What is the value of the y-intercept for the following function: $G(t) = (t + 4)2$

The owner of a 300-seat theatre sells tickets for $20 each. He believes that for every dollar he increases the price of a ticket, he will lose 10 customers. He charts his research in the given table.

Increase in Price ($)	Revenue ($)
0	6 000
1	6 090
2	6 160
3	6 210
4	6 240
5	6 250
6	6 240

The owner determined that this data models a quadratic regression.

 In order to have a total revenue of $6120, the most he can increase the price of a ticket is

Select one:

a. $9.55

b. $8.61

c. $1.29

d. $6.81

What is the value of the y-intercept for the following function: $G(t) = (t + 4)^2$

A research company summarized the average time spent everyday by teenagers on the phone.

Year	1999	2000	2002	2003	2005	2008	2009	2011
Time (min)	45	44	38	40	42	46	40	33

a) Create a scatter plot, and draw a curve of best fit for the data using cubic regression.

b) Use your graph to interpolate the average amount of time spent on the phone in 2006.

c) Do you think your curve of best fit is reasonable for extrapolating values? Explain.

A college kept track of the attendance at varsity football home games in the table below.

Game	1	2	3	4	6	7
Attendance	1530	1410	1355	1372	1620	1785

a) Create a scatter plot, and draw a curve of best fit for the data using quadratic regression.

b) Use your graph to interpolate the attendance at the fifth game.

The height, h, in metres, of an object in free fall after t seconds can be modelled by the quadratic function

$$h = -4.9t^2 + 100, \ t > 0$$

To the nearest tenth of a second, the object will reach a height of 10m after _____

The volume, V, in cubic inches, of a fish tank can be modelled by the function

$$V = h(48 - 2h)^2$$

where h is the height of the fish tank in inches and $0 < h < 24$.

To the nearest cubic inch, the maximum volume of this fish tank is _____

The tide depth in a Pacific harbour from noon on March 1, 2012 to noon the next day can be modelled by the cubic function

$f(t) = 0.001t^3 - 0.061t^2 + 0.870t + 0.315$

where f is the tide depth in metres and t is the number of hours after noon.

Determine the tide depth at 10:00 on the second day.[show your detail workings to obtain full marks]

Use cubic regression to extrapolate the value of y when x = 50. Round your answer to the nearest whole number.

x	5	10	15	20	25	30	35	40
y	211	236	255	258	264	267	276	291

A soccer coach wanted to know the relationship between the number of shots his team takes during a game and the number of goals they score. He collected the following data from the last few games.

Shots	18	14	8	21	15	10	25	18
Goals	2	1	0	3	2	0	4	3

a) Create a scatter plot, and draw a line of best fit for the data.

b) Use your graph to estimate the number of shots required to score 2 goals.

Determine the following characteristics of the polynomial function $f(x) = x^2 + -x(x + 1)$.

Show your work.

• number of possible x-intercepts

• y-intercept

• end behaviour
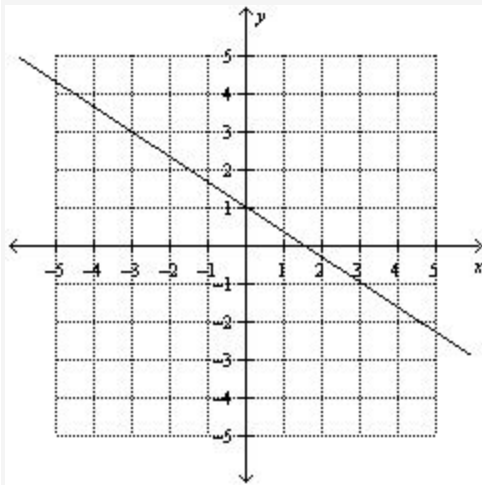
• domain

• range

• number of possible turning points

Using 2, 0, 1, 9 as coefficients, what is the strangest polynomial can you make in the form ax^3+bx^2+cx+d, where a,b,c,d is either 2,0,1, or 9. Explain why you find it so strange.

Write an equation for a polynomial function that satisfies each set of characteristics. Explain your reasoning.

a) degree 1, decreasing function, y-intercept of −2

b) one turning point, a maximum value, y-intercept of 3

Identify the correct polynomial function for this graph

$$\textbf{i) } y = -\dfrac{2}{3}x + 1$$

$$\textbf{iv) } y = -\dfrac{2}{3} - x$$

ii) $y = -x^2 + x + 4$

v) $y = 2(x - 2)(x - 1)$

$$\textbf{iii) } y = \dfrac{x^3 - 4x^2}{2}$$

$$\textbf{vi) } y = \dfrac{1}{3}(x^3 + x + 1)$$

The equation of the exponential function that models a data set is

$y = 6.8(1.03)^x$

Determine the range of this function.

Select one:

a. $\{y \mid y > 0, y \in R\}$

b. $\{y \mid y \in R\}$

c. $\{y \mid y > 6.8, y \in R\}$

d. $\{y \mid y > 1.03, y \in R\}$

Determine the equation of the exponential regression function for the data. Round all values to the nearest hundredth.

x	1	2	3	4	5	6
y	154	194	243	310	388	488

In the table of values, it shows the amount of temperature to bacteria growth. What would be the value of y when x = 10. Round your answer to the nearest tenth.

x (temperature, °C	0	2	5	7	12	14
y (amount of bateria)	51.6	28.2	11.5	6.3	1.4	0.8

Express 2401^0.5x as a power with a base of 7.

Determine if the exponential function $f(x) = 5(\%)^x$ is increasing or decreasing.

Sketch the exponential function $f(x) = 1/2\,(3)^x$.

(There are two parts to this question)

Describe the range of the exponential function $g(x) = -5(2)^x$ and complete a general statement of all exponential functions by filling in the blanks for the following statement:

The range of all exponential functions of the form $f(x) = a(b)^x$, where $a > \underline{\quad\quad}$, $b > \underline{\quad\quad}$, and $b \;\square\; 1$ is $\{y \mid y \underline{\;\;\;} 0, y \in R\}$ or $(0, \square\,)$

People use AA and AAA batteries for all types of household objects. Batteries power video game controllers, cameras, toys, calculators, portable radios, flashlights, and small appliances. Unfortunately, batteries don't last very long. The battery sales across the globe make about $50 billion (U.S.) each year and is a growing industry, see http://batteryuniversity.com/learn/article/battery_statistics. The life of a battery can be represented as an exponential distribution when measuring the probability of a battery dying over time. Check out the following table tracking the days of use of batteries and the probability of failure over that time, note that the probability of failure is in decimal form, such that 0.095 means 9.5%.

Days in Use	Probability of Failure
0	0
1	0.00995
2	0.0198
5	0.04877
10	0.095
18	0.16473
32	0.27385
43	0.34295
99	0.62842

Use the table above to answer the following question.

