

**Grade 11  
Advanced**

**M  
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**معاً  
نتفوق**

**Term  
3**

**2020  
2021**

# Final Revision

انتظرونا قريباً يوم السبت 4:30 مساءً ويوم الاختبار 7:30 صباحاً

**100 Questions**

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معاً نتفوق (Math only)  
WhatsApp group



<https://cutt.us/GRADE11AD>



<https://cutt.us/w8LYu>



1

Which of the following is a characteristic of a negatively-skewed distribution?

- a) The mean is less than the median.
- b) The mean is greater than the median.
- c) The majority of the data are on the left of the mean.
- d) The mean and median are approximately equal.

2

At Khawla's telemarketing job, 15 % of the calls that she makes to potential customers result in a sale. She makes 20 calls in a given hour. What is the probability that 5 calls result in a sale?

- a) 6.7 %
- b) 10.3 %
- c) 8.3 %
- d) 11.9 %

3

In a normal distribution with standard deviation  $\sigma = 4$  and  $X = 24$ , what is the value of the mean  $\mu$  if  $z = -1.25$ ?

- a)  $\mu = 16$
- b)  $\mu = 29$
- c)  $\mu = 6.3$
- d)  $\mu = 19$

4

Which function is an even function?

a)  $f(x) = x^3 - 3x^2$

b)  $f(x) = x^4 - 3x^2$

c)  $f(x) = \frac{3}{x}$

d)  $f(x) = \sqrt{x-2}$

5

State the domain of the function  $g(x) = \frac{8x}{\sqrt{2x+6}}$ 

a)  $[0, \infty)$

b)  $(3, \infty)$

c)  $(-3, \infty)$

d)  $[-3, \infty)$

6

Which function has an infinite discontinuity?

a)  $f(x) = x^5 - x^2$

b)  $f(x) = \frac{1}{2x-9}$

c)  $f(x) = \begin{cases} 2 & \text{if } x < 0 \\ 3 & \text{if } x \geq 0 \end{cases}$

d)  $f(x) = \frac{x^2 - 49}{x - 7}$

7

The average age of the visitors to a museum is 40.7. Assume that the distribution is normal with a standard deviation of 2.3.

The probability that the age of a randomly selected visitor is less than 40 =

- a) 38%                                      b) 8.7%
- c) 83%                                      d) - 0.30
- 

8

The average age of the visitors to a museum is 40.7. Assume that the distribution is normal with a standard deviation of 2.3.

If a sample of 20 visitors is selected, the probability that the mean age of the sample will be less than 40 =

- a) 38%                                      b) 8.7%
- c) 83%                                      d) - 0.30
- 

9

You are recording the weight, in Kgs, of a group of 50 people. In this dataset, the average weight is 60 kg, and the standard deviation is 4 kg. What percentage of the people's weight is there in the range of 52-68 Kgs? The dataset is normally distributed.

- a) 34%                                      b) 68%
- c) 95%                                      d) 99%

10

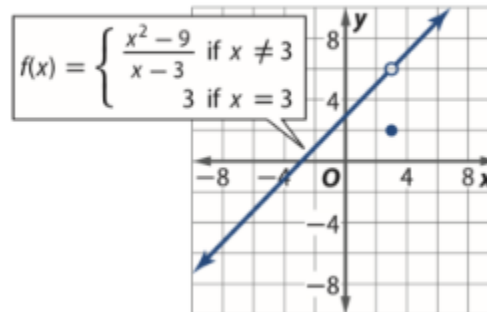
Find  $f(-9)$  for  $f(x) = \begin{cases} -3|x+5| & \text{if } x < 1 \\ -9 & \text{if } x \geq 1 \end{cases}$ .

- a)
- b)
- c)
- d)

11

What is the type of discontinuity at  $x = 3$ ?

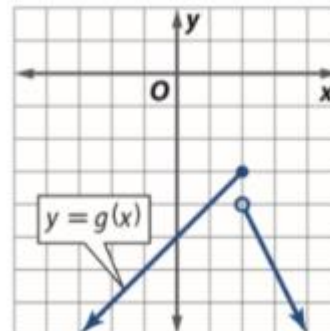
- a)
- b)
- c)
- d)



12

Use the graph of  $g(x)$  to find the domain and range of the function.

- a)
- b)
- c)
- d)



13

Determine the coordinates of the absolute extremum of the function  $f(x) = 2(x + 3)^2 + 5$  and state whether it is a maximum or minimum value.

- a)  $(-3, 5)$ ; maximum                      c)  $(-3, 5)$ ; minimum  
b)  $(3, 5)$ ; maximum                      d)  $(3, 5)$ ; minimum

14

Find the average rate of change of the function  $g(x) = 3x^2 - 8x + 2$  on the interval  $[-2, 0]$

- a) 14                      c) -15  
b) -14                      d) -2

15

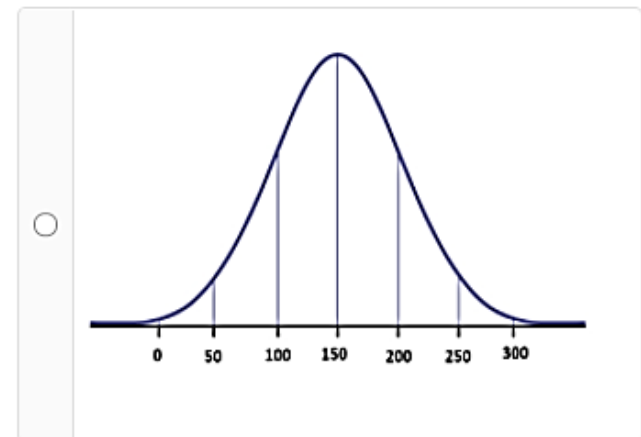
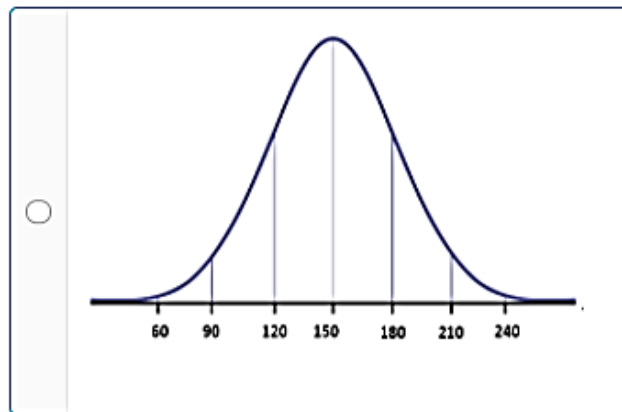
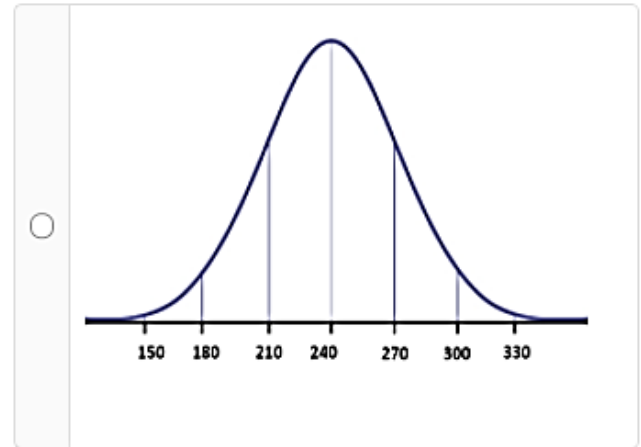
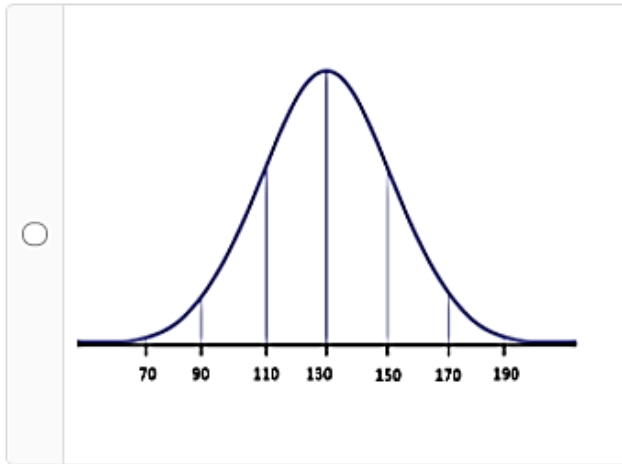
Given that  $f(x) = x^2 + 5x + 6$  and  $g(x) = x + 2$ , find  $(f + g)(x)$ .

