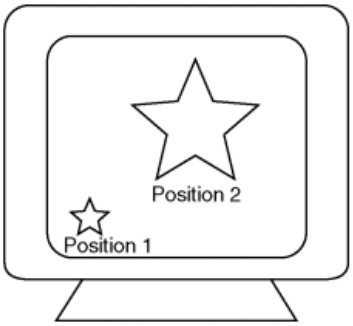
Old Math II Final Exam

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 1. As shown in the accompanying diagram, the star in position 1 on a computer screen transforms to the star in position 2.



This transformation is best described as a

A. line reflection
C. rotation
B. translation
D. dilation

____ 2. For her lunch, Sandy has the following choices

Sandwich	Chips	Fruit
Ham	Corn	Banana
Turkey	Potato	Apple
Egg Salad		

How many different combinations of 1 kind of sandwich, 1 kind of chips, and 1 piece of fruit can she make?

A. 5
C. 12
B. 7
D. 24

____ 3. An urn contains five red marbles, four green marbles, and three blue marbles. If one marble is drawn at random, what is the probability that it is either a green marble or a blue marble?

A. $\frac{5}{12}$
C. $\frac{7}{12}$
B. $\frac{3}{12}$
D. $\frac{4}{12}$

____ 4. The graph of $y = ax^2$ is shifted up 3 units and right 5 units. Which equation represents the resulting graph?

A. $y = a(x-5)^2 + 3$

C. $y = a(x-3)^2 + 5$

B. $y = a(x+5)^2 + 3$

D. $y = a(x+3)^2 + 5$

____ 5. The height of a swimmer's dive off a 10-foot platform into a diving pool is modeled by the equation $y = 2x^2 - 12x + 10$, where x represents the number of seconds since the swimmer left the diving board and y represents the number of feet above or below the water's surface. What is the farthest depth below the water's surface that the swimmer will reach?

A. 6 feet

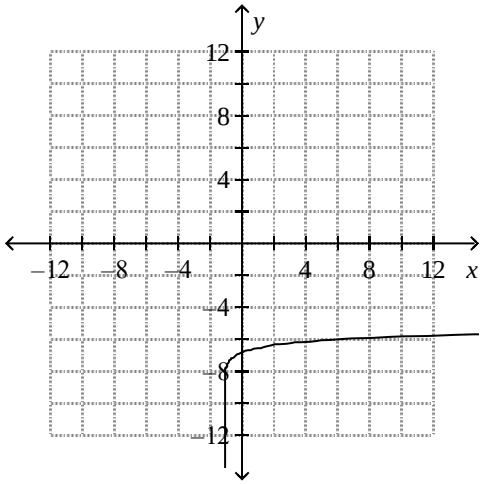
C. 10 feet

B. 8 feet

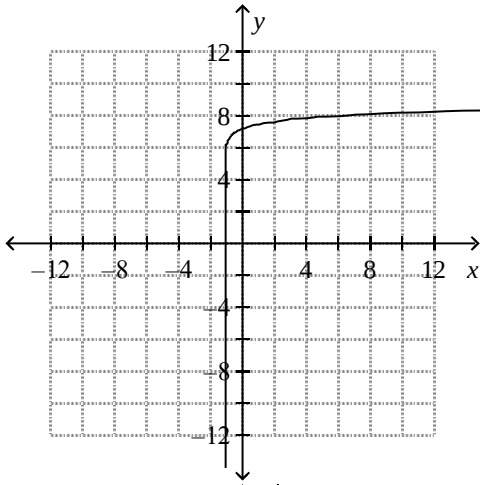
D. 12 feet

____ 6. Graph: $y = \log(x + 1) - 7$

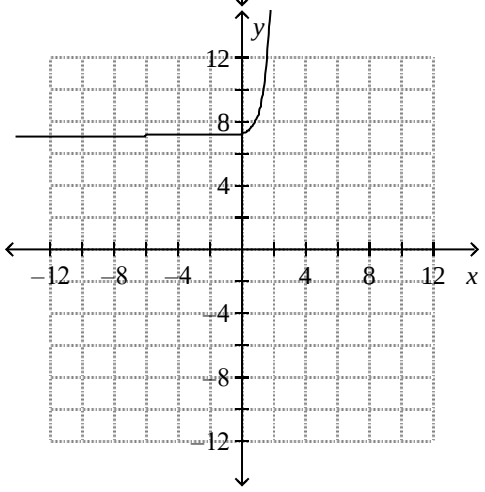
A.