Use your TI-84 calculator to create an exponential regression equation to represent the exponential distribution [if it exists]. Round all values to the nearest tenths. Maybe it will help to change the decimals into percentage and include a scatter graph to see if it creates an exponential regression.
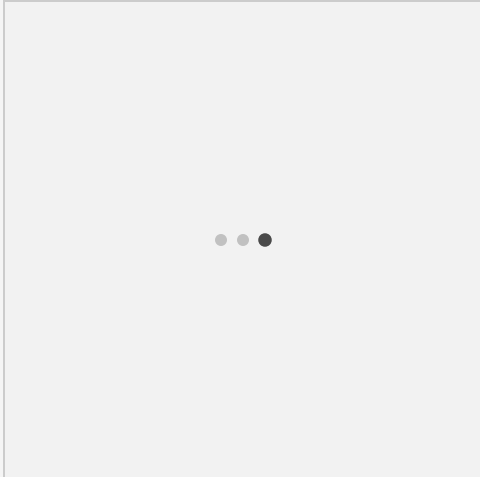
Match the following graph with its function.
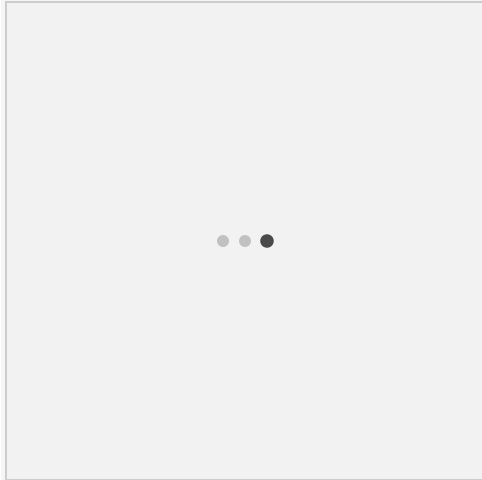
Select one:

a. $y = 3(0.5)^x$

b. $y = 2(1.25)^x$

c. $y = 0.5(3)^x$

d. $y = 2(0.75)^x$

A scatter plot is drawn using a data set.

Identify the equation of the curve of best fit.

Select one:

a. $y = 4.8(1.08)^x$

b. $y = 4.8(0.81)^x$

c. $y = 8.4(0.81)^x$

d. $y = 8.4(1.08)^x$

For the exponential function shown, estimate the x-values at $y = 4$ and $y = 3$.
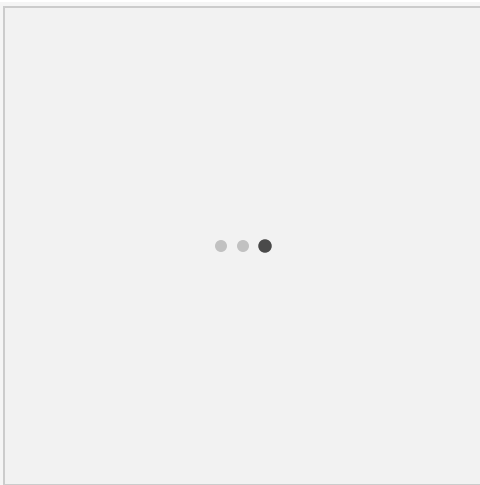
Determine the y-intercept of the exponential function $h(x) = \boxed{}$.

Consider the equation $y = 6500(0.8)^x$.

a. Is this exponential growth or decay? Explain your answer.

b. How do you figure out the initial value, and what is the value?

c. What are its domain and range? [make sure you state the domain and range in both notations, set builder and interval notation and if you are not sure what that this is, click here to view:https://docs.google.com/document/d/1ZfF3I-DOBpJrqjmi7VVMXnrLkRVK-r8KS4zpWtDm0Mw/edit?usp=sharing]

d. What is the value when x = 9.5?

Solve the following exponential equation by writing both sides with the same base.
5(4)^x+2 = 5120
Select one:
a. z = 0
b. z = 1
c. z = 2
d. z = 3

Solve the following exponential equation by writing both sides with the same base.
2(27)x = 162

What is the general assumption when $y = a^x$, $a > 1$, as the x value decreases, the value of y will be closer to what value?

Select one:

a. 0

b. 1

c. infinity

d. negative infinity

Marcus put $750 into a bank account that pays compound interest quarterly. His bank gave him figures for the first year of his investment, as shown below.

Compounding Period	Value ($)
0	750.00
1	754.31
2	758.65
3	763.01
4	767.40

a) Explain how you can determine an exponential growth function that models the growth of his investment.

b) What is the annual interest rate that is being paid on the account? Explain.

c) Assuming the same growth rate, how much interest will Marcus earn after 4 years? Show your work.

Use what you know about the exponential function y = (½)^x to predict the number of x-intercepts, the y-intercept, the end behaviour, the domain, and the range of the following function:
Y = (½)^x + 5

The population of a city has been growing exponentially. The data table shows the city population in thousands over a 40 year period.

Year	1970	1980	1990	2000	2010
Population (thousands)	219.5	268.0	326.5	397.5	485.0

a) Create a scatter plot, and draw a curve of best fit for the data using exponential regression.
b) Use your graph to estimate the population in 2015, to the nearest hundred people.

The population of a harmless bacteria growing in a Petri dish in the lab is modelled by the function

P(t) = 5000(2)^t/3

where P(t) represents the number of bacteria and t represents the time, in days, after the initial time.

Determine the time when the population is 40 000.

Select one:

a. 3 days

b. 6 days

c. 9 days

d. 24 days

An investment can be modelled by the following growth function, where x represents the time in years:

$y = 4800(1.03)^x$

What was the annual interest rate for the investment?

Select one:

a. 48%

b. 1.03%

c. 3%

d. 0.03%

Sophia has been given some money from her great aunt. She is going to put it into her bank account. The following function describes investing money (x represents the time in years).

$y = 2500(1.018)^x$

What was the principal invested by Sophia?

Select one:

a. $1250

b. $2500

c. $18

d. $1018

An investment can be modelled by the following growth function, where x represents the time in years:

$y = 775(1.024)^x$

What was the annual interest rate for the investment?

Determine the y-intercept of the exponential function $h(x) = 10\left(\frac{\pi}{3}\right)^x$.

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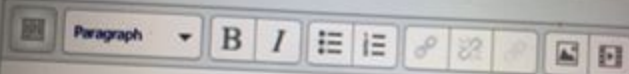
over time (days of use).

Days in Use	Probability of Failure
0	0
1	0.00995
2	0.0198
5	0.04877
10	0.095
18	0.16473
32	0.27385
43	0.34295
99	0.62842

Use the table above to answer the following question.