- a)  $(f + g)(x) = x^2 + 4x + 4$                       c)  $(f + g)(x) = x^2 + 4x + 8$   
b)  $(f + g)(x) = -x^2 - 4x - 4$                       d)  $(f + g)(x) = x^2 + 6x + 8$



16

The trunk diameter of a certain variety of an oak tree is normally distributed with a mean of 150 cm and a standard deviation of 30 cm. Which normal curve describes the distribution?



17

A school is starting a peer tutoring ECA club. The school's focus is on students whose scores fall in the outside 15% of the data set. Some of these students will be supporting the others. The scores are normally distributed with a mean,  $\mu$  of 85% and a standard deviation of 10.

The school's focus is on students whose scores are between

a) 60.3 and 88.2

b) 69.1 and 88.5

c) 70.7 and 90.3

d) 70.7 and 98.3

18

If  $f(x) = \sqrt{4x}$ , find  $g(x)$  so that  
 $[g \circ f](x) = 200x + 25$ .

a)

$$g(x) = 50x + 25$$

c)

$$g(x) = 50x^2 + 25$$

b)

$$g(x) = \sqrt{800x + 25}$$

d)

$$g(x) = 50x^2$$

19

Find the inverse of  $f(x) = 2\sqrt{x} - 3$ .

a)

$$f^{-1}(x) = \frac{1}{2}\sqrt{x} + 3; x \geq 0$$

c)

$$f^{-1}(x) = \left(\frac{x+3}{2}\right)^2; x \geq 3$$

b)

$$f^{-1}(x) = \left(\frac{x-3}{2}\right)^2; x \geq 3$$

d)

$$f^{-1}(x) = \frac{1}{2}\sqrt{x} - 3; x \geq 0$$

20

Find the value  $\lim_{x \rightarrow 2} \frac{2x^2 - x - 15}{x - 3}$ .

a)

$$\frac{1}{9}$$

c)

$$9$$

b)

$$-9$$

d)

$$-\frac{1}{9}$$

21

Find the value  $\lim_{x \rightarrow \infty} \frac{-3x^2 + 7}{5x + 1}$ .

a)

$$0$$

c)

$$-\infty$$

b)

$$2$$

d)

$$\infty$$



22

Suppose the width in millimeters of an animal's pupil is given by

$d(x) = \frac{152x^{-0.45} + 85}{4x^{-0.45} + 10}$ , where  $x$  is the illuminance of the light shining on the pupils measured in lux.

Find the width of the animal's pupils when the light is at its maximum illuminance.

a)  $\lim_{x \rightarrow \infty} \frac{152x^{-0.45} + 85}{4x^{-0.45} + 10} = 8.5 \text{ mm}$

b)  $\lim_{x \rightarrow 0} \frac{152x^{-0.45} + 85}{4x^{-0.45} + 10} = 38 \text{ mm}$

c)  $\lim_{x \rightarrow 0} \frac{152x^{-0.45} + 85}{4x^{-0.45} + 10} = 8.5 \text{ mm}$

d)  $\lim_{x \rightarrow \infty} \frac{152x^{-0.45} + 85}{4x^{-0.45} + 10} = 38 \text{ mm}$

23

Find the width of the animal's pupils when the light is at its minimum illuminance.

a)  $\lim_{x \rightarrow 0} \frac{152x^{-0.45} + 85}{4x^{-0.45} + 10} = 8.5 \text{ mm}$

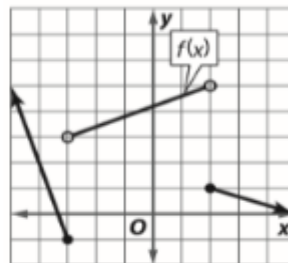
b)  $\lim_{x \rightarrow \infty} \frac{152x^{-0.45} + 85}{4x^{-0.45} + 10} = 38 \text{ mm}$

c)  $\lim_{x \rightarrow 0} \frac{152x^{-0.45} + 85}{4x^{-0.45} + 10} = 38 \text{ mm}$

d)  $\lim_{x \rightarrow \infty} \frac{152x^{-0.45} + 85}{4x^{-0.45} + 10} = 8.5 \text{ mm}$

24

Consider the graph of  $y = f(x)$  shown. What is the  $\lim_{x \rightarrow -3^-} f(x)$ ?



a)  $-1$

b) The limit does not exist.

c)  $0$

d)  $3$

25

The exam score are normally distributed with  $\mu = 77$  and  $\sigma = 7$ . Hamda expects to earn a grade in the middle 80% of the distribution. What range of scores fall in this category?

Hamda expects to score between

a) 69 and 85

b) 69 and 90

c) 55 and 85

d) 67 and 92

26

The height of grade 11 boys in UAE is approximately normally distributed with a mean of 180 cm and a standard deviation of 7 cm. What is the probability that a randomly chosen 11th grade boy would be taller than 170 cm?

a) 0.9222

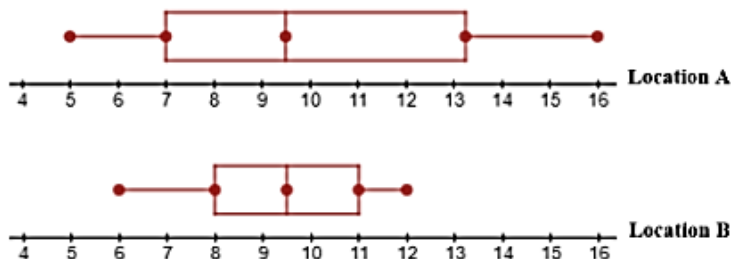
c) 0.4234

b) 0.0766

d) -1.4286

27

Compare the two distributions.



a) The five-number summaries are used to compare the two distributions

c) Both box-and-whisker plots are symmetric.

b) The mean and standard deviation are used to compare the two distributions

d) Both distributions have the same mean but a different median

28

Find the slope of the line tangent to the graph of function if  $y = x^2 + 4$  at the point  $(-1, 5)$ .

a)

-2

c)

8

b)

2

d)

0

29

Find the derivative of  $f(x) = (3x^4 + 2x)(5 + 3x)$ .

a)

$$f'(x) = (-3)(3x^4 + 2x) + (12x^3 + 2)(5 + 3x)$$

b)

$$f'(x) = (12x^3 + 2)(5 + 3x) + (5)(3x^4 + 2x)$$

c)

$$f'(x) = (12x^3 + 2)(5 + 3x) + 3(3x^4 + 2x)$$

d)

$$f'(x) = (12x^3 + 2)(-3)$$

30

Determine the coordinates of the absolute extremum of the function  $f(x) = 2(x - 3)^2 + 5$  and state whether it is a maximum or minimum value.

