Name: _____ Date: _____

End-of-Course Test A

100

Suggested Time: 90 min

Multiple Choice (10 × 2 points = 20 points)

Fill in the circle next to the correct answer.

1. Simplify $\left[\left(\frac{5}{6}\right)^3 \cdot \left(\frac{5}{6}\right)^{-5}\right]^2$. Write your answer using a positive exponent.

(A) $\left(\frac{5}{6}\right)^4$ (B) $\left(\frac{5}{6}\right)^{-2}$ (C) $\left(\frac{6}{5}\right)^4$ (D) $\left(\frac{5}{6}\right)^{-4}$

2. Which of the following represents $5.14 \cdot 10^4$ in standard form?

(A) 51,400 (B) 514 (C) 5,140 (D) 0.514

3. What is the value of y when $x = 5$ and $\frac{2y - 1}{5} = x$?

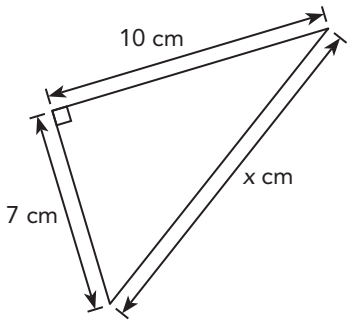
(A) 1 (B) 12 (C) 13 (D) 10

4. The equation $y = 3x + 2$ is a function because _____.

(A) it is a nonlinear equation of a horizontal line
(B) it is a linear equation of a slanted line
(C) it is a linear equation of a vertical line
(D) it is not a nonlinear equation

5. Find the value of x.

(A) $\sqrt{149}$ cm
(B) $\sqrt{51}$ cm
(C) $\sqrt{17}$ cm
(D) 149 cm



6. What is the distance between the points A (3, 5) and B (6, −5)?

(A) $\sqrt{13}$ units (B) $\sqrt{109}$ units (C) 109 units (D) (D) 9 units

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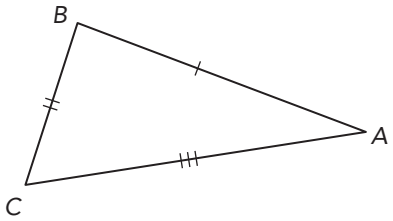
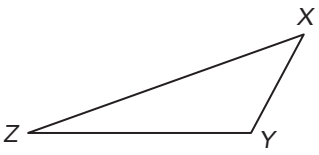
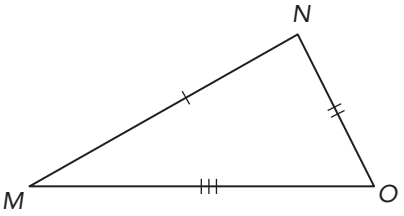
7. Which of the following triangles is congruent to triangle *ABC*?



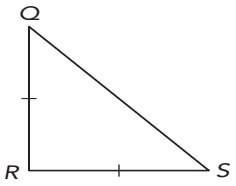
A



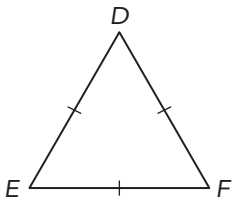
B



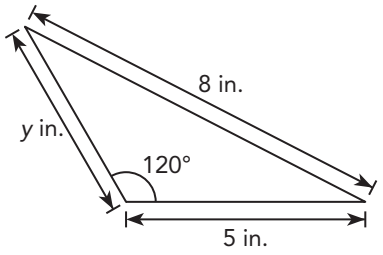
C

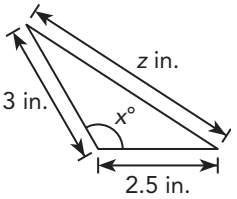


D



8. The two figures are similar. Find the value of each variable.





A $x = 120$; $y = 6$; $z = 4$

B $x = 60$; $y = 6$; $z = 4$

C $x = 120$; $y = 5.5$; $z = 5.5$

D $x = 120$; $y = 4$; $z = 6$

9. Which of the following scenarios is a simple event?

A Obtaining two heads when a coin is tossed.

