty)$
- D $(-\infty, \infty)$



24. What would be the difference between the graph of $y = x^2 + 3$ and the graph of $y = (x-2)^2 + 3$?

- A $y = (x-2)^2 + 3$ would shift up two units
- B $y = (x-2)^2 + 3$ would shift left two units
- C $y = (x-2)^2 + 3$ would shift right two units
- D $y = (x-2)^2 + 3$ would shift down two units

25. What is the value of b in $2\sqrt{2b+4} = 12$?

- A 1
- B 4
- C 16
- D 48

$$2\sqrt{2b+4} = 12$$

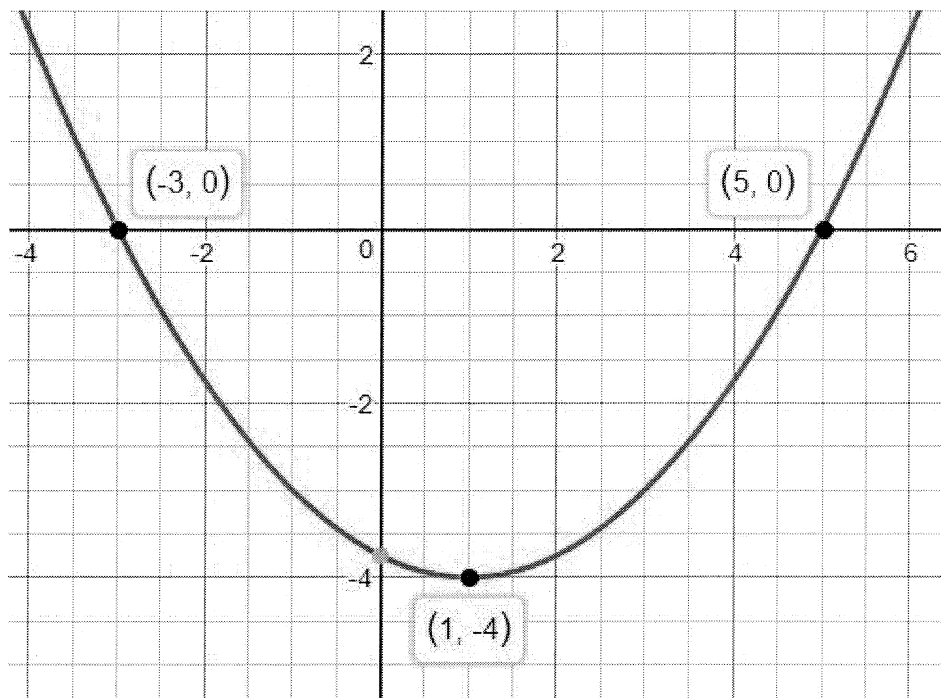
$$\sqrt{2b+4} = 6$$

$$2b+4 = 36$$

$$2b = 32$$

$$b = 16$$

26. The function rule $f(x) = ax^2 + bx + c$ creates the graph of the following parabola for specific values of a , b and c .

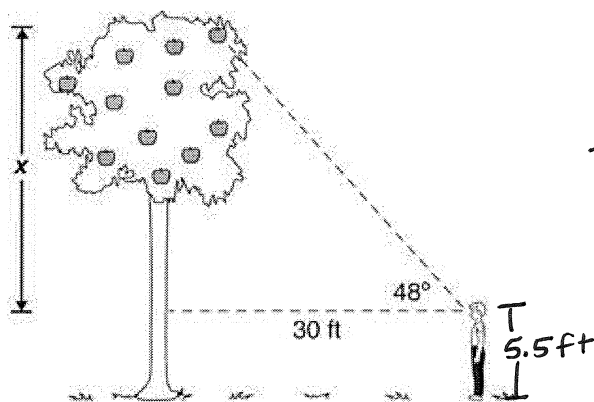


What is the value of a ?