a)

قيمة صغرى  $(-3, 5)$   
 $(-3, 5)$ ; minimum

c)

قيمة عظمى  $(-3, 5)$   
 $(-3, 5)$ ; maximum

b)

قيمة صغرى  $(3, 5)$   
 $(3, 5)$ ; minimum

d)

قيمة عظمى  $(3, 5)$   
 $(3, 5)$ ; maximum

31

Find the average rate of change of the function  $g(x) = 3x^2 - 8x + 2$  on the interval  $[0, 2]$ .

a)

2

c)

-2

b)

-4

d)

-1

32

Given that  $f(x) = x^2 + 5x + 6$  and  $g(x) = x + 2$ , find  $(f - g)(x)$ .

a)

$$(f - g)(x) = x^2 + 4x + 4$$

c)

$$(f - g)(x) = x^2 + 5x + 8$$

b)

$$(f - g)(x) = x^2 + 4x + 8$$

d)

$$(f - g)(x) = -x^2 - 4x - 4$$

33

If  $f(x) = \sqrt{4x}$ , find  $g(x)$  so that  $[f \circ g](x) = |6x|$ .

a)

$$g(x) = 36x^2$$

c)

$$g(x) = -3x^2$$

b)

$$g(x) = 9x^2$$

d)

$$g(x) = \sqrt{24x}$$

34

Find the inverse of  $f(x) = 2\sqrt{x} + 3$ .

a)

$$f^{-1}(x) = \frac{1}{2}\sqrt{x} + 3; x \geq 0$$

c)

$$f^{-1}(x) = \left(\frac{x+3}{2}\right)^2; x \geq 3$$

b)

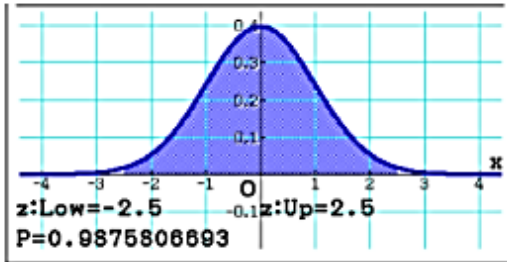
$$f^{-1}(x) = \left(\frac{x-3}{2}\right)^2; x \geq 3$$

d)

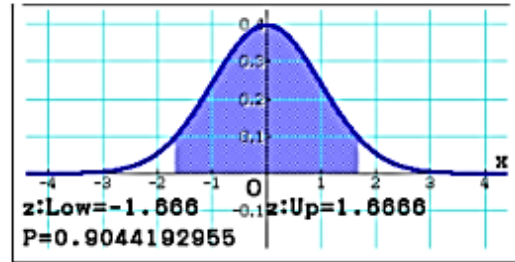
$$f^{-1}(x) = \frac{1}{2}\sqrt{x} - 3; x \geq 0$$

The marks of a class on a math test are normally distributed with  $\mu = 80$  and  $\sigma = 6$ . Find the probability that a randomly selected mark will be between 70 and 90, and use a graphing calculator to sketch the corresponding area under the curve.

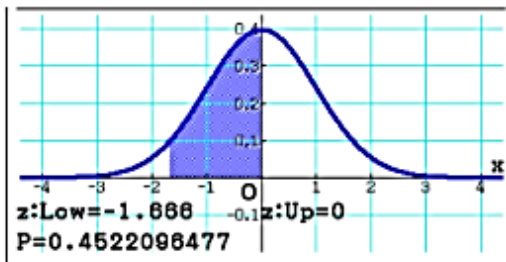
a)



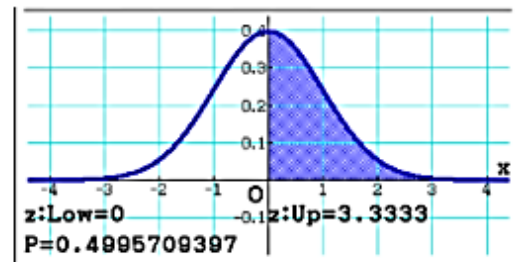
b)



c)



d)



X is a random variable representing each prize value what amount Khaled can win when spinning one time the wheel at the right. All prizes are equally likely to occur.

What is the expected value of Khalid's winnings? AED

a) 120

b) 150

c) 140

d) 175



37

Find the value  $\lim_{x \rightarrow -\infty} \frac{6x^2 - x}{3x^3 + 1}$ .

a)

 $\infty$ 

c)

2

b)

 $-\infty$ 

d)

0

38

Find the value  $\lim_{x \rightarrow 25} \frac{x-25}{\sqrt{x}-5}$ .

a)

0

c)

10

b)

 $\frac{1}{10}$ 

d)

 $\infty$ 

38

Use the graph of  $g(x)$  to find the domain and range of the function.

a)

 $D = \{x|x \in \mathbb{R}\}, R = (-\infty, -3]$ 

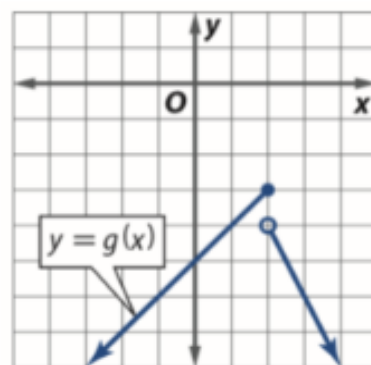
b)

 $D = (-\infty, 2], R = (-3, \infty)$ 

c)

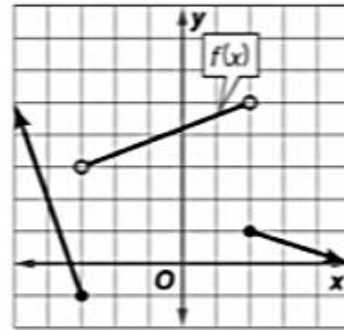
 $D = (-\infty, -3), R = \{x|x \in \mathbb{R}\}$ 

d)

 $D = [2, \infty), R = (-\infty, -3)$ 

39

Consider the graph of  $y = f(x)$  shown. What is the  $\lim_{x \rightarrow 2^+} f(x)$ ?



a)

0

c)

5

b)

النهاية غير موجودة.

The limit does not exist.

d)

1

40

Find the slope of the line tangent to the graph of function if  $y = x^2 + 4$  at the point  $(-2, 8)$ .

a)

-4

c)

0

b)

8

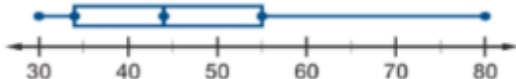
d)

4

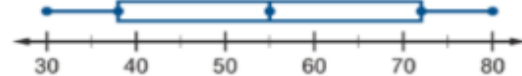
3

Which of the following displays a data set that is positively skewed?