Use your TI-84 calculator to create an exponential re
exponential distribution [if it exists]. Round all values
change the decimals into percentage and include a sc
regression.
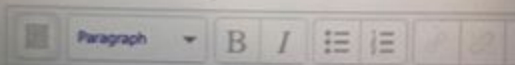
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○ a. y = 2(0.75)

A scatter plot is drawn using a data set.
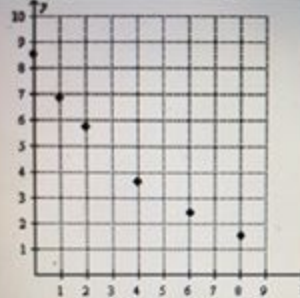
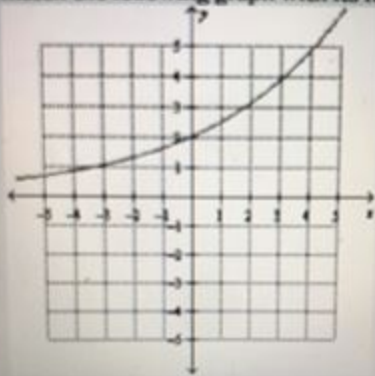Identify the equation of the curve of best fit.

Select one:
- ○ a. $y = 4.8(1.08)^x$
- ○ b. $y = 4.8(0.81)^x$
- ○ c. $y = 8.4(0.81)^x$
- ○ d. $y = 8.4(1.08)^x$

3   For the exponential function shown, estimate the x-valu

Match the following graph with its function.

Select one:

- a. $y = 3(0.5)^x$
- b. $y = 2(1.25)^x$
- c. $y = 0.5(3)^x$
- d. $y = 2(0.75)^x$

Use what you know about the exponential function $y = \left(\frac{1}{2}\right)^x$ to predict the number of x-

intercepts, the y-intercept, the end behaviour, the domain, and the range of the following

$$y = \left(\frac{1}{2}\right)^x + 5$$

(for the domain and range do include both notations)

Paragraph ▸ B I ≡ ≡ % ⅜

Which logarithmic equation correctly represents the exponential equation $10^7 = x$?

Select one:

a. $x = \log 7$

b. $x = \log 10$

c. $7 = \log x$

d. $10 = \log x$

Write $0.2 = \ln x$ as an exponential equation

Which function will have the fastest increase in the y-values?

Select one:

a. $y = 1 / 2 \; \ln x$

b. $y = 9 \ln x$

c. $y = 1 / 4 \ln x$

d. $y = 20 \ln x$

Which function will have the fastest decrease in the y-values?

Select one:

a. $y = -1/2 \log x$

b. $y = -2 \log x$

c. $y = -\log x$

d. $y = -5 \log x$

Recall that the graph of $y = 10^x$ is a reflection of the graph of $y = \log x$ about the line $y = x$.

a) Draw the reflection of $y = 10^{1/2x}$ about the line $y = x$. Is the reflection a logarithmic function? Include a diagram and your reasoning.

b) What function might this be a graph of? Explain your reasoning.

Use what you know about the exponential function to predict the number of x-intercepts, the number of y-intercepts, the end behaviour, the domain, and the range of the following function:
$y = 100 - \ln x$

What is the largest log value can you make in the form $a\log_b(c^d)$, where a,b,c,d are 2,0,1,or 9. Explain why you choose to place those values in that place.

Which value is the best estimate for $\log_3 100$?

Select one:

a. 4.2

b. 4.7

c. 5.2

d. 5.7

Evaluate the logarithmic expression $\log_{11} 1331$.

Select one:

a. 0

b. 1

c. 2

d. 3

Evaluate the logarithmic expression $\log_2 128$ without technology.

Evaluate the logarithmic expression $\log_7 343$ without technology.

Which expression has the greater value? Explain.

A: $\log_2 16 + \log_2 8$ **B:** $\log\left(\frac{1}{2}\right)\frac{1}{8} - \log\left(\frac{1}{2}\right)32$

Which expression is equivalent to $\ln 52 - \ln 13$?

Select one:

a. ln 39

b. ln 39e

c. ln 4

d. ln 4e

Write the following expression as a base 10 logarithm.

$\log_{105}\left(\frac{8}{11}\right)$

Determine the equation of the logarithmic regression function for the data.

x	1	2	3	4	5	6
y	0.0	3.2	4.5	5.0	5.4	5.6

Select one:

a. $y = 1.55 + 4.25 \ln x$

b. $y = 0.54 + 3.11 \ln x$

c. $y = 2.74 + 1.31 \ln x$

d. $y = -0.81 + 2.45 \ln x$

Use the equation of the logarithmic regression function for the data to describe the location of any intercepts. Round your answers to the nearest tenth.

x	2	5	20	50	100	1000
y	−3.5	−2.8	−1.7	−1.0	−0.5	1.3

Use logarithmic regression to extrapolate the value of y when $x = 32$. Round your answer to the nearest tenth.

x	2	4	6	10	15	20
y	9.0	11.6	13.2	15.1	16.6	17.7

The lengths of two sides of a right triangle are $\sqrt{\log 20}$ and $\sqrt{\log 5}$. Determine the length of the hypotenuse, x. Show your work.

The following data can be modelled with a logarithmic function.

x	2	4	6	10	15	25	40
y	12.0	9.5	7.9	6.0	4.5	2.6	0.86

a) Use logarithmic regression to model the data. Round all values to the nearest hundredth.

b) Interpolate the y-value when $x = 35$, to the nearest hundredth. Show your work.

c) Determine the x-intercept, to the nearest hundredth. Show your work.

Determine the concentration of hydrogen ions in bleach, with a pH of 12.8.

Recall that pH, $p(x)$, is defined by the equation

$p(x) = -\log x$

where the concentration of hydrogen ions, x, in a solution is measured in moles per litre.

Select one:

a. 1.3×10^{-13} mol/L

b. 1.6×10^{-13} mol/L

c. 1.3×10^{-12} mol/L

d. 1.6 x 10^{-12} mol/L

Solve the following equation to three decimal places.
$3(4)^{3x-1} = 750\ 000$

The altitude above sea level is modelled by the equation
$A(p) = 100\ 610 - 21\ 790\ \ln p$
where $A(p)$ represents the altitude in feet and p represents the atmospheric pressure in kilopascals (kPa).
Estimate the altitude of a town in Saskatchewan where the average atmospheric pressure is 93.8 kPa.

The equation of the logarithmic function that models a data set is $y = 43.9 - 8.7 \ln x$.

Determine the range of this function.