- A. $\frac{1}{3}$
- B. $\frac{1}{4}$
- C. 1
- D. 4

$$\begin{aligned} f(x) &= a(x+3)(x-5) \\ f(x) &= a(x^2 - 2x - 15) \\ f(1) &= a(1^2 - 2(1) - 15) \\ -4 &= -16a \\ \frac{1}{4} &= a \end{aligned}$$

27. Tom is $5\frac{1}{2}$ feet tall. If Tom stands 30 feet from the base of an apple tree looking up at an apple in the tree at an angle of sight of 48° , how far is the apple from the ground?



Note: Figure is not drawn to scale.

$$\tan 48^\circ = \frac{x}{30}$$

$$30 \tan 48^\circ = x$$

$$33.3 \approx x$$

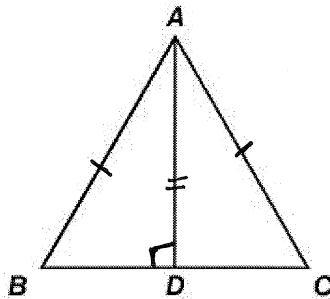
$$38.8 \approx x + 5.5$$

- A 25.6 feet
- B 27.8 feet
- C 33.2 feet
- D 38.8 feet

28. Patricia uses the given isosceles triangle ABC to prove that the base angles of an isosceles triangle are congruent. The statements associated with the 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. <u>Given</u>
2. $m\angle ADB = m\angle ADC = 90^\circ$	2. <u>definition of \perp lines</u>
3. $\overline{AD} \cong \overline{AD}$	3. <u>Reflexive property</u>
4. $\triangle ADB \cong \triangle ADC$	4. <u>Hypotenuse-Leg \cong Thm</u>
5. $\angle B \cong \angle C$	5. <u>CPCTC</u>

Which of these reasons does NOT justify any of the statements given above?

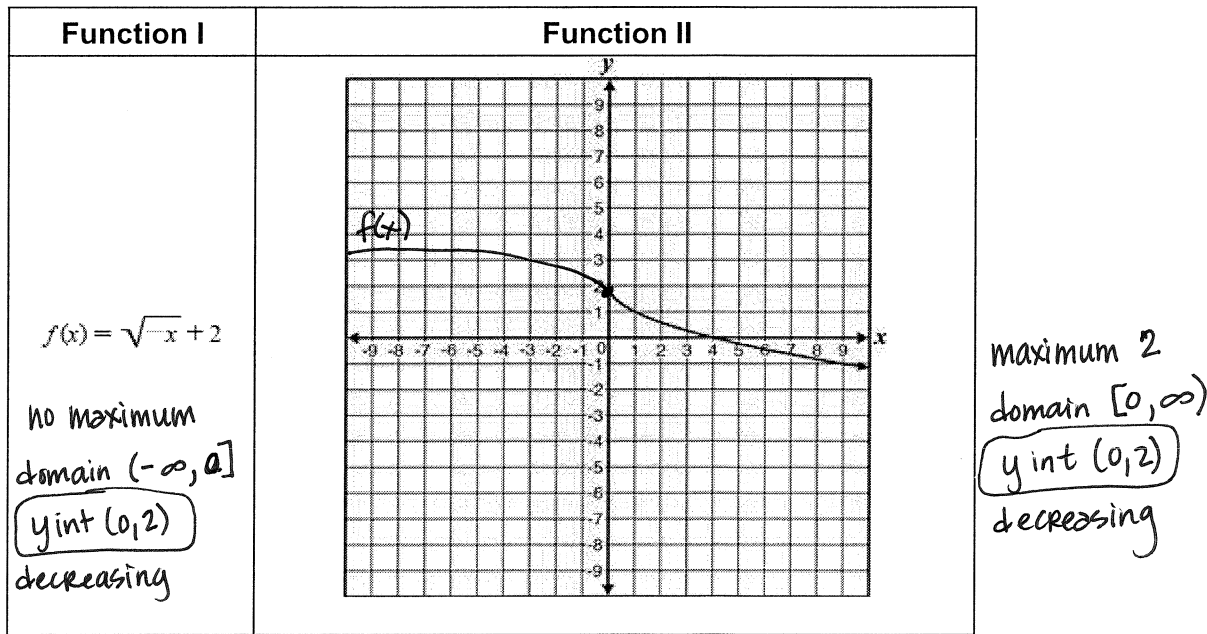
- A. Corresponding Parts of Congruent Triangles are Congruent
- B. Reflexive Property
- C. Side-Angle-Side Triangle Congruence Theorem
- D. Definition of Perpendicular Lines