B Rolling a fair 20-sided number die and obtaining a sum of 17.

C Picking two blue marbles from a bag of blue and yellow marbles.

D Selecting the letter B from the word TABLE.

10. Which of the following scenarios is an independent event?

A Picking two oranges from a fruit basket of 3 oranges and 2 peaches.

B Selecting two novels from a bookshelf with 3 language books and 5 novels.

C Selecting two students from a class to participate in an interactive game.

D Spinning a spinner that is divided into four equal areas labeled 1 to 4 and obtaining two 4s in a row.

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Short Answer and/or Constructed Response

(Questions 11 to 20: 10 × 2 points = 20 points, Questions 21 to 23: 3 × 4 points = 12 points, Questions 24 to 27: 4 × 5 points = 20 points, Questions 28 to 31: 4 × 6 points = 24 points)

Write your answer on the answer blank provided.

11. Express $0.0\overline{23}$ as a fraction. _____

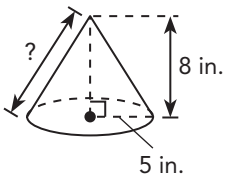
12. Write an equation of the line given its slope, $m = -3$, and its y-intercept, $b = 10$. _____

13. Solve the system of linear equations using the elimination method.
$x = 3y$
$3x - 2y = 14$ _____

14. Identify the input and the output given the relation described:

Mr. Edward wants to find the cost of parking his car at a shopping center for a few hours. _____

15. Find the missing dimension. Round your answer to the nearest tenth.



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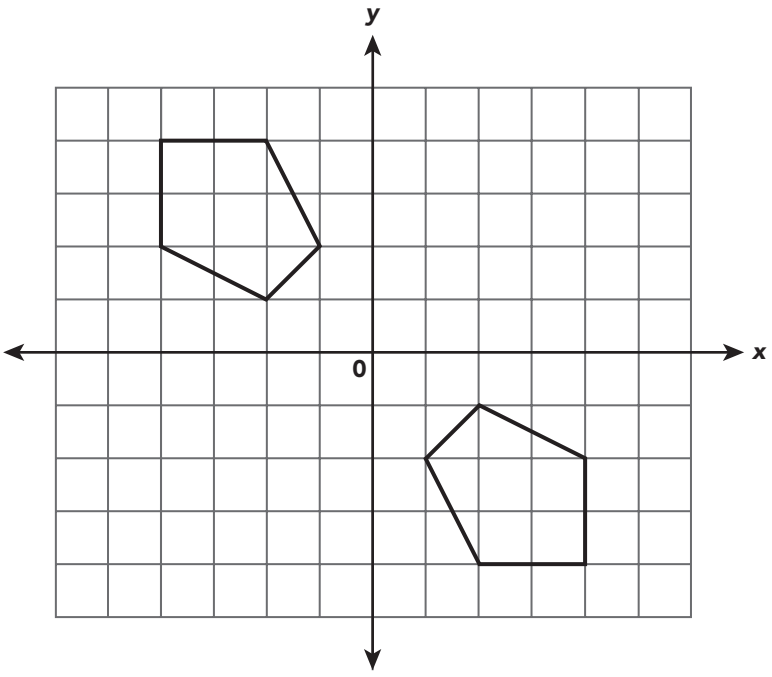
16. Two symmetrical figures are shown on the coordinate plane. Write the equation of the line of reflection.



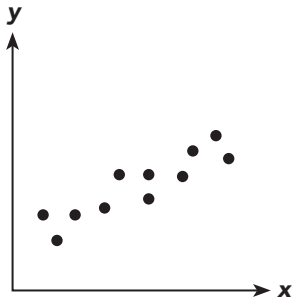
_____

17. Find the coordinates of the image of point *P* (5, 8) after it is translated 7 units to the left and 3 units up.

_____

18. Describe the association between the bivariate data shown in the scatter plot.

_____



19. From the following data set, identify whether the data is quantitative or categorical in nature. Explain your answer.