Select one:

a. $\{y \mid y \ \varepsilon \ R\}$

b. $\{y \mid y > 0, y \ \varepsilon \ R\}$

c. $\{y \mid y < 43.9, y \ \varepsilon \ R\}$

d. $\{y \mid y > -8.7, y \ \varepsilon \ R\}$

Examples of solutions		
pH = 0	acid used in car batteries	A neutral solution, such as distilled water, has a pH of 7. An acidic solution, such as pop, has a pH that is less than 7. The lower the pH, the more acidic the solution is. An alkaline solution, such as milk of magnesia, has a pH that is greater than 7. The higher the pH, the more alkaline the solution is.
pH = 1	acid secreted by lining of stomach	
pH = 2	lemon juice, vinegar	
pH = 3	grapefruit, orange juice, pop	
pH = 4	tomato juice, acid rain	
pH = 5	soft drinking water, black coffee	
pH = 6	saliva	An increase or decrease of one unit on the pH scale indicates a change in the hydrogen ion concentration by a factor of 10. For example, a solution with a pH of 4 has 10 times the hydrogen ion concentration of a solution with a pH of 5 and, as a result, is 10 times more acidic.
pH = 7	distilled water	
pH = 8	seawater	
pH = 9	baking soda	
pH = 10	milk of magnesia	
pH = 11	ammonia solution used in cleaning products	
pH = 12	soapy water	
pH = 13	bleaches, oven cleaner	
pH = 14	chemical used in liquid drain cleaner	

acidity increases in this direction

neutral

alkalinity increases in this direction

a) The acid used in the car batteries is _____ times as acidic as saliva

b) The acid in the stomach lining is _____ times acidic as grapefruit juice

c) Tea has pH level of 5.5 cola has a pH level of 2.5 cola is _____ times acidic as tea

Examples of solutions		
pH = 0	acid used in car batteries	A neutral solution, such as distilled water, has a pH of 7. An acidic solution, such as pop, has a pH that is less than 7. The lower the pH, the more acidic the solution is. An alkaline solution, such as milk of magnesia, has a pH that is greater than 7. The higher the pH, the more alkaline the solution is.
pH = 1	acid secreted by lining of stomach	
pH = 2	lemon juice, vinegar	
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pH = 7	distilled water	
pH = 8	seawater	
pH = 9	baking soda	
pH = 10	milk of magnesia	
pH = 11	ammonia solution used in cleaning products	
pH = 12	soapy water	
pH = 13	bleaches, oven cleaner	
pH = 14	chemical used in liquid drain cleaner	

acidity increases in this direction

neutral

alkalinity increases in this direction

Water from a tap has a pH of 6.6. How many times as acidic is this tap water as distilled water? Round to the nearest tenth. Show your work.

Choose the best estimate for 120° in radians.

Select one:

a. 2.1

b. 0.7

c. 2.8

d. 3.1

Imagine that it is now 2 p.m. What time will it be when the minute hand has rotated through 300°?

Select one:

a. 2:40

b. 2:50

c. 3:00

d. 3:10

Estimate, to the nearest radian, the measure of the central angle. Check your estimate with a protractor.
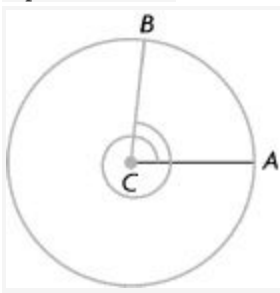
For the following pair of angle measures, determine which measure is greater. Explain your reasoning.
370°, 6.2

Before trying to hit a piñata, Shen is blindfolded and spun 2475°. Estimate the angle he must turn to face the piñata to the nearest tenth of a radian. Show your work.

Determine the amplitude of the following graph.
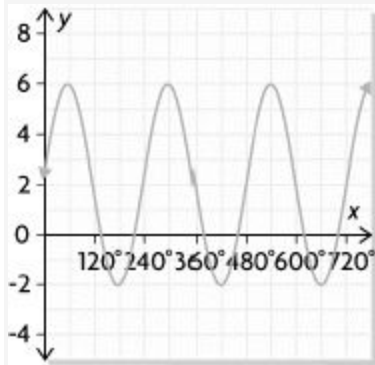
Select one:

a. 2

b. 3

c. 4

d. 5

Determine the range of the following graph
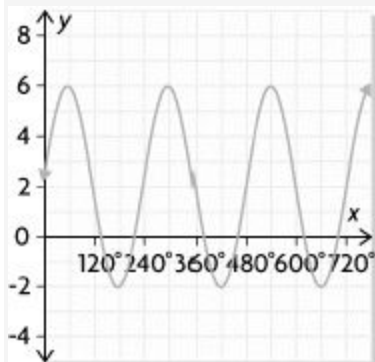
Select one:

a. {y | 0 £ y £ 8, y Î R}

b. {y | –2 £ y £ 6, y Î R}

c. {y | –4 £ y £ 8, y Î R}

d. {y | y Î R}

Match each graph with the corresponding equation below. Explain your answers.
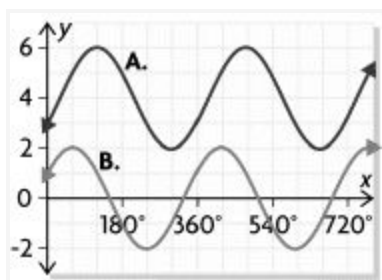
i) $y = 2 \cos (x - 120°) + 4$ **iv)** $y = 2 \cos (x - 120°)$

ii) $y = 2 \cos (x - 60°) + 4$ **v)** $y = 2 \cos (x - 60°)$

iii) $y = 2 \cos (x + 60°) + 4$ **vi)** $y = 2 \cos (x + 60°)$

Determine the range of the following graph
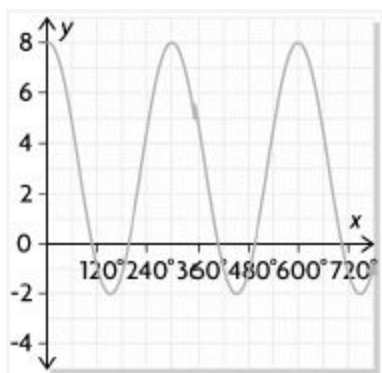
Identify the range of the graph of $y = 1 + \sin x$.

Select one:

a. $\{y \mid -1 \leq y \geq 1, y \in R\}$

b. $\{y \mid 0 \leq y\ 2, \leq y \in R\}$

c. $\{y \mid -1 \leq y \leq 2, y \in R\}$

d. $\{y \mid -2 \leq y \leq 2, y \in R\}$

Determine the midline of the following function.

$y = \dfrac{2}{5} \cos(x - pi)$

Determine the period of the following function.
$y = 5 \sin 1.5(x + 60°) - 5$

Determine the equation of the sinusoidal regression function for the data.

x	−5	−4	−3	−2	−1	0	1	2
y	0.8	1.5	1.8	1.4	0.8	0.0	−0.2	0.1

Select one:

a. $y = 1.0 \sin 0.8(x - 2.3) + 0.8$

b. $y = 1.0 \sin 0.8(x + 2.3) + 1.0$

c. $y = 0.8 \sin 1.0(x - 3.2) + 1.0$

d. $y = 0.8 \sin 1.0(x + 3.2) + 0.8$

Determine the equation of the function whose amplitude and period are both triple the amplitude and the period of this function:
$y = 2 \sin 6x + 1$
but the midline is 5 units below the midline of the original function. Show your work.

A sinusoidal graph has an amplitude of 10 and a maximum at the point (18, 5). Determine the midline of the graph.