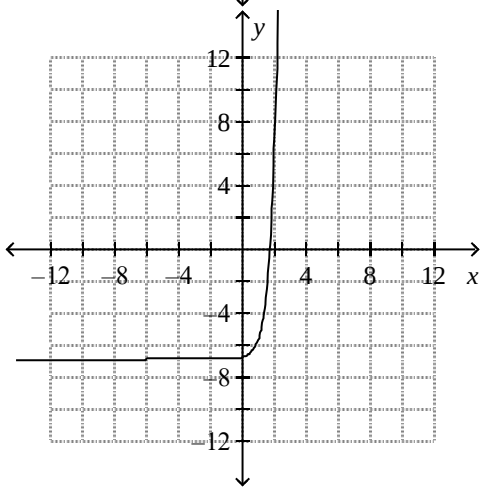
C.



B.



D.



____ 7. Gary has 10 coins in his pocket.

2 quarters
5 dimes
3 nickels

Without looking, Gary pulls one coin from his pocket and puts it on the table. The, he pulls one more coin from his pocket. What is the probability that the first coin is a dime and the second coin is a nickel?

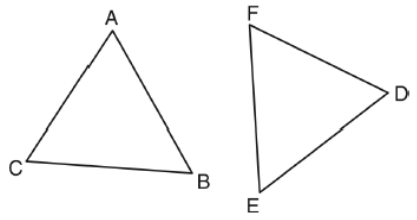
A. $\frac{1}{8}$

C. $\frac{1}{5}$

B. $\frac{1}{6}$

D. $\frac{1}{2}$

____ 8. In the diagram of ΔABC and ΔDEF below, $\overline{AB} \cong \overline{DE}$, $\angle A \cong \angle D$, and $\angle B \cong \angle E$.



Which method can be used to prove $\Delta ABC \cong DEF$?

A. SSS

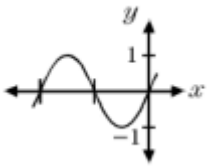
C. ASA

B. SAS

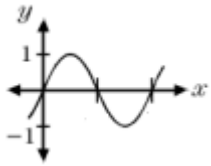
D. AAS

____ 9. Which is the graph of the equation $y = -\sin x$? (The distance between each tick mark on the x-axis is 90°.

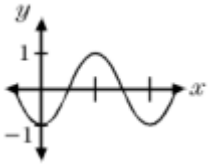
A.



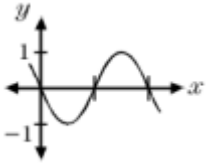
C.



B.



D.



____ 10. Which of the following is a point of intersection of the graphs of $y = 4 - x$ and $y = x^2 - x$?

A. (3, 1)

C. (-2, 6)

B. (-1, 5)

D. (4, 0)

____ 11. The expression $\frac{3^{\frac{1}{3}}}{3^{-\frac{2}{3}}}$ is equivalent to

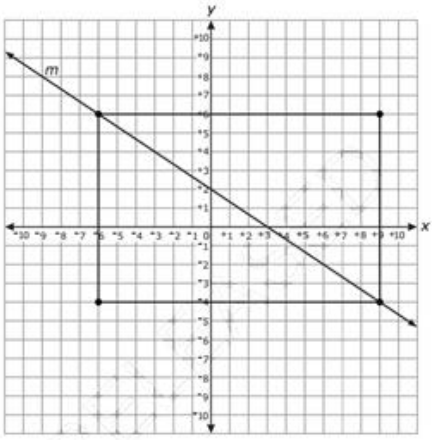
A. 1

C. 3

B. $\sqrt{3}$

D. $\frac{1}{\sqrt[3]{3}}$

____ 12. Which transformation will carry the rectangle shown below onto itself?



A. A reflection over line *m*

C. A rotation 90° counterclockwise about the origin

B. A reflection over the line $y = 1$

D. A rotation 270 counterclockwise about the origin

____ 13. Ruby is making a calendar.

Which shows a **translation** of the word "March" over the line?

A.

C.

B.

D.

____ 14. Which of the following is an example of independent events?

A. flipping a fair coin and rolling a six-sided cube

B. selecting the order in which one picture will be taken of each of four friends by drawing their names out of a hat

C. selecting the order in which each member of a history class will present a speech to the rest of the class

D. selecting two different flavored pieces of candy one piece at a time, from a bag containing four different flavors of candy.

____ 15. Three transformations will be performed on triangle ABC. Which set of transformations will always produce a congruent triangle?