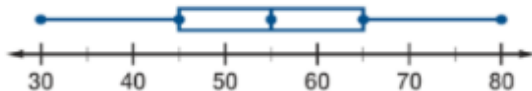
a)



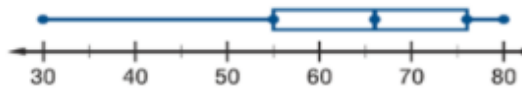
c)



b)



d)





41

Describe the function  $y = x^4 + 2x^2 - 5$ .

a) not a function

c) odd function

b) even function

d) a function that is neither odd nor even

42

X represents the number of heads after three flips of a fair coin. What is true about the theoretical probability distribution of this random variable?

a)  $P(X = 2) = \frac{1}{2}$ 

b) The possible values of X are 0, 1, and 2

c) The possible values of X are 1, 2 and 3

d)  $P(X = 2) = \frac{3}{8}$ 

43

If you guess the answers on all 8 questions of a true/false quiz, what is the probability that exactly 5 of your answers will be correct?

a)  $\frac{7}{32}$ c)  $\frac{3}{125}$ b)  $\frac{7}{64}$ d)  $\frac{7}{16}$

44

Evaluate  $\lim_{x \rightarrow 3} \frac{x^2 - 8x + 15}{x - 3}$ .

a)

8

c)

2

b)

-2

d)

-8

45

Find an expression for the slope of the graph of  $y = 2x^3$  at any point.

a)

$$m = \frac{2}{3}x^2$$

c)

$$m = 6x^2$$

b)

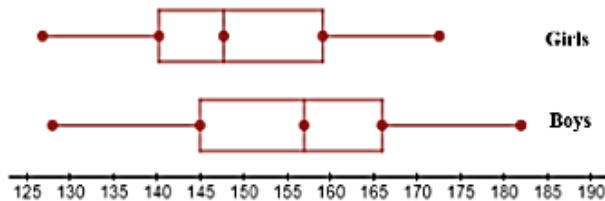
$$m = 2$$

d)

$$m = 6x$$

45

The heights of the boys and the girls in a class of fourteen-years-old are represented by the Box-and-Whisker Plots. What is true about these distributions?



a)

The medians of both distributions are equal

b)

You can find a boy shorter than the shortest girl

c)

almost 50% of the boys are taller than 75% of the girls

d)

Both distributions are positively skewed

46

Which of the following studies is conducted without a sample?

a) An observational study

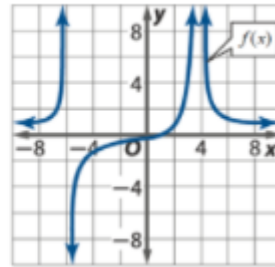
c) An experiment

b) A survey

d) A census

47

Estimate  $\lim_{x \rightarrow 4} f(x)$ , using the graph below.



a) 0

c)  $-\infty$

b) 4

d)  $\infty$

48

Find the derivative of the function

$$f(m) = \frac{5-2m}{5+2m}.$$

a)  $f'(m) = -\frac{8m}{(5+2m)^2}$

c)  $f'(m) = \frac{20-8m}{(5+2m)^2}$

b)  $f'(m) = -\frac{20}{(5+2m)^2}$

d)  $f'(m) = \frac{20+8m}{(5+2m)^2}$

49

Find an equation for the instantaneous velocity  $v(t)$  if the path of an object is defined as  $s(t) = t^3 - 5t^2 + t$  for any point in time  $t$ .

a)  $v(t) = 3t^2 - 10t - 1$

c)  $v(t) = 3t^2 - 10t + 1$

b)  $v(t) = 3t^2 - 10t$

d)  $v(t) = t^2 - 10t + 1$

50

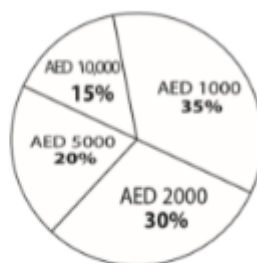
Find the expected value of winning one of the following prizes:

a) AED 2,100

b) AED 3,450

c) AED 1,950

d) AED 3,000



51

Evaluate  $\lim_{x \rightarrow \infty} \frac{8x^3 - 6x^2 + 1}{2x^3 + x}$ .

a) 1

c) -3

b) 4

d) 8

52

Find an equation for the instantaneous velocity  $v(t)$  if the path of an object is defined as  $s(t) = t^3 - 5t^2 + t$  for any point in time  $t$ .

a)  $v(t) = 3t^2 - 10t - 1$

c)  $v(t) = 3t^2 - 10t + 1$

b)  $v(t) = 3t^2 - 10t$

d)  $v(t) = t^2 - 10t + 1$

53

Find the mean of the probability distribution shown below.

| $X$    | 0   | 1    | 2    | 3   | 4   | 5   |
|--------|-----|------|------|-----|-----|-----|
| $P(X)$ | 0.2 | 0.15 | 0.05 | 0.2 | 0.3 | 0.1 |

a)  $\mu = 3.55$

b)  $\mu = 1.55$

c)  $\mu = 4.55$

d)  $\mu = 2.55$

54

80% of the daily visitors to a shopping mall make purchases. If 150 people visited on Thursday, the probability that exactly 120 of them make purchases is

a)  ${}_{150}C_{120}(0.8)^{120}(0.2)^{30}$

b)  ${}_{150}C_{120}(0.8)^{120}$

c)  ${}_{150}C_{120}(0.8)^{30}(0.2)^{120}$

d)  ${}_{150}C_{80}(0.2)^{120}(0.8)^{30}$

55

A survey of students finds that 75% of students have an indoor plant at their home. You take a random sample of 40 students. Find the mean and standard deviation of the normal approximation of the binomial distribution.

a)  $\mu = 30$        $\sigma = 2.74$

b)  $\mu = 2.74$        $\sigma = 30$

c)  $\mu = 40$        $\sigma = 2.74$

d)  $\mu = 30$        $\sigma = 4.72$

56

Evaluate  $\lim_{x \rightarrow 1} (-x^2 + 5x - \sqrt{x})$ .

a)

5

c)

2

b)

3

d)

4

57

A survey of employees finds that 70% have worked for the organization more than 5 years. You take a random sample of 30 employees. You want to find the probability that less than 20 employees in your sample have worked for the organization more than 5 years. Write this probability in probability notation with the continuity factor included.

a)

 $P(X < 20.5)$ 

c)

 $P(X > 20.5)$ 

b)

 $P(X > 19.5)$ 

d)

 $P(X < 19.5)$ 

58

If  $h(x) = x^2 + 8x - 4$ , find  $h(-2)$ .

a)

-24

c)

-12

b)

-16

d)

-8

59

The mean mass for a group of camels is 335 kilograms. Assume this variable is normally distributed with a standard deviation of 15 kilograms. If a random sample of 20 camels is taken and the sample mean is 341 kilograms, what is the z-value of the sample mean?

The z-value of the sample mean is

a) -1.79

b) 0.4

c) -0.4

d) 1.79

60

Which of the following is an even function?

a)  $f(x) = x^3$

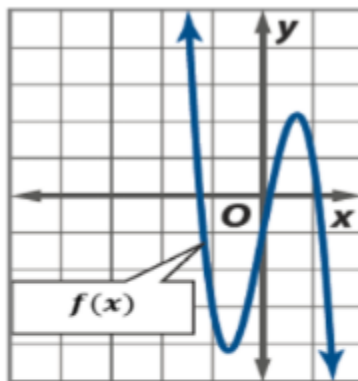
b)  $f(x) = x^3 - 2x$

c)  $f(x) = x^4 + 2$

d)  $f(x) = x^5$

61

Which of the following statements could be used to describe the end behavior of  $f(x)$ ?



a)  $\lim_{x \rightarrow -\infty} f(x) = \infty, \lim_{x \rightarrow \infty} f(x) = \infty$

b)  $\lim_{x \rightarrow -\infty} f(x) = -\infty, \lim_{x \rightarrow \infty} f(x) = \infty$

c)  $\lim_{x \rightarrow -\infty} f(x) = \infty, \lim_{x \rightarrow \infty} f(x) = -\infty$

d)  $\lim_{x \rightarrow -\infty} f(x) = -\infty, \lim_{x \rightarrow \infty} f(x) = -\infty$