Select one:

a. $y = 0$

b. $y = -5$

c. $y = 13$

d. $y = 8$

Determine the midline of the following function.

$$y = \cos^{\frac{1}{3}} x + 12$$

Select one:

a. $y = 12$

b. $y = 3$

c. $y = 4$

d. $y = 0$

The graph of a sinusoidal function is shown. Describe this graph by determining its range (both notations), the equation of its midline, and its amplitude. Show your work.
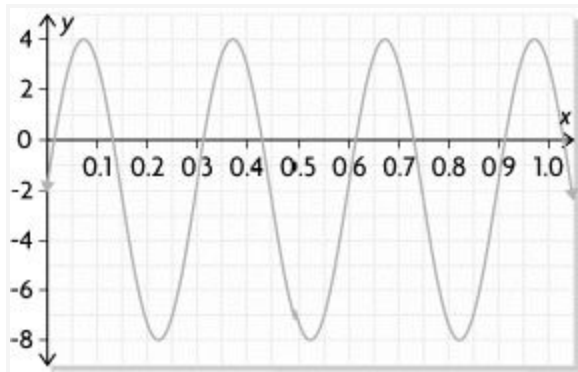
The graph of a sinusoidal function has a maximum at (4, 3) followed by a minimum at (8, 1).
a) Describe the graph of the function by stating the amplitude, equation of its midline, range (in both notations), and period. Show your work.

b) Determine the *y*-value of the function when *x* = 10. Show your work.
c) Determine the *y*-value of the function when *x* = 100. Show your work.

Meteorologists have been studying the trends of the amount of daylight (or sunlight) throughout the seasons. They have determined that the amount of daylight can be described by the sinusoidal function

$d(t) = 4.37 \cos 0.017t + 12.52$

where $d(t)$ represents the hours of daylight and t represents the number of days since June 20, 2012.

How many hours of daylight should be expected on August 20, 2012?

Select one:

a. 14.74 h

b. 14.89 h

c. 15.04 h

d. 15.19 h

A competitive gymnast's coach analyzes one particular series of jumps. These jumps can be modelled by the sinusoidal function

$h(t) = 11.5 \sin \dfrac{\pi t}{2} + 9.8$

where $h(t)$ represents the height of the gymnast in feet and t represents the time in seconds.
a) What is the maximum height of the gymnast jumps? Explain how you know.
b) How often does the gymnast jump? Explain how you know.

A ferris wheel creates a sinusoidal function when you compare the position of a seat to its height as it travels around. A function that describes this is

h(t) = 15.4 sin (2.3t − 1.4)+ 17.2

where h(t) represents the seat's height in metres and t represents the time in minutes.

How much higher is a person riding the ferris wheel after 30 s than at the start of the ride? Round your answer to the nearest tenth of a metre.

Determine the equation of the sinusoidal regression function for the data. Round values to the nearest tenth.

x	−5	−4	−3	−2	−1	0	1	2
y	−1.5	−22.5	−41.0	−53.0	−56.5	−51.0	−38.5	−19.5

The following data set is sinusoidal. Determine the missing value from the table.

x	1	2	3	4	5	6	7
y	−5	−8	−5	−2	−5	−8	

Select one:

a. −2

b. −5

c. −8

d. −11

The following data set is sinusoidal. Determine the missing value from the table.

x	4	8	12	16	20	24	28
y	124	135	124	113	124	135	

The following table gives the average depth of the water on an ocean port measured every 3 h for a day.

Time (h)	3	6	9	12	15	18	21	24
Depth (m)	2.0	2.5	2.9	3.1	2.7	2.2	1.8	1.7

a) Create a scatter plot, and draw a curve of best fit for the data using sinusoidal regression.
b) Determine the locations of two maximums and calculate the period of the graph, to the nearest minute. Show your work.

How do you decide where to use a sine function or a cosine function to model data that can be described with a sinusoidal function?

A restaurant offers Chinese, Thai, and Korean food. The following Venn diagram shows the types of food the customers like.
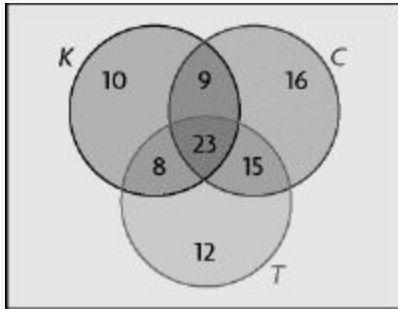
Use the diagram to determine

n(C∪T)

n(C∪T)

[remember to show workings to obtain full marks]

Select one:

a. 53

b. 15

c. 40

d. 83
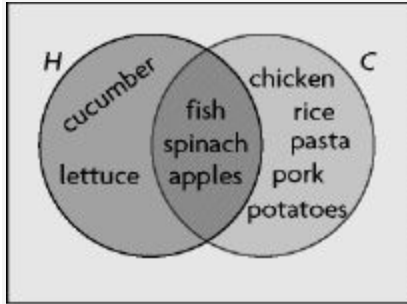
Determine
n(H∩C)

Select one:
a. 2
b. 5
c. 11
d. 3

Consider the following two sets:

• C = {−10, −8, −6, −4, −2, 0, 2, 4, 6, 8, 10}

• B = {−9, −6, −3, 0, 3, 6, 9, 12}

Determine C ∩ B

[remember to show workings to obtain full marks].

Select one:

a. {3, 6, 9, 12}

b. {−6, 0, 6}

c. {0}

d. {−6, 0, 6, 12}

Given the following situation:

• the universal set U = {positive integers less than 20}

• X = {4, 5, 6, 7, 8}

• P = {prime numbers of U}

• O = {odd numbers of U}

Which set represents the odd, prime numbers of set U?

[remember to show workings to obtain full marks]

Select one:

a. {0, 3, 5, 7, 11, 13, 17, 19}

b. {3, 5, 7, 11, 13, 17, 19}

c. {2, 3, 5, 7, 11, 13, 17, 19}

d. {1, 2, 3, 5, 7, 11, 13, 17, 19}

Some table games use a board, dice, or cards, or a combination of these. The following Venn diagram shows the number of games that use these tools.
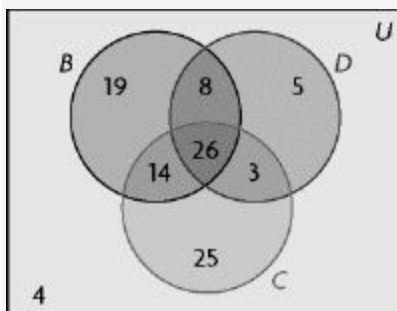
Use the diagram to determine $n(U)$.