Cloudy, sunny, windy

_____

20. Picking two red pens from a pencil box with 10 red and blue pens is a compound event. Identify the simple events in this scenario.

_____

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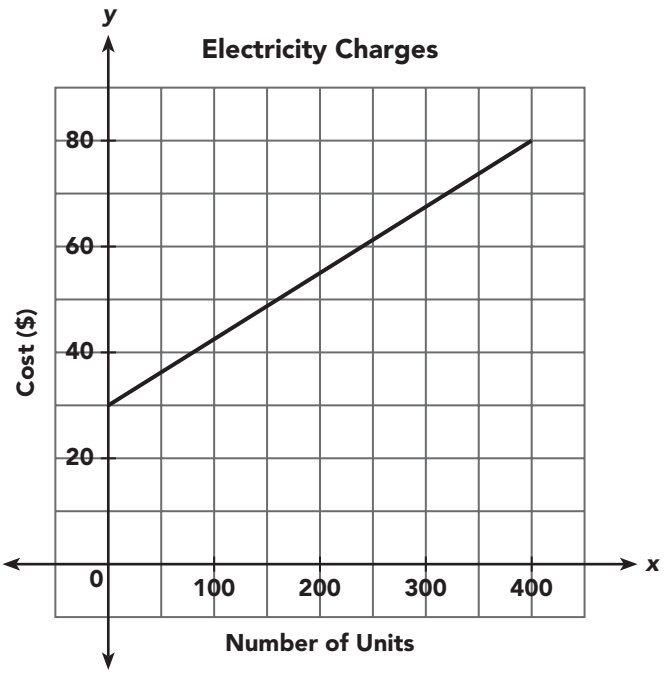
Solve. Show your work.

21. The graph shows the total cost, *C* dollars, of the electricity supplied to a house based on the number of units, *x*, of electricity used.



a) Find the vertical intercept of the graph and explain what information it gives about the situation.

b) Find the slope of the graph and explain what information it gives about the situation.

22. Four years ago, Samantha was three times as old as Danny. Four years from now, Samantha will be only twice as old as Danny. How old are they now?

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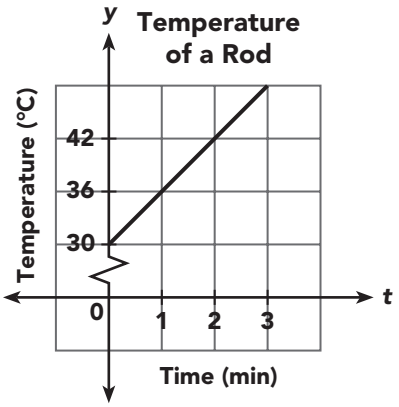
23. The graph shows the relation between the temperature of a metal rod, $y°C$, and the time, x minutes, it has been heated over a fire.



a) Tell whether the relation is a linear function. Then tell whether the function is increasing or decreasing.

b) Write an algebraic equation to represent the function.

c) Describe how the slope and y-intercept are related to the function.

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24. A photograph is 6 centimeters wide and 8 centimeters high. An enlargement of the photograph has a height of 16 centimeters. Calculate the width of the enlargement.

25. A survery was conducted to investigate the association between park location and exercising habits. The data is shown in the two-way table.

		Exercising Habits		
		Resident Exercises	**Resident Does Not Exercise**	Total
Park Location	**Park is Within 1 Kilometer Radius of a Residence**	160	65	225
	Park is Not Within 1 Kilometer Radius of a Residence	95	85	180
	Total	255	150	405

a) Find the relative frequencies to compare the distribution of residences having a park within a 1 kilometer radius and residents exercising.

b) Describe the association between residences having a park within a 1 kilometer radius and residents exercising.