A. dilation, rotation, translation

B. reflection, dilation, translation

C. rotation, reflection, dilation

D. rotation, translation, reflection

____ 16. How will the graph of the function $f(x) = 3^x$ translate when the function is changed to $f(x) = 3^{(x-2)}$?

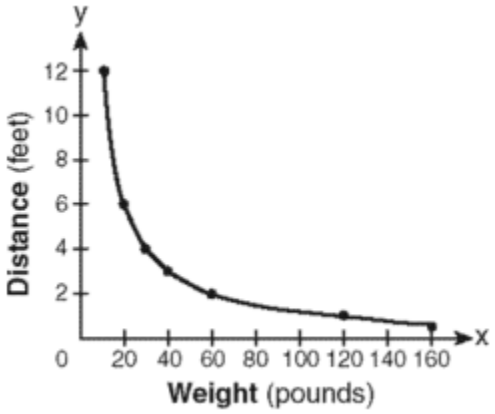
A. 2 units up

B. 2 units left

C. 2 units right

D. 2 units down

____ 17. The accompanying graph shows the relationship between a person's weight and the distance that the person must sit from the center of a seesaw to make it balanced.



Which equation best represents this graph?

A. $y = 12x^2$

C. $y = \log x$

B. $y = -120x$

D. $y = \frac{120}{x}$

____ 18. Carter is solving this equation by factoring.

$10x^2 - 25x + 15 = 0$

Which expressions could be one of his correct factors?

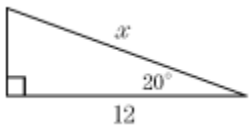
A. $x + 3$

C. $2x + 3$

B. $x - 3$

D. $2x - 3$

____ 19. Which equation can be used to find the value of x in the right triangle shown?



A. $\cos 20° = \frac{x}{12}$

C. $\cos 20° = \frac{12}{x}$

B. $\sin 20° = \frac{12}{x}$

D. $\cos 70° = \frac{x}{12}$

____ 20. Matty's piano book includes 15 songs in the key of C, 10 in the key of G, and 5 in the key of F. The songs from all three keys appear in random order. Over the past month, Matty has randomly opened his piano book to a song in the key of C 80 times, the key of G 30 times, and the key of F 10 times. What are the theoretical and experimental probabilities that the next song Matty randomly picks will be in the key of G?

A. Theoretical probability = $\frac{1}{4}$; and experimental probability = $\frac{1}{3}$

C. Theoretical probability = $\frac{1}{3}$; and experimental probability = $\frac{1}{2}$

B. Theoretical probability = $\frac{1}{2}$; and experimental probability = $\frac{1}{3}$

D. Theoretical probability = $\frac{1}{3}$; and experimental probability = $\frac{1}{4}$

____ 21. ΔGHI will be dilated by a scale factor of 3, resulting in $\Delta G'H'I'$. What rule describes this transformation?

A. $(x', y') = \left(\frac{1}{3}x, \frac{1}{3}y\right)$

C. $(x', y') = (x + 3, y + 3)$

B. $(x', y') = (3x, 3y)$

D. $(x', y') = (x - 3, y - 3)$

____ 22. Solve: $\sqrt{9x^2 - 11} = 5$

A. 0

C. -2

B. 2

D. 2, -2

____ 23. The solution to the quadratic equation $2x^2 + 5x - 1 = 0$ is:

A. $\frac{5 \pm \sqrt{17}}{4}$

C. $\frac{-5 \pm \sqrt{17}}{4}$

B. $\frac{5 \pm \sqrt{33}}{4}$

D. $\frac{-5 \pm \sqrt{33}}{4}$

____ 24. Given the quadratic function, $f(x) = 2x^2 + 3x - 2$, what are the zeros?

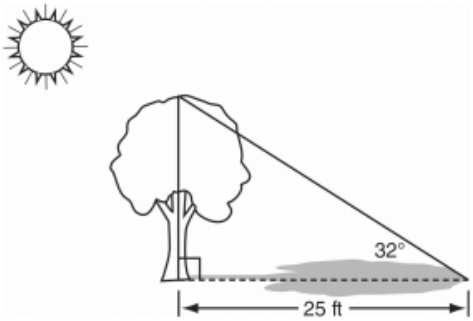
A. $-\frac{1}{2}$, 2

C. $\frac{1}{2}$, 2

B. $\frac{1}{2}$, -2

D. $-\frac{1}{2}$, -2

____ 25. A tree casts a 25-foot shadow on a sunny day, as shown in the diagram below.



If the angle of elevation from the tip of the shadow to the top of the tree is 32°, what is the height of the tree to the *nearest tenth of a foot*?