[remember to show workings to obtain full marks]

Select one:

a. 100

b. 104

c. 97

d. 88

A new fusion restaurant serves Chinese, Korean and Thai dishes. The following Venn diagram shows the types of food the customers like.
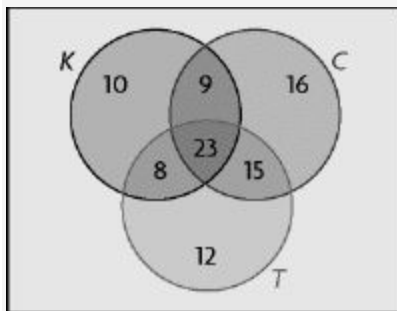
Use the diagram to determine $n(C) - n(T)$.

[remember to show workings to obtain full marks]

Select one:

a. 5

b. 4

c. 10

d. 15

Consider the following Venn diagram of foods we eat raw or cooked:

Determine n(H U C).

[remember to show workings to obtain full marks]

Select one:

a. 2

b. 5

c. 10

d. 3

Consider the following Venn diagram of herbivores and carnivores:
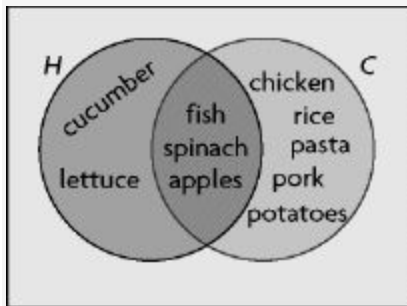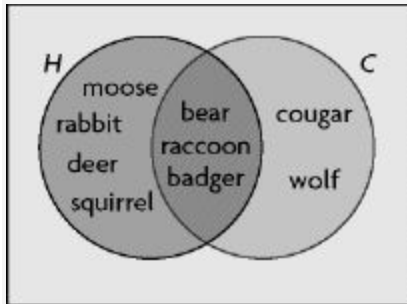
Determine $n(H \cup C)$.

[remember to show workings to obtain full marks]

Select one:

a. 2

b. 9

c. 4

d. 3

Consider the following Venn diagram of foods we eat raw or cooked:
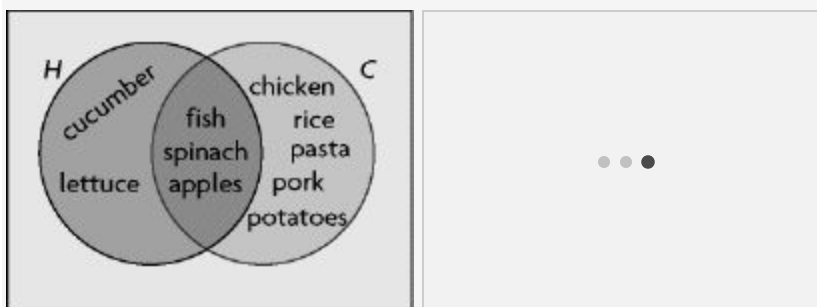
Determine H U C.

[remember to show workings to obtain full marks]

Select one:

a. {fish, spinach, apples, cucumber, lettuce, chicken, pork, rice, pasta, potatoes}

b. {chicken, pork, rice, pasta, potatoes}

c. {cucumber, lettuce}

d. {fish, spinach, apples}

An adventure summer camp offers canoeing, rock climbing, and archery. The following Venn diagram shows the types of activities the campers like.
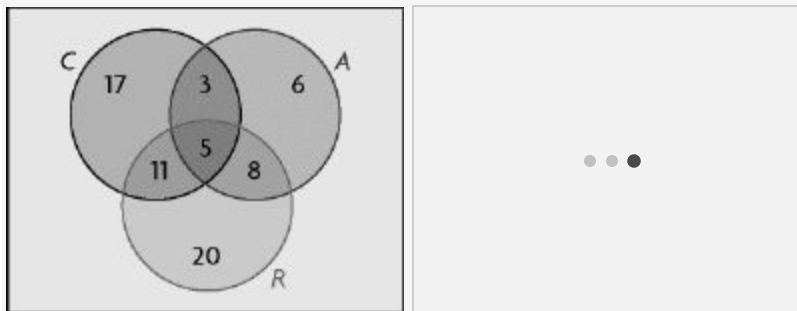
Use the diagram to determine $n((R \cap A) \setminus C)$.

[remember to show workings to obtain full marks]

Select one:

a. 14

b. 5

c. 26

d. 8

There are Three Sets

R ={natural numbers less than 50}

S ={even numbers}

T ={10, 20, 30, 40}

Which of the following statements is **NOT** true for sets R, S, and T?

[remember to show workings to obtain full marks]

Select one:

a. (R ∩ S) ⊂ T

b. T⊂ (R ∩ S)

c. (R ∩ T) ⊂ T

d. T ⊂ (R ∩ T)

A group of 100 students was surveyed about movies that they have seen, as shown below.

  2 people saw all three movies

12 people saw "Metal Man" and "The Princely Groom"

53 people saw "Metal Man"

10 people saw "Metal Man" and "Quick and Angry 8"

18 people saw "The Princely Groom" only

23 people saw "The Princely Groom" and "Quick and Angry 8"

  6 people did not see any of the movies

Jason started to organize the results in the Venn diagram shown below.
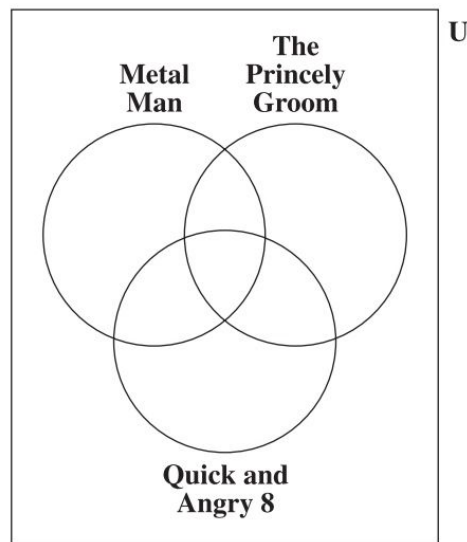
The number of people who saw "The Princely Groom" is

[remember to show workings to obtain full marks]

Select one:

a. 20

b. 55

c. 53

d. 18

e. 51

A group of 100 students was surveyed about movies that they have seen, as shown below.