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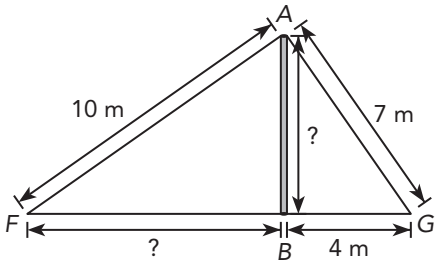
26. In a class, there are 28 students. There are 8 more girls than boys.

a) Write a system of two linear equations to represent this scenario.

b) State, with reasons, whether the system of equations has a unique solution, is inconsistent, or is dependent.

c) Can the system in **a)** be used to calculate the number of boys and the number of girls in the class? If so, find the number of boys and the number of girls in the class.

27. A tent pole, $\overline{AB}$, is held vertically by two ropes, $\overline{AF}$ and $\overline{AG}$. AF is 10 meters and AG is 7 meters. Point B is 4 meters from point G.



a) Find the length of the pole, $\overline{AB}$. Round your answer to the nearest tenth.

b) Find the distance between point B and point F. Round your answer to the nearest tenth.

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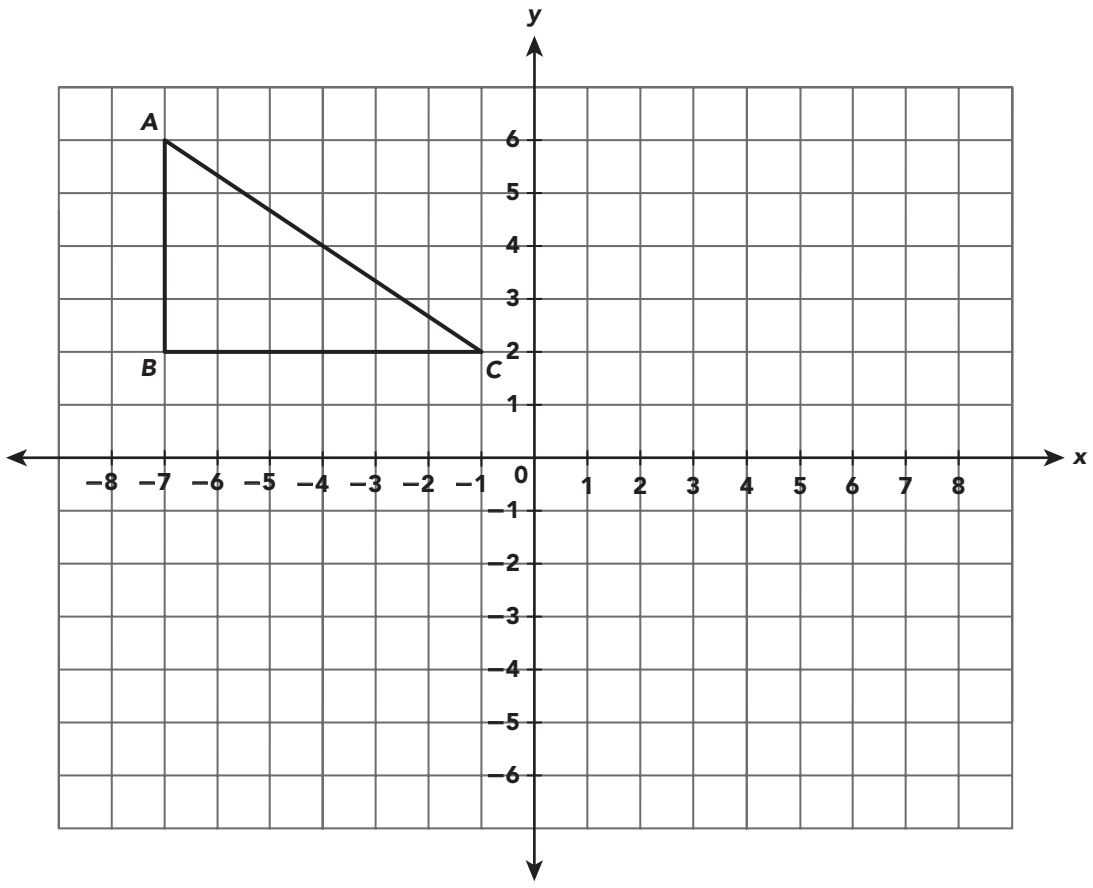
28. $\triangle ABC$ is first mapped onto $\triangle A'B'C'$ by a reflection in the y-axis. $\triangle A'B'C'$ is then mapped onto $\triangle A''B''C''$ by a 180° rotation about the origin, O.

a) Draw $\triangle A'B'C'$ and $\triangle A''B''C''$.



b) Describe the transformation that maps $\triangle ABC$ onto $\triangle A''B''C''$.