29. Megan has a bag containing 75 candies in four different colors. She randomly pulls out 2 red candies, 4 blue candies, 2 green candies, and 2 yellow candies. Based on these results, which group would be closest to the actual number of candies of each color that is in the bag?

- A. 18 red, 20 blue, 18 green, 19 yellow
- B.** 16 red, 29 blue, 15 green, 15 yellow
- C. 18 red, 18 blue, 19 green, 19 yellow
- D. 18 red, 21 blue, 18 green, 18 yellow

2 Red : 4 blue : 2 green : 2 yellow 10 candies
 $\times 7.5$
 \rightarrow 15 Red : 30 blue : 15 green : 15 yellow 75 candies

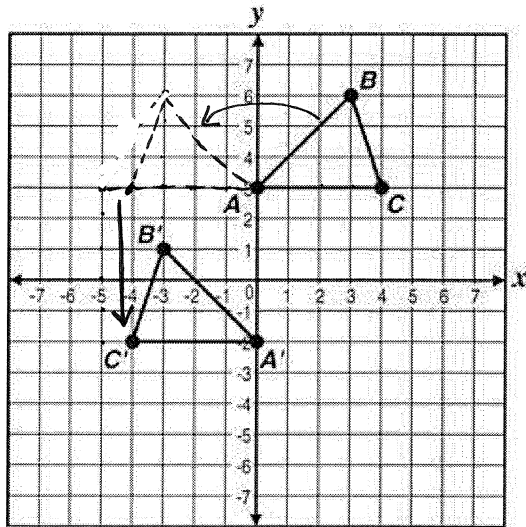
30. Two square root functions are shown.



Which statement about these two functions is true?

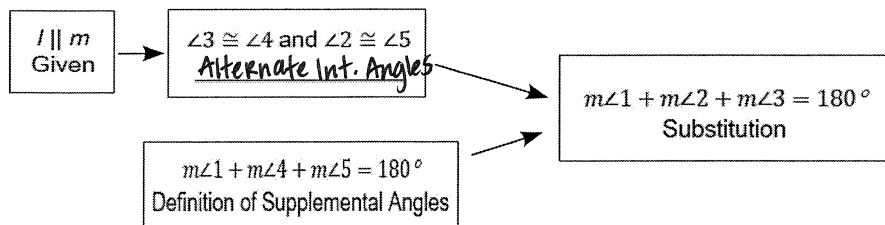
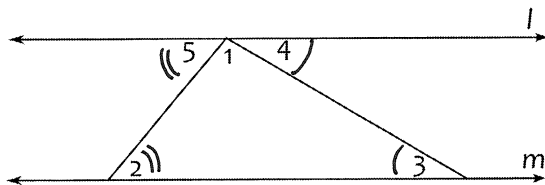
- A. Both functions have the same maximum value.
- B. Both functions have the same domain.
- C.** Both functions have a y-intercept of 2.
- D. Both functions are increasing.

31. Which transformations describe how $\triangle ABC$ was transformed to create $\triangle A'B'C'$ in the picture below?



- A translation 5 units down and 1 unit to the right
- B translation 5 units down and 4 units to the left
- C reflection across the y -axis and translation 5 units down
- D reflection across the x -axis and clockwise rotation of 90 degrees

32. Given $l \parallel m$, prove the sum of the angles in a triangle is 180° .



Fill in the blank with the reason that justifies the statement.

- A. Same side interior angles are congruent.
- B. Same side interior angles are supplementary.
- C. Alternate interior angles are congruent.
- D. Alternate interior angles are supplementary.