  2 people saw all three movies

12 people saw "Metal Man" and "The Princely Groom"

53 people saw "Metal Man"

10 people saw "Metal Man" and "Quick and Angry 8"

18 people saw "The Princely Groom" only

23 people saw "The Princely Groom" and "Quick and Angry 8"

  6 people did not see any of the movies

Jason started to organize the results in the Venn diagram shown below.
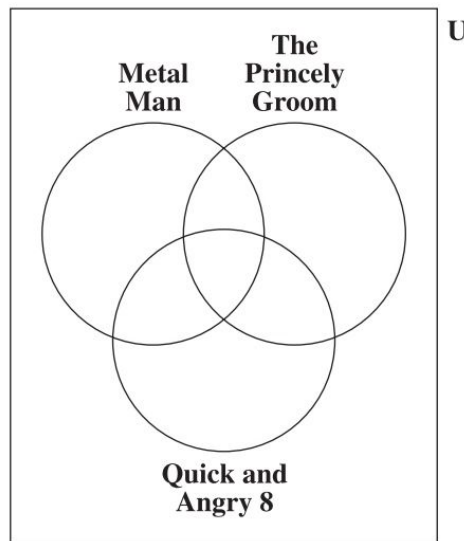
The number of students who saw "Metal Man" and "The Princely Groom" but not "Quick and Angry" is

Answer

On a hot summer day, Landon and Mariah ate seven Popsicles.
With the sticks left over, they challenged themselves to the
following game:

On a hot summer day, Landon and Mariah ate seven Popsicles.
With the sticks left over, they challenged themselves to the
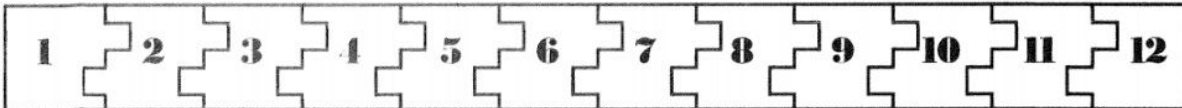following game:

- Each player alternates turns picking up one, two, or three
  consecutive sticks.
- The sticks must be picked up in order from left to right.
- Player one starts with the first stick on the left side.
- The player who picks up the last stick loses.
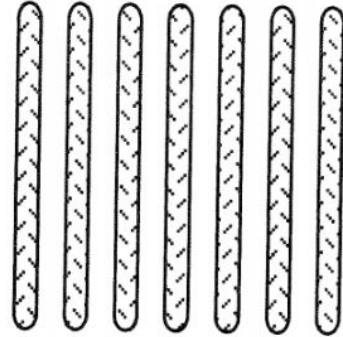
Landon starts the game by picking up one stick. The number of sticks Mariah must pick up to force a win is

⚠️

The leader at summer camp challenged the campers to a math game made out of interlocking foam tiles, as shown.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

The game is played in the following manner:
- Two campers take turns pulling up any number of tiles on one turn.
- Any tile(s) can be picked up as long as they are not adjacent to one another.
- The last player to pick up a tile wins the game.

[remember to show workings to obtain full marks]

Select one:

a. tile 5

b. tile 6 and tile 12

c. tile 6

The object of Hitori is to blackout squares so that the following goals are achieved:

1) There are no more than one of any particular digit in the unblackened (or "clear") squares of any row or column;

2) No two blackened squares touch each other horizontally or vertically {they can and often do touch diagonally); and

3) All of the clear squares form one contiguous region. This means that you can make a path consisting of only clear squares that connects any clear square to any other one using only horizontal and vertical steps.

This is equivalent to saying (hat diagonally adjacent blackened squares cannot form a wall that produces an "island" of clear squares isolated from the rest of the clear squares. For example, if a wall of blackened squares needs just one more square to extend from one side of the diagram to another — thus severing one clear region from another — you'll know that this remaining square must remain clear. Solvers often find it useful to circle the numbers in such clear squares to help keep track of what has been determined.

Solve the following Hitori grid by copying the grid with the blackouts.

| 3	1	3	4	5
2	1	5	1	3
1	5	4	3	2
2	4	4	2	3
3	2	1	4	4

A pattern of pictures is shown below. The first picture is the original. In each subsequent picture, each shaded square has stayed in the same place or moved to a square horizontally, vertically, or diagonally adjacent to its previous location. The shaded square undergoes the same movement in each subsequent step.

a.

b.

c.
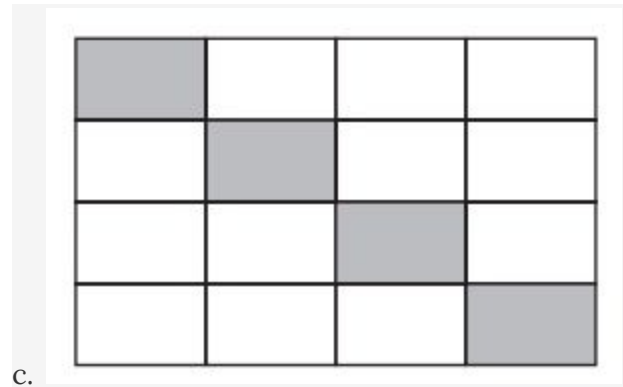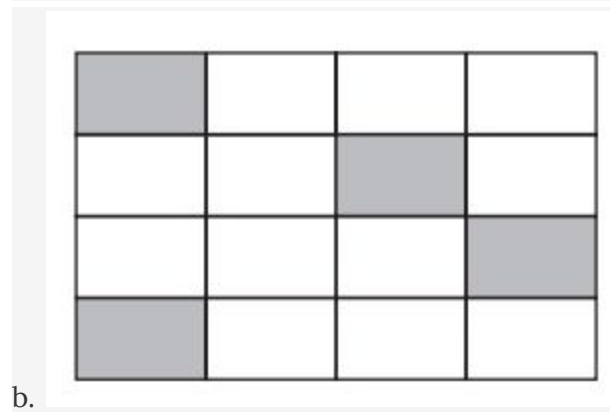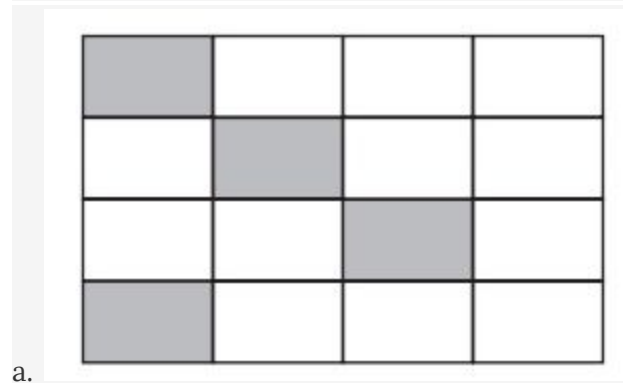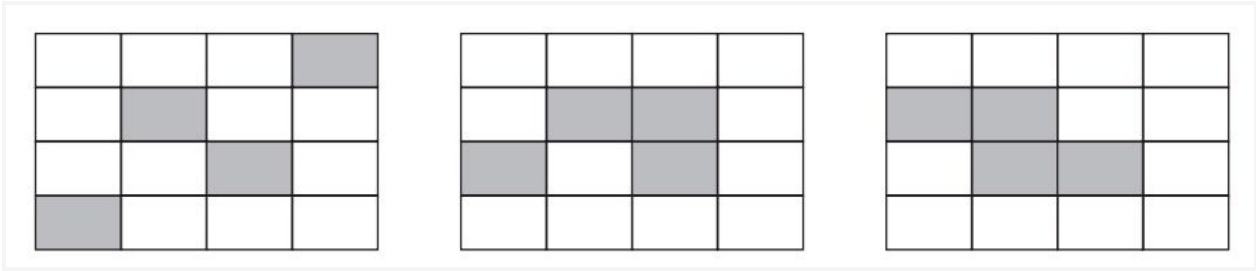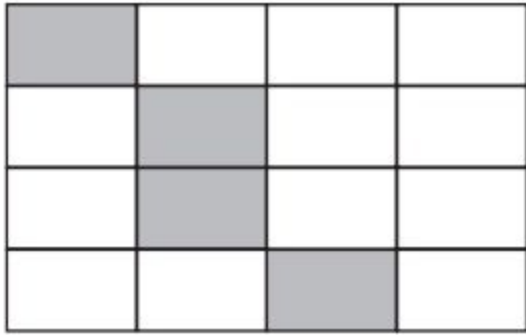
d.