62

Given

$f(x) = \sqrt{x-1}$  and  $g(x) = x^2 + 9$ , find  $[f \circ g](x)$ .

a)  $\sqrt{x^2 + 8}$

b)  $x + 8$

c)  $x - 8$

d)  $\sqrt{x^2 - 8}$



63

Given

 $f(x) = \sqrt{x-1}$  and  $g(x) = x^2 + 9$ , find  $[g \circ f](x)$ .

a)

c)

b)

d)

64

The mean nightly rate for hotels in a major city is AED 200. Assume this variable is normally distributed with a standard deviation of AED 25. If a random sample of 15 hotels is taken and the sample mean is AED 190, what is the z-value of the sample mean?

a)

c)

b)

d)

65

The mean mass for a group of camels is 335 kilograms. Assume this variable is normally distributed with a standard deviation of 15 kilograms. If a random sample of 20 camels is taken, what is the standard error for the sample means?

a)

c)

b)

d)

66

Given

 $f(x) = \sqrt{x-1}$  and  $g(x) = x^2 + 9$ , find  $[g \circ f](x)$ .

a)

c)

b)

d)

67

There are 400 crates of food products being delivered. The weights of the crates are normally distributed with a mean weight of 40 kg and a standard deviation of 6 kg. About how many crates weigh 34 kg or less?

a) 336

c) 64

b) 16

d) 54

68

Which of the following statements represents one of the characteristics of the standard normal distribution?

a)  $\mu = 1, \sigma = 0$ c)  $\mu = 1, \sigma = 1$ b)  $\mu = 0, \sigma = 0$ d)  $\mu = 0, \sigma = 1$ 

69

Suppose a baseball player hits the ball 64% of the time when at bat. During his next 20 at-bats, what is the probability that he hits the ball 14 times?

a) 18.8%

c) 17.4%

b) 16.3%

d) 15.5%

70

Let a trial be spinning the spinner shown. Determine the probability of landing on a color that is light blue or blue.

Define a success and the values of  $p$  and  $q$  in the experiment.



- a) A success is landing on a color that is not light blue or blue.

$$p = \frac{3}{4}, q = \frac{1}{4}$$

- b) A success is landing on a color that is not light blue or blue.

$$p = \frac{1}{4}, q = \frac{3}{4}$$

- c) A success is landing on a color that is light blue or blue.

$$p = \frac{1}{4}, q = \frac{3}{4}$$

- d) A success is landing on a color that is light blue or blue.

$$p = \frac{3}{4}, q = \frac{1}{4}$$

71

When determining if a new pet food is going to be successful, the best type of study to collect the needed data would be

- a) an observational study

- b) an experiment

- c) a survey

- d) a census

72

Find the inverse of  $f(x) = \sqrt[3]{x-4} + 6$  and state its domain.

a)  $f^{-1}(x) = (x-6)^3 + 4$ ; Domain:  $(-\infty, \infty)$

b)  $f^{-1}(x) = (x-6)^3 + 4$ ; Domain:  $(-\infty, 0)$

c)  $f^{-1}(x) = (x-6)^3 + 4$ ; Domain:  $[4, \infty)$

d)  $f^{-1}(x) = (x+6)^3 - 4$ ; Domain:  $[0, \infty)$

73

If  $g(x) = x^2 - 3x + 7$ , find  $g(2a-5)$ .

a)  $g(2a-5) = 4a^2 - 16a + 17$

c)  $g(2a-5) = 4a^2 - 26a + 47$

b)  $g(2a-5) = 4a^2 - 26a + 27$

d)  $g(2a-5) = 4a^2 - 26a + 17$

74

Determine whether  $f(x) = \frac{x+5}{x^2-25}$  is continuous at  $x=5$  and  $x=-5$ . Justify your reasoning.

a)  $f(x)$  is continuous at  $x=5$  and  $x=-5$ .

c)  $f(x)$  has a removable discontinuity at  $x=5$  and a jump discontinuity at  $x=-5$ .

b)  $f(x)$  has an infinite discontinuity at  $x=5$  and a removable discontinuity at  $x=-5$ .

d)  $f(x)$  has a jump discontinuity at  $x=5$  and a removable discontinuity at  $x=-5$ .

75

The formula  $P(t) = \frac{2800t^2}{4t^2 - 2t + 25}$  is used to determine the population of a village,  $P(t)$ , given the time,  $t$ , in years.

What happens to the population as time increases and increases?

- |  |                                     |
|--|-------------------------------------|
| a) The population approaches 0.            | c) The population approaches 2,800. |
| b) The population increases without bound. | d) The population approaches 700.   |

76

Let  $f(x) = 3x^2 + 8$  and  $g(x) = \sqrt{x-4}$ . Find  $f \circ g$  and state its domain.

- |   |   |
|---|---|
| a) $(f \circ g)(x) = 3x - 4$ for $x \neq \frac{4}{3}$ | c) $(f \circ g)(x) = \sqrt{3x^2 + 4}$ for $x \geq -\frac{3\sqrt{3}}{3}$ |
| b) $(f \circ g)(x) = 3x - 4$ for $x \geq 4$           | d) $(f \circ g)(x) = \sqrt{3x^2 + 4}$ for all real numbers              |

77

The height  $h$  in meters of a small airplane relative to the ground can be modeled by