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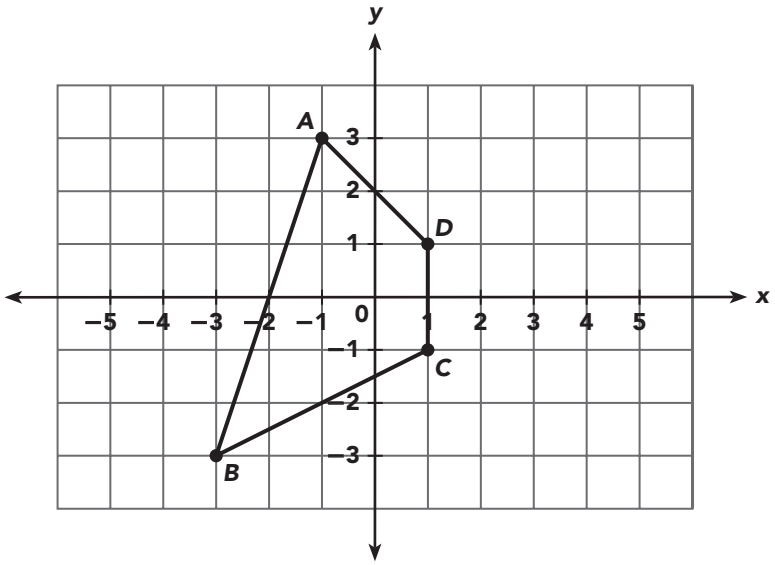
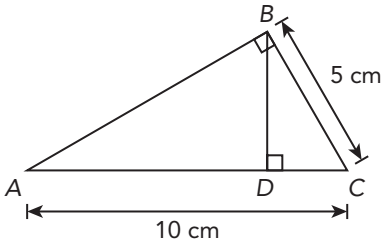
29. Draw the image of the figure below through a 90° counterclockwise rotation about the origin, *O*. Write the coordinates of the vertices of the image.



30. In the diagram, $\triangle ABC$ is divided into two similar smaller triangles.



a) Identify the two similar triangles.

b) Find the length of $\overline{CD}$.

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31. Data was collected from six different libraries in two different cities with similar neighborhoods to investigate the association between loan periods and the percent of books overdue in the fiction category. The results are shown in the tables below.

City A

Loan Period (Number of Days)	1	3	5	7	9
Percent of Books Overdue (%)	2	6	8	11	10

City B

Loan Period (Number of Days)	5	7	9	10
Percent of Books Overdue (%)	7	10	12	2

a) Use the graph paper on the next page. Construct a scatter plot for this data and draw the line of best fit.

b) Describe the association between loan period and the percent of books overdue.

c) Identify the outlier.