Pat and Jamie line up five custom-painted billiard balls in a row, with each of the balls touching one another as illustrated in the diagram.
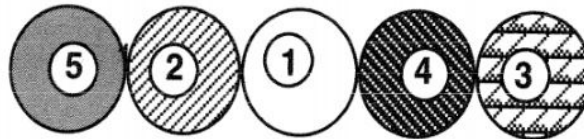
Jamie and Pat agree on the following game:
On each turn, a player may pick up as many billiard balls as they would like, so long as the balls are not touching each other. The winner is the player who picks up the last ball.

If Jame starts the game, then the billiard ball that must be removed first if he is to guarantee himself a win is billiard ball number_____

[remember to show workings to obtain full marks]

Select one:

a. 1

b. 2

c. 3

d. 4

e. 5

The city surveyed 3000 people about how they travel to work.
• 1978 took public transit (P)
• 1494 drove (D)
• 818 cycled (C)
• 731 took public transit and drove only
• 298 took public transit and cycled only
• 27 drove and cycled only
• 164 used all three modes of transportation
How many people use two modes of transportation? Use a Venn diagram to show your answer.

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• 731 took public transit and drove only
• 298 took public transit and cycled only
• 27 drove and cycled only
• 164 used all three modes of transportation
How many people travel to work some other way? Use a Venn diagram to show your answer.

A music school offers lessons on 8 different instruments.

piano	bagpipe
recorder	harmonica
violin	xylophone
steel drum	banjo

Determine the number of instruments with either more than 6 letters in their name or end in a vowel

(L∪V)

(L∪V)

[remember to show workings to obtain full marks]

The card game Uno has cards divided into 4 colours: red, blue, green, and yellow. For each colour, there are 19 number cards and 6 action cards. There are also 8 special black action cards.
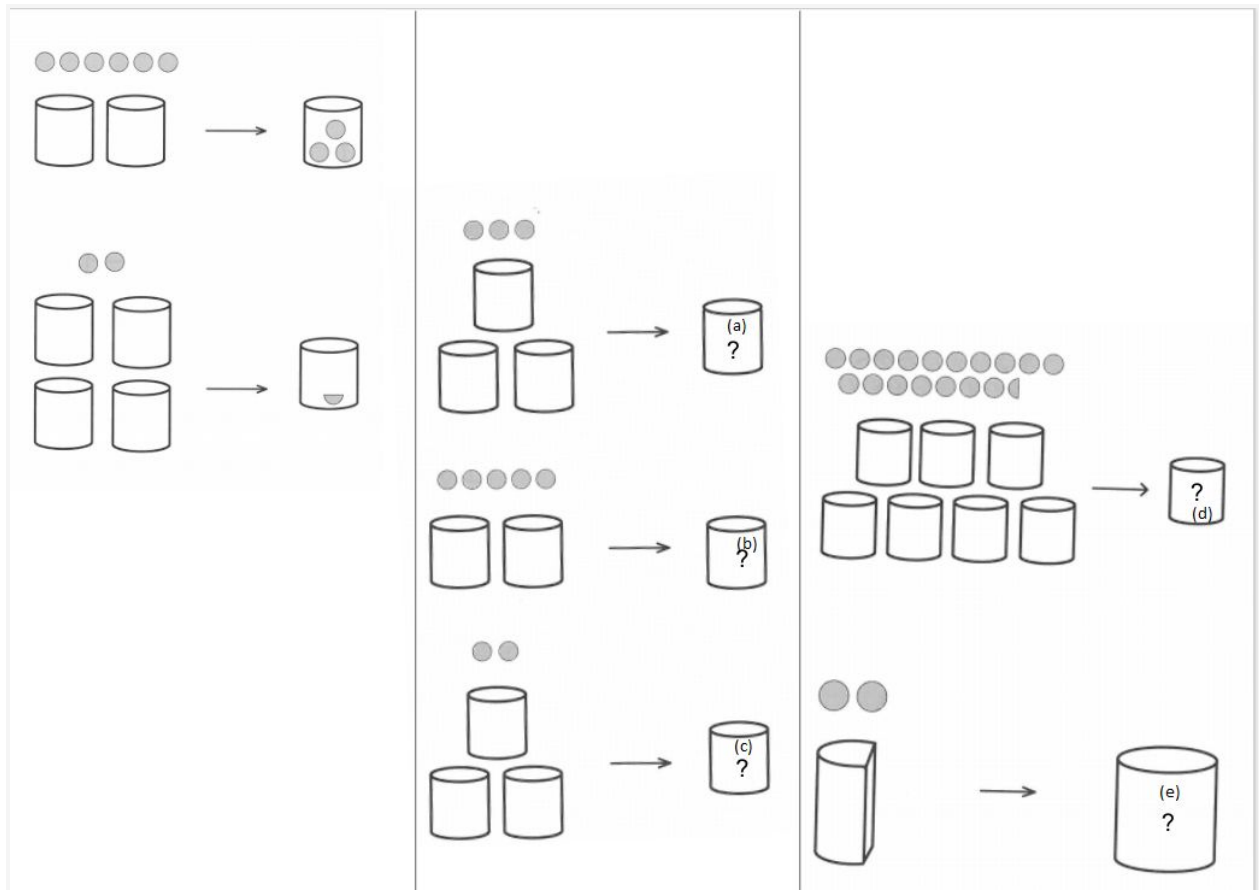
Determine the following amounts.

a) $n(D)$, the total number of cards in the deck

b) $n(A)$, the total number of action cards in the deck

c) $n(G)$, the total number of green cards in the deck

d) $n(N)$, the total number of number cards in the deck

e)
n(A∪G)
n(A∪G)

f)
n(G∩N)

The children's matching game includes several pairs of identical cards. There are 10 pairs of animal cards, half with a blue background and half with a red background. There are 8 pairs of food cards, half with a yellow background and half with a red background. There are also 4 pairs of people cards with a blue background and 3 pairs of toy cards with a yellow background.

Determine the following amounts.

a) $n(D)$, the total number of cards in the deck

b) $n(A)$, the total number of animal cards in the deck

c) $n(R)$, the total number of red cards in the deck

d) $n(B)$, the total number of blue cards in the deck

e)
n(A∪B)
n(A∪B)

f)
n(R∩A