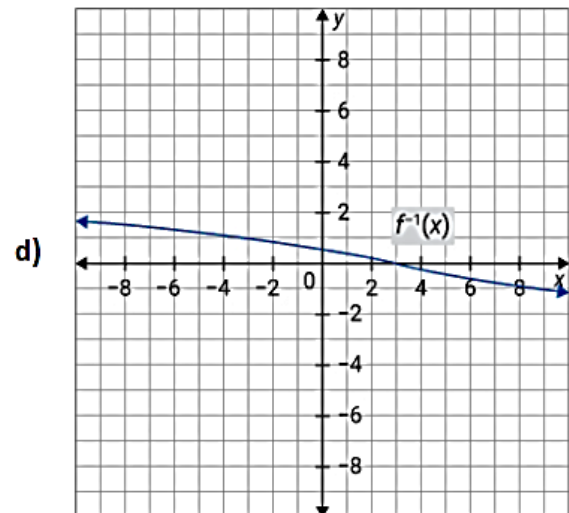
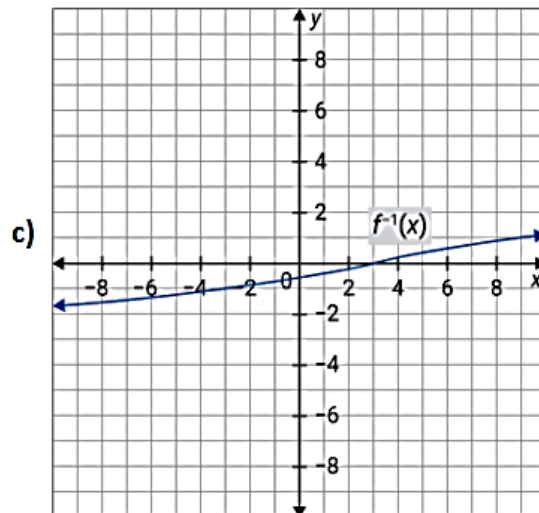
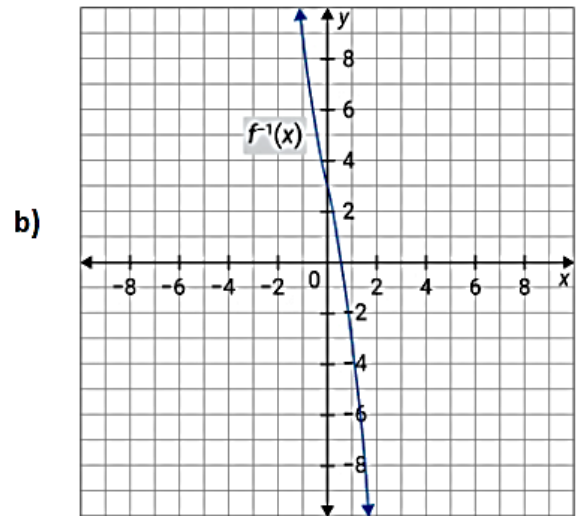
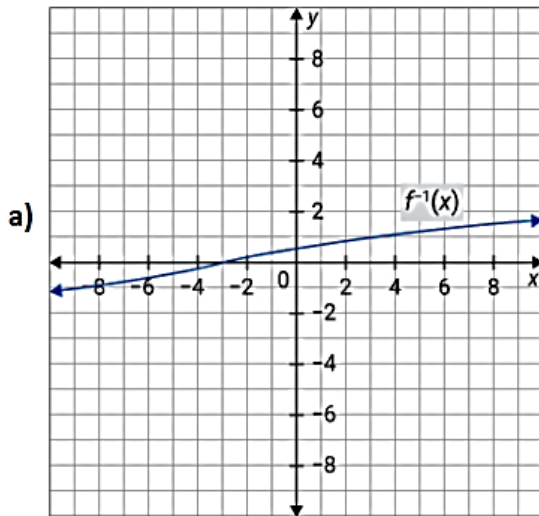
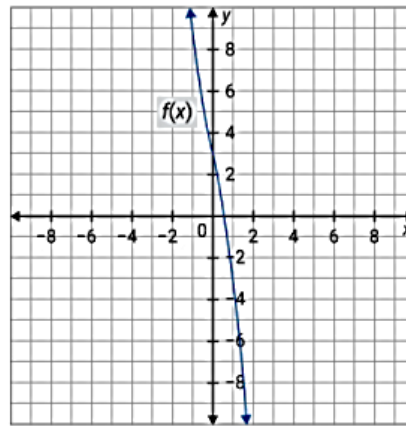
$$h(t) = \frac{1}{12}t^3 - \frac{11}{4}t^2 + \frac{105}{4}t + 10 \text{ on the interval } [8, 18], \text{ where } t \text{ is the time in minutes.}$$

Find the maximum and minimum heights of the airplane.

- |   |   |
|---|---|
| a) Maximum at about 12; Minimum at about 88 | c) Maximum at about 97; Minimum at about 76 |
| b) Maximum at about 97; Minimum at about 88 | d) Maximum at about 88; Minimum at about 76 |

Use the graph of  $f(x)$  to graph  $f^{-1}(x)$ .

78



79

Between which consecutive integers do the real zeros for  $f(x) = x^3 - 8x - 2$  lie on  $[-3, 3]$ ?

a)

$$\begin{aligned} -3 \leq x \leq -2, \\ -1 \leq x \leq 0, \text{ and} \\ 2 \leq x \leq 3 \end{aligned}$$

b)

$$\begin{aligned} -2 \leq x \leq -1, \\ -1 \leq x \leq 0, \text{ and} \\ 2 \leq x \leq 3 \end{aligned}$$

c)

$$\begin{aligned} -3 \leq x \leq -2, \\ 0 \leq x \leq 1, \text{ and} \\ 1 \leq x \leq 2 \end{aligned}$$

d)

$$\begin{aligned} -2 \leq x \leq -1, \\ 0 \leq x \leq 1, \text{ and} \\ 2 \leq x \leq 3 \end{aligned}$$

80

Given the function  $f(x) = x^3 - 5x - 12$ , find  $a$  such that  $f^{-1}(88) = a$

a)

$$\frac{1}{88}$$

c)

$$125$$

b)

$$681020$$

d)

$$5$$

81

An object moves along a path given by the position function  $f(t) = 3t^2 + 2t$ , with the position in kilometers and time in hours. Which is the average velocity from 1 to 3 hours?

a)

$$28 \text{ km/h}$$

c)

$$33 \text{ km/h}$$

b)

$$14 \text{ km/h}$$

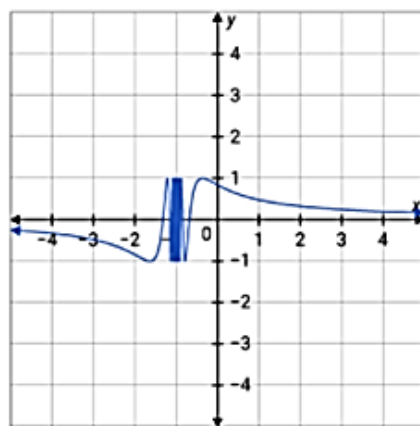
d)

$$5 \text{ km/h}$$



82

Estimate  $\lim_{x \rightarrow -1} \sin\left(\frac{1}{x+1}\right)$ .



a) 1

c) 0

b) -1

d) does not exist

83

Jamila throws a ball. The height of the ball in meters  $g$  and the horizontal distance in meters  $x$  of the ball from Jamila can be modeled by  $g(x) = -\frac{1}{45}(x-15)^2 + 7$ . Describe the transformations of the parent function  $f(x) = x^2$  used to graph  $g(x)$ .

a)

reflected across the  $x$ -axis, compressed vertically, translated 15 units right and 7 units up

c)

reflected across the  $y$ -axis, compressed vertically, translated 15 units right and 7 units up

b)

compressed vertically, translated 15 units right and 7 units up

d)

reflected across the  $x$ -axis, compressed vertically, translated 15 units left and 7 units up

84

Between which consecutive integers do the real zeros for  $f(x) = x^2 + x + 0.05$  lie on  $[-3, 3]$ ?

a)

$1 \leq x \leq 2$

c)

$-2 \leq x \leq -1$

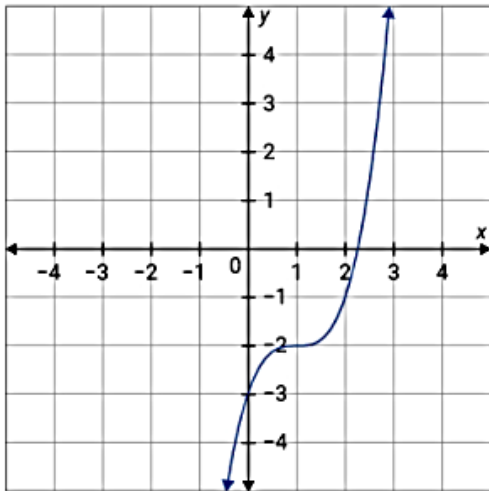
b)

$-1 \leq x \leq 0$

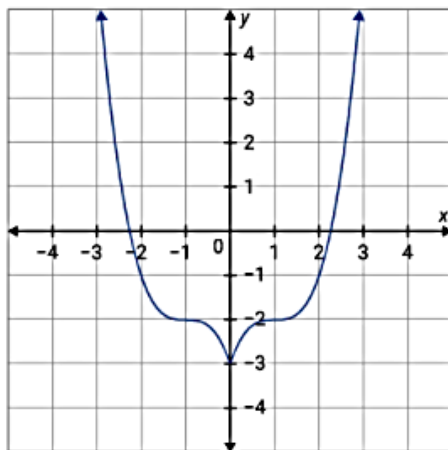
d)

$0 \leq x \leq 1$

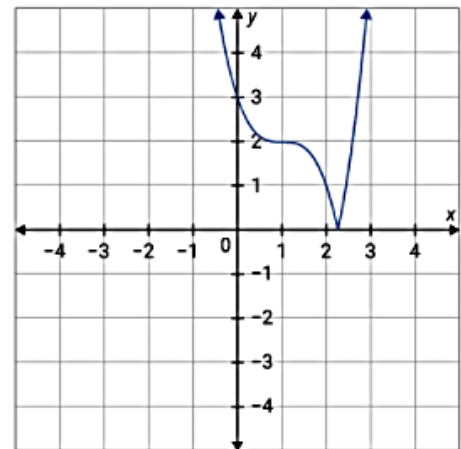
Use the graph of  $f(x) = (x - 1)^3 - 2$  to graph  $g(x) = |f(x)|$ .