33. For which value of P and W is $P + W$ a rational number?

- A. $P = \frac{1}{\sqrt{3}}$ and $W = \frac{1}{\sqrt{6}}$
- B. $P = \frac{1}{\sqrt{4}}$ and $W = \frac{1}{\sqrt{9}}$ $\frac{1}{\sqrt{4}} = \frac{1}{2}$ $\frac{1}{\sqrt{9}} = \frac{1}{3}$ $\frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$
- C. $P = \frac{1}{\sqrt{6}}$ and $W = \frac{1}{\sqrt{10}}$
- D. $P = \frac{1}{\sqrt{25}}$ and $W = \frac{1}{\sqrt{2}}$

Math 2 Practice NCFE [2431595]SUBJECT: **Mathematics**ADMINISTRATION DATES: **Not Scheduled**PREFERRED STANDARDS DOCUMENT: ***Mathematics**GRADE LEVEL: **09 - Ninth Grade - 12 - Twelfth Grade**NUMBER OF QUESTIONS: **33**

Item #	Correct Answer	Standard ID	Point Value	Type
✓1	A	MA.9-12.NC.M2.N-RN.2	1	Multiple Choice
✓2	B	MA.9-12.NC.M2.G-SRT.2b.	1	Multiple Choice
✓3	D	MA.9-12.NC.M2.A-CED.1	1	Multiple Choice
✓4	A	MA.9-12.NC.M2.S-CP.4	1	Multiple Choice
✓5	C	MA.9-12.NC.M2.F-IF.2	1	Multiple Choice
✓6	B	MA.9-12.NC.M2.G-CO.3	1	Multiple Choice
✓7	C	MA.9-12.NC.M2.G-SRT.12	1	Multiple Choice
✓8	B	MA.9-12.NC.M2.A-SSE.3	1	Multiple Choice
✓9	A	MA.9-12.NC.M2.A-REI.7	1	Multiple Choice
✓10	C	MA.9-12.NC.M2.S-CP.4	1	Multiple Choice
✓11	C	MA.9-12.NC.M2.A-APR.1	1	Multiple Choice
✓12	A	MA.9-12.NC.M2.G-CO.8	1	Multiple Choice
✓13	A	MA.9-12.NC.M2.A-REI.4b	1	Multiple Choice
✓14	C	MA.K-12.CCSS.Math.Practice.MP7	1	Multiple Choice
✓15	C	MA.9-12.NC.M2.F-IF.4	1	Multiple Choice
✓16	B	MA.9-12.NC.M2.S-CP.4	1	Multiple Choice
✓17	C	MA.9-12.NC.M2.A-CED.1	1	Multiple Choice
✓18	C	MA.9-12.NC.M2.F-IF.8	1	Multiple Choice
✓19	A	MA.9-12.NC.M2.S-CP.7	1	Multiple Choice
✓20	C	MA.K-12.CCSS.Math.Practice.MP1	1	Multiple Choice
✓21	C	MA.9-12.NC.M2.S-CP.8	1	Multiple Choice
✓22	B	MA.9-12.NC.M2.G-CO.5	1	Multiple Choice
✓23	B	MA.9-12.NC.M2.F-IF.7	1	Multiple Choice
✓24	C	MA.9-12.NC.M2.F-BF.3	1	Multiple Choice
✓25	C	MA.9-12.NC.M2.A-REI.2	1	Multiple Choice
✓26	B	MA.9-12.NC.M2.F-BF.1	1	Multiple Choice
✓27	D	MA.9-12.NC.M2.G-SRT.8	1	Multiple Choice
✓28	C	Prove geometric theorems.	1	Multiple Choice
✓29	B	MA.9-12.NC.M2.S-IC.2	1	Multiple Choice
✓30	C	MA.9-12.NC.M2.F-IF.9	1	Multiple Choice
✓31	C	MA.9-12.NC.M2.G-CO.5	1	Multiple Choice
✓32	C	MA.9-12.NC.M2.G-CO.9	1	Multiple Choice
✓33	B	MA.9-12.NC.M2.N-RN.3	1	Multiple Choice