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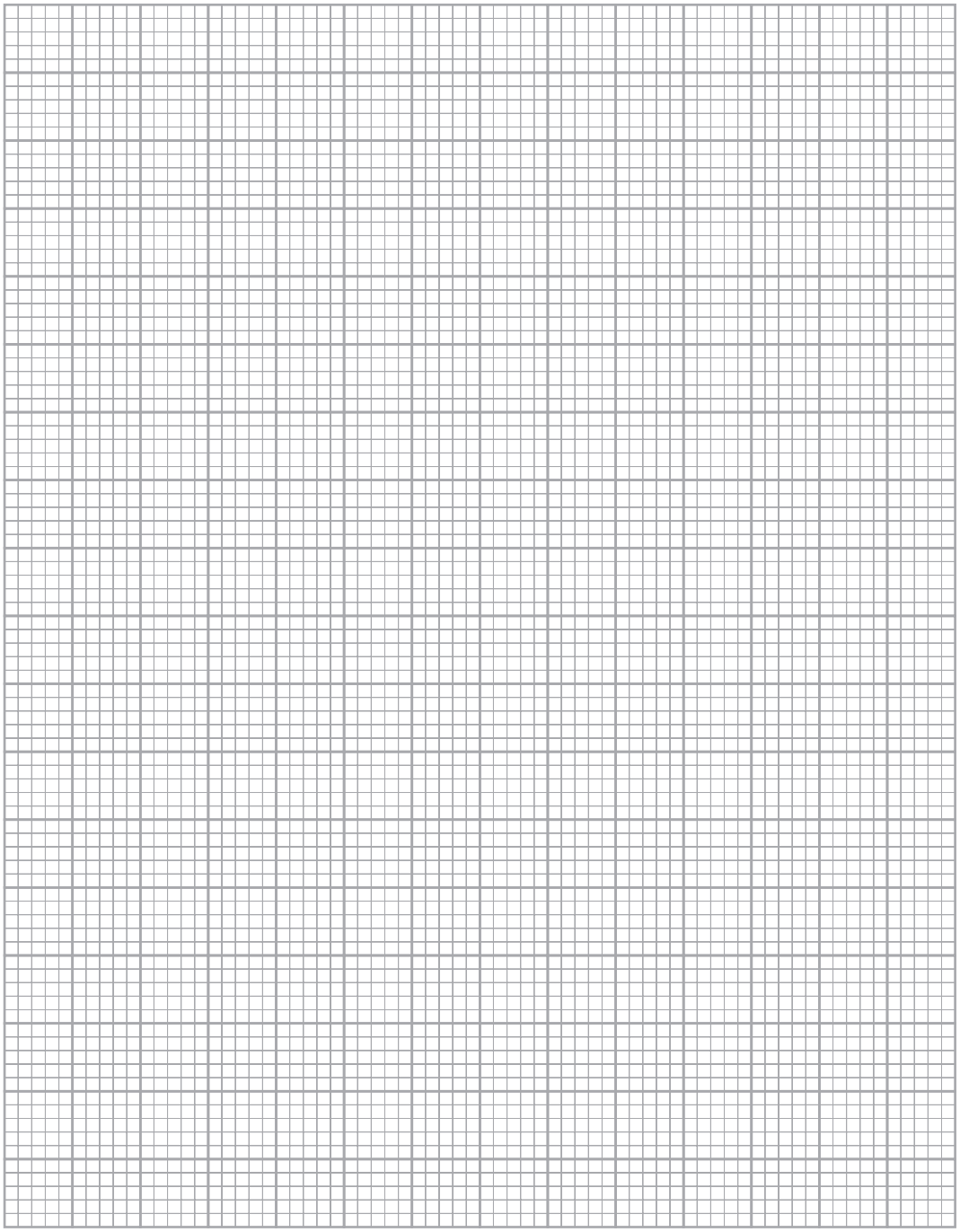

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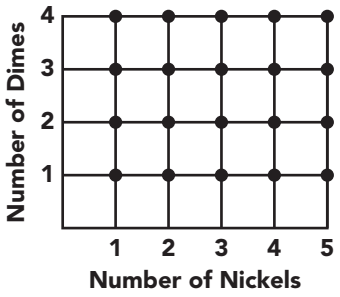
Bonus Questions

Solve. Show your work.

32. To mail a letter, Umberto needs to buy a 45-cent stamp. He has a pocket full of dimes and nickels.



a) Draw a small circle around each point in the possibility diagram that represents a possible combination of coins he could choose to pay for his stamp.

b) Find the probability that he chooses exactly two nickels to pay for his stamp.

c) Find the probability that he chooses exactly three nickels to pay for his stamp.

d) Find the probability that he chooses more nickels than dimes to pay for his stamp.

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33. The probability that a baseball team will win any particular game is 0.55 and the probability that it will tie any particular game is 0.35.

a) Draw a tree diagram for two games of a particular season.

b) Find the probability that the team will tie for both games of the season.

c) Find the probability that the team will lose exactly one game of the season.

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