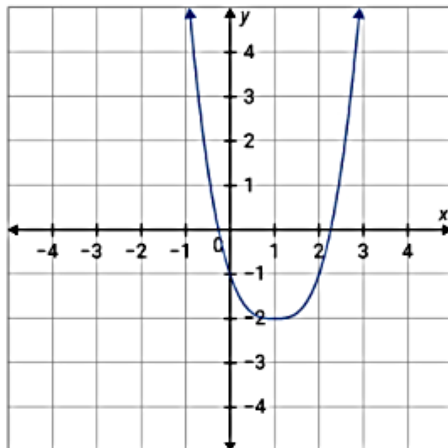
a)



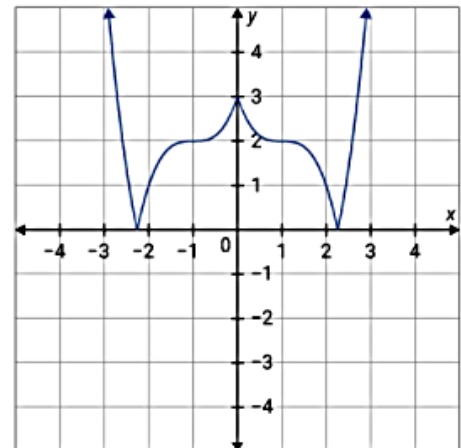
b)



c)

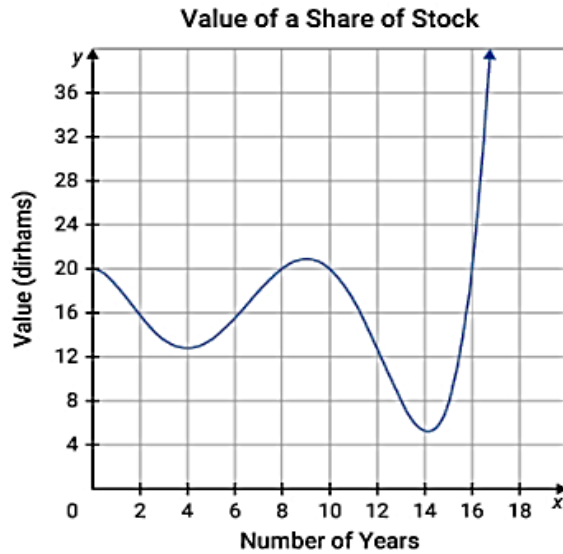


d)



86

Use the graph to estimate the value of this share of stock after 6 years.



a) AED 16

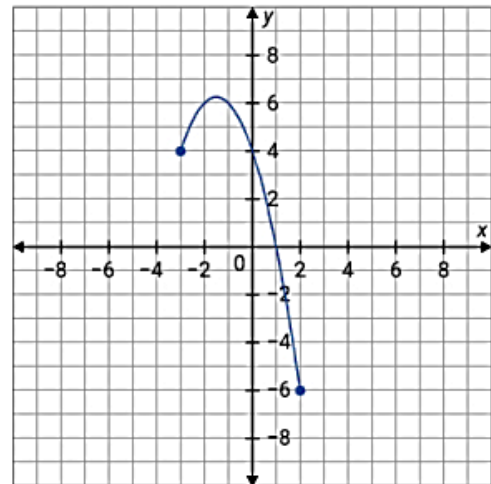
c) AED 15

b) AED 10.5

d) AED 14

87

Find the domain and range of the function.



a) Domain:  $-3 \leq x \leq 2$ ,  
Range:  $-6 \leq y \leq 4$

c) Domain:  $-3 \leq x \leq 2$ ,  
Range:  $-6 \leq y \leq 6.25$

b) Domain:  $-6 \leq x \leq 4$ ,  
Range:  $-3 \leq y \leq 2$

d) Domain:  $-3 < x < 2$ ,  
Range:  $-6 < y < 6.25$

88

Describe the set of numbers using set-builder notation.

The set includes all real numbers less than or equal to 7.

a)  $\{x \mid x \leq 7, x \in \mathbb{R}\}$

c)  $\{x \mid x < 7, x \in \mathbb{R}\}$

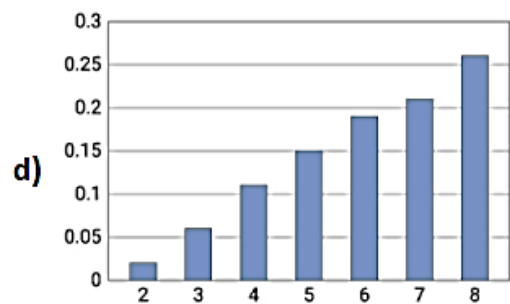
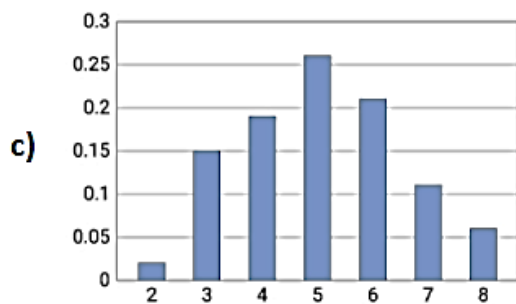
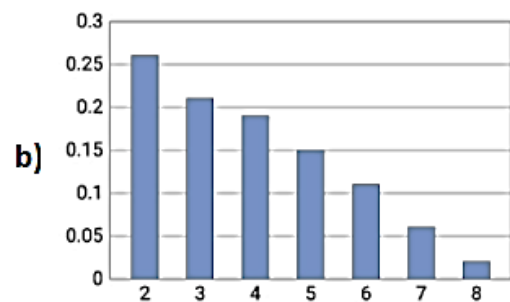
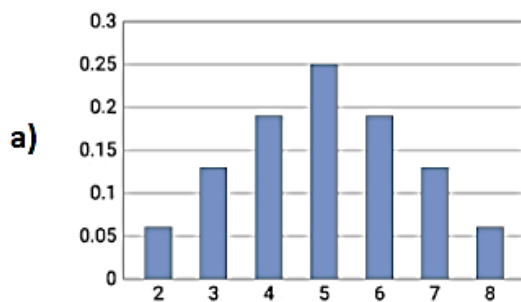
b)  $\{x \mid x < 7, x \in \mathbb{Z}\}$

d)  $\{x \mid x \leq 7, x \in \mathbb{Z}\}$

89

Which graph represents the experimental probability distribution represented in this relative frequency table?