A. 13.2 feet

C. 21.2 feet

B. 15.6 feet

D. 40.0 feet

____ 26. The bowling team at Lincoln High School must choose a president, vice president, and secretary. If the team has 10 members, which expression could be used to determine the number of ways the officers could be chosen?

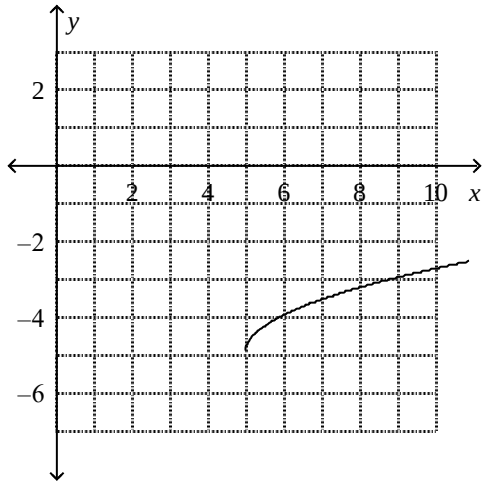
A. ${}_3P_{10}$

C. ${}_{10}P_3$

B. ${}_7P_3$

D. ${}_{10}P_7$

____ 27. Which function matches the graph?



A. $y = \sqrt{x + 5} + 5$

C. $y = \sqrt{x + 5} - 5$

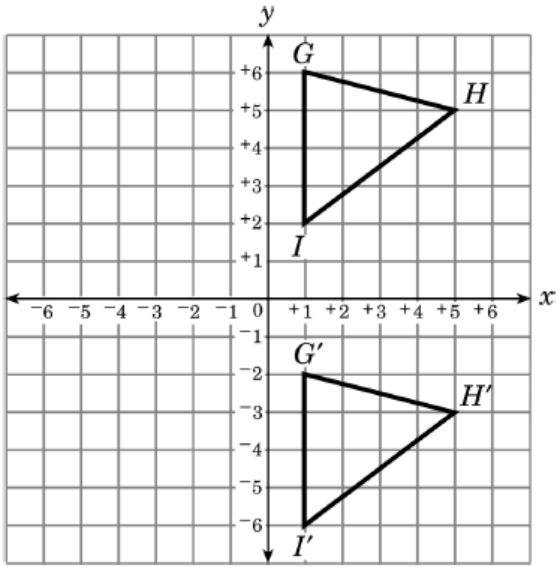
B. $y = \sqrt{x - 5} - 5$

D. $y = \sqrt{x - 5} + 5$

____ 28. A drama club is planning a bus trip to New York City to see a Broadway play. The cost per person for the bus rental varies inversely as the number of people going on the trip. It will cost $30 per person if 44 people go on the trip. How much will it cost per person if 60 people go on the trip? Round your answer to the nearest cent, if necessary.

A. $22.00 B. $40.91 C. $1,320.00 D. $21.29

____ 29. $\Delta G'H'I'$ is the image of ΔGHI after a transformation.

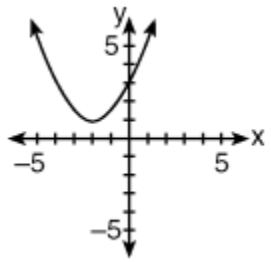


Which choice describes the transformation shown?

A. reflection over the x-axis C. $(x', y') = (x - 8, y)$

B. reflection over the y-axis D. $(x', y') = (x, y - 8)$

____ 30. The accompanying diagram shows a parabola.



Which statement is *not* true?

A. The equation of the axis of symmetry is $x = -2$.

B. The parabola has a minimum point.

C. The turning point of the parabola is (-2, 1).

D. The parabola has two x-intercepts.

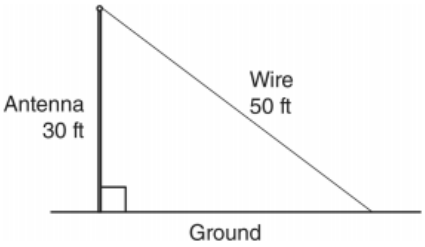
____ 31. The table shows the results of a survey of college students. Find the probability that a student's first class of the day is a humanities class, given the student is male. Round to the nearest thousandth.

First Class of the Day for College Students

	Male	**Female**
Humanities	70	80
Science	50	80
Other	60	70

A. 0.171 B. 0.467 C. 0.269 D. 0.389

____ 32. A communications company is building a 30-foot antenna to carry cell phone transmissions. As shown in the diagram below, a 50-foot wire from the top of the antenna to the ground is used to stabilize the antenna.