| Sum                | 2    | 3    | 4    | 5    | 6    | 7    | 8    |
|--------------------|------|------|------|------|------|------|------|
| Relative Frequency | 0.02 | 0.15 | 0.19 | 0.26 | 0.21 | 0.11 | 0.06 |



90

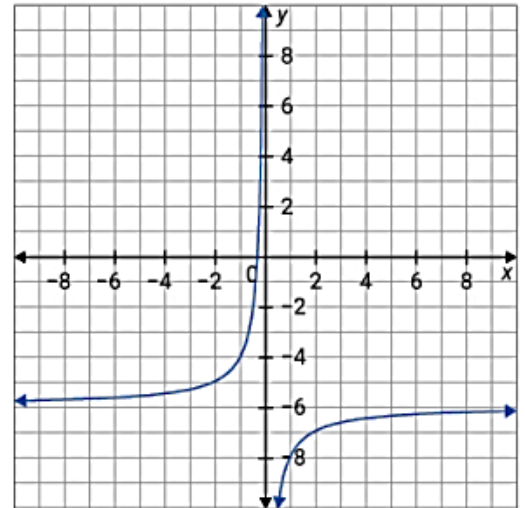
Estimate  $\lim_{x \rightarrow -\infty} -\frac{2}{x} - 6$ .

a)  $\infty$

c)  $-6$

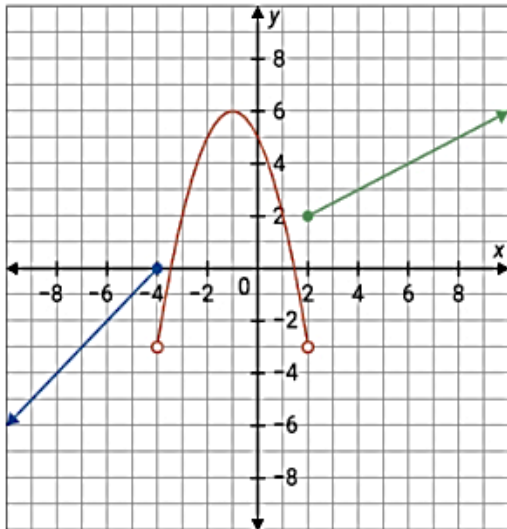
b)  $-\infty$

d) does not exist



Which piecewise function is displayed in the graph?

91



a) 
$$f(x) = \begin{cases} x+4 & x \leq -4 \\ -(x+1)^2 + 6 & -4 < x < 2 \\ 0.5x+1 & x \geq 2 \end{cases}$$

c) 
$$f(x) = \begin{cases} x+4 & x < -4 \\ -(x+1)^2 + 6 & -4 \leq x \leq 2 \\ 0.5x+1 & x > 2 \end{cases}$$

b) 
$$f(x) = \begin{cases} x+4 & x < -4 \\ -(x+1)^2 + 6 & -4 < x < 2 \\ 0.5x+1 & x > 2 \end{cases}$$

d) 
$$f(x) = \begin{cases} x+4 & x \leq 0 \\ -(x+1)^2 + 6 & 0 < x < 2 \\ 0.5x+1 & x \geq 2 \end{cases}$$

92

The height  $h$  in meters of a bird flying in the air relative to the ground can be modeled by

$$h(t) = \frac{1}{24}t^3 - \frac{7}{8}t^2 + 6t + 15 \text{ on the interval } [5, 10], \text{ where } t \text{ is the time in minutes.}$$

Find the critical values for  $h(t)$ .

a)  $t = 6$  and  $t = 8$

c)  $t = 8$  only

b) There are no critical values.

d)  $t = 10$  only

93

Find two functions  $f$  and  $g$  such that  $h(x) = \frac{5}{(x-3)^2}$  can be written as  $(f \circ g)(x)$ .

a)  $f(x) = x - 3; g(x) = \frac{5}{x^2}$

c)  $f(x) = \frac{5}{x}; g(x) = x^2 - 3$

b)  $f(x) = x^2 - 3; g(x) = \frac{5}{x}$

d)  $f(x) = \frac{5}{x^2}; g(x) = x - 3$

94

Which of the following is the domain of  $f(x) = \frac{6x-30}{x^2+7x-18}$  in  $\mathbb{R}$ ?

a)  $\{x \mid x \neq -2, x \neq 9, x \in \mathbb{R}\}$

c)  $\{x \mid x \neq -9, x \neq 2, x \in \mathbb{Z}\}$

b)  $\{x \mid x \neq -9, x \neq 2, x \in \mathbb{R}\}$

d)  $\{x \mid x \neq 5, x \in \mathbb{R}\}$

95

Which functions has a removable discontinuity

a)  $f(x) = x^2 - 4$

b)  $f(x) = \frac{1}{x-7}$

c)  $f(x) = \frac{x^2 - 25}{x-5}$

d)  $f(x) = \frac{x-1}{x+3}$

96

Which function is the parent function for  $g(x) = -3|x + 9|$ 

a)  $f(x) = 3|x|$

b)  $f(x) = |x + 9|$

c)  $f(x) = 3|x + 9|$

d)  $f(x) = |x|$

97

If  $f(x) = 1 - x^2$  and  $g(x) = 4 - x^2$ , find  $(f - 2g)(x)$ .

a)  $(f - 2g)(x) = 3$

b)  $(f - 2g)(x) = x^2 - 7$

c)  $(f - 2g)(x) = -3$

d)  $(f - 2g)(x) = 8 - 3x^2$

98

Find the average rate of change of the function  $g(x) = 8x^2 - 2x$  over  $[-1, 1]$ .

a)  $-2$

b)  $0$

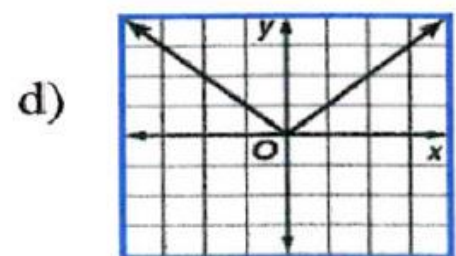
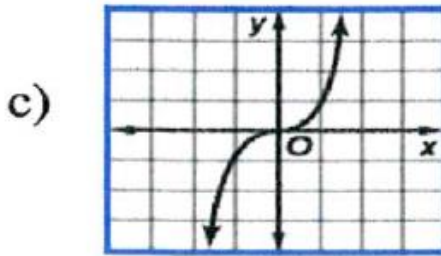
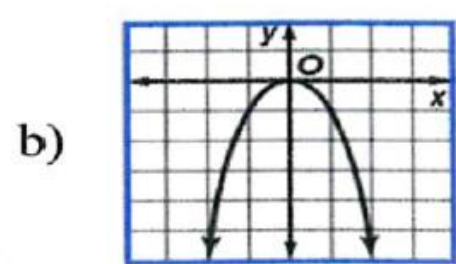
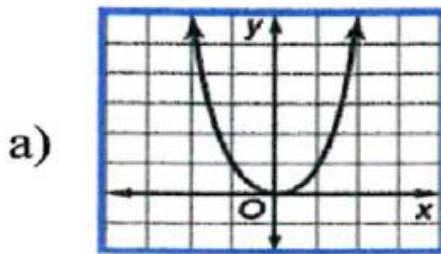
c)  $2$

d)  $\infty$



99

Which of the following represents the graph of  $f(x) = |x^3|$  ?



100

Which of the following functions is odd?

a)  $f(x) = x^4 + 4x$

b)  $f(x) = x^4 - 9$

c)  $f(x) = 2x^3$

d)  $f(x) = -x^3 + 4$