Find, to the *nearest degree*, the measure of the angle that the wire makes with the ground.

A. 37° C. 40°

B. 53° D. 31°

____ 33. An initial population of 505 quail increases at an annual rate of 23%. Write an exponential function to model the quail population.

A. $f(x) = 505(0.23)^x$
C. $f(x) = 505(23)^x$
B. $f(x) = (505 \cdot 0.23)^x$
D. $f(x) = 505(1.23)^x$

____ 34. Write an exponential function $y = ab^x$ for a graph that includes (1, 15) and (0, 6).

A. $y = 6(2.5)^x$
C. $y = 2.5(6)^x$
B. $y = 3(5)^x$
D. $y = 5(3)^x$

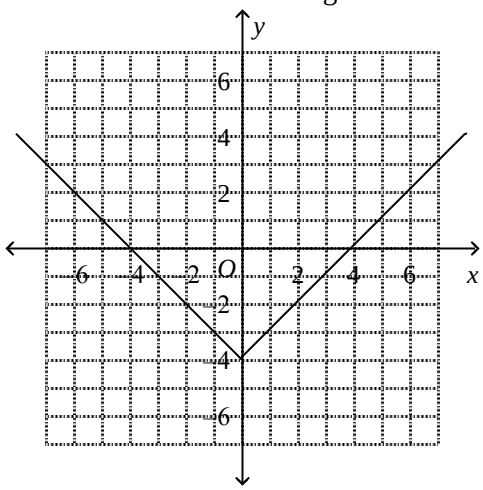
____ 35. Find the annual percent increase or decrease that $y = 0.35(0.85)^x$ models.

A. 85% increase
C. 15% decrease
B. 15% increase
D. 85% decrease

____ 36. Solve $10^{2x} = 76$. Round to the nearest ten-thousandth.

A. 4.0563
B. 2.7134
C. 3.7616
D. 0.9404

____ 37. Choose the domain and range of the function $f(x) = |x| - 4$, which is graphed below.



A. Domain: All real numbers
Range: All real numbers
C. Domain: All real numbers
Range: $y \geq -4$
B. Domain: $-4 \leq x \leq 4$
Range: $y \geq -4$
D. Domain: $y \geq -4$
Range: All real numbers

____ 38. Evaluate $f(-2)$ if

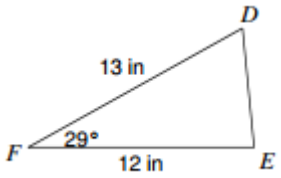
$$f(x) = \begin{cases} 2x + 5 & x < -1 \\ x^2 - 4 & -1 \leq x \leq 2 \\ -2x + 7 & x > 2 \end{cases}$$

A. 1
C. -8
B. 0
D. 11

____ 39. Find the angle of elevation of the sun from the ground to the top of a tree when a tree that is 10 yards tall casts a shadow 14 yards long. Round to the nearest degree.

A. 54°
B. 36°
C. 46°
D. 44°

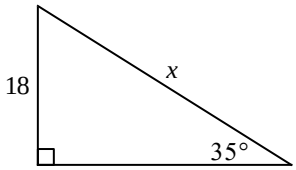
____ 40. Find the area of $\triangle DEF$ to the nearest tenth.



A. $68.2\ \text{in}^2$
B. $37.8\ \text{in}^2$
C. $75.6\ \text{in}^2$
D. $78\ \text{in}^2$

Find the value of *x*. Round to the nearest tenth.

____ 41.



Not drawn to scale

A. 10.3 B. 31.4 C. 10.7 D. 31.8

____ 42. Juan is flying his kite on the football field. There is 70 meters of string between Juan and his kite. The string makes an angle of 38° with the ground. Find to the nearest meter how far above the ground the kite is flying.

A. 43 meters
B. 55 meters
C. 89 meters
D. 114 meters

Old Math II Final Exam - Answer Section

MULTIPLE CHOICE

1. D
2. C
3. C
4. A
5. B
6. A
7. B
8. C
9. D
10. C
11. C
12. B
13. B
14. A
15. D
16. C
17. D
18. D
19. C
20. D
21. B
22. D
23. D
24. B
25. B
26. C
27. B
28. A
29. D
30. D
31. D
32. A
33. D
34. A
35. C
36. D
37. C
38. A
39. B
40. B
41. B

42. A