

Module 5 Questions: NR1, NR2, 4, 10

Relations and Functions Lesson #12: Practice Test

1. Which of the following variables is discrete?
 - A. The time taken to run 50 metres.
 - B. The distance travelled by a train.
 - C. The number of animals in a zoo.
 - D. The weight of a dog.

2. Which of the following statements is false?
 - A. The domain of a relation is associated with values of the independent variable.
 - B. The dependent variable is represented by the first coordinate of an ordered pair.
 - C. The inputs of a relation are shown on the horizontal axis of a Cartesian Plane.
 - D. The range of a relation is represented on the vertical axis of the graph of the relation.

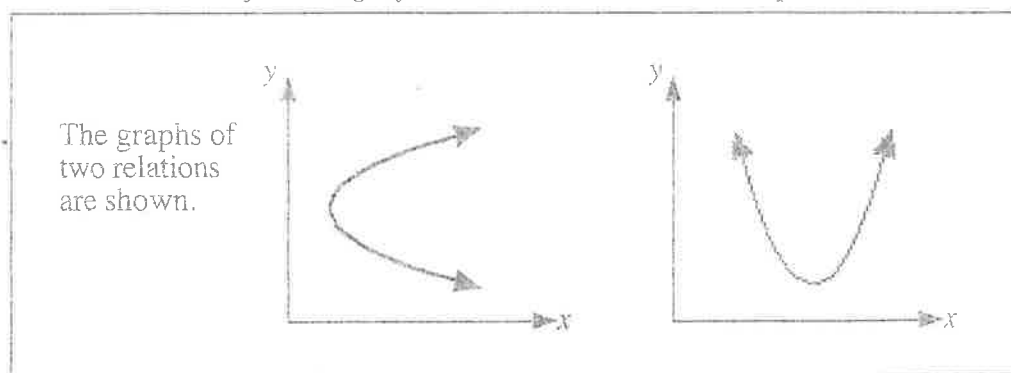
**Numerical
Response:**

1. To the nearest hundredth, the positive x -intercept on the graph of the relation $2x^2 + 6y^2 = 7$ is _____.

(Record your answer in the numerical response box from left to right)

--	--	--	--

Use the following information to answer the next question.



3. Which of the following statements is true?
 - A. The domains are the same, but the ranges are different.
 - B. The ranges are the same, but the domains are different.
 - C. The domains are the same, and the ranges are the same.
 - D. The domains are different, and the ranges are different.

Numerical
Response

2. The graph of the relation $4x^2 - 3y = 12$ has x -intercepts a and b , and y -intercept c . The value of the product abc is _____.

(Record your answer in the numerical response box from left to right)

--	--	--	--

Use the following information to answer the next two questions.

The cost (\$ C) of publishing a school newspaper is partially fixed and partially depends on the number (n) of newspapers printed. The cost is given by the formula $C = 98 + 0.12n$.

4. The cost of publishing 780 newspapers is

- A. \$191.60
- B. \$773.76
- C. \$94.58
- D. \$9 458.00

Numerical
Response

3. The domain of the relation can be expressed in the form $n \geq x$, and the range can be expressed in the form $C \geq y$. Write the value of y in the first two boxes, and the value of x in the last two boxes.

(Record your answer in the numerical response box from left to right)

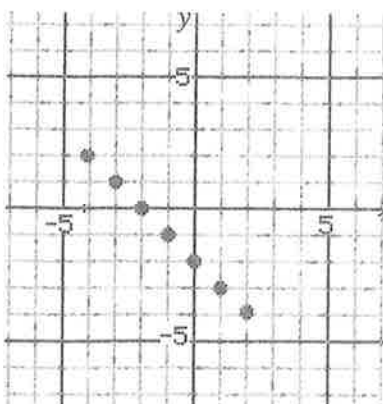
--	--	--	--

5. The function $f(x) = 3 - 2x^2$, has domain $\{-6, -4, 0, 2, 5\}$. Which of the following is an element of the range of the function?

- A. 35
- B. 27
- C. 1
- D. -29

Use the following information to answer the next question.

The diagram shows the graph of the function $y = f(x)$.



6. The diagram shows the graph of the function $y = f(x)$.
The value of $f(-2) + f(2)$ is

A. -4
B. -2
C. 0
D. $f(0)$

Use the following information to answer questions #7 and #8.

Consider the function $P(x) = 5x + 2$.

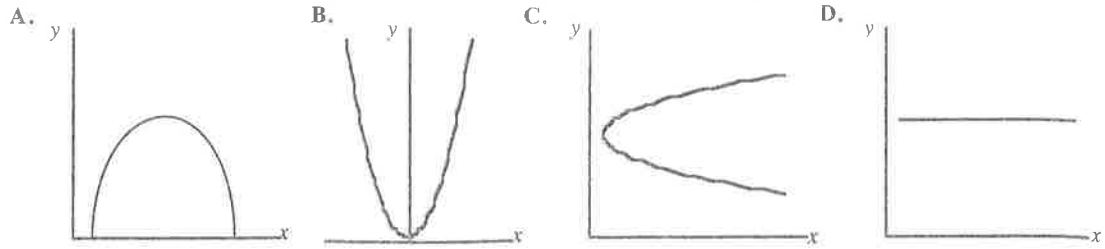
7. The value of $P(6)$ is

A. $\frac{8}{5}$
B. $\frac{4}{5}$
C. 32
D. 58

8. If $P(b) = 6$, then $b =$

A. $\frac{8}{5}$
B. $\frac{4}{5}$
C. $\frac{5}{4}$
D. 32

9. Which of the following diagrams shows a relation which is not a function?



10. Consider the graph of the function $f(x) = 4x - 10$. The x -intercept of the graph of f is

- A. -10
- B. -2.5
- C. 2.5
- D. 10

11. Given a function g defined by $g(x) = px + q$ with $g(0) = 2$ and $g(1) = 3$ then

- A. $p = 1, q = 0$
- B. $p = 3, q = 2$
- C. $p = 1, q = 2$
- D. $p = 3, q = 0$

12. If $f(x) = 3^x$ and $f(-a) = \frac{1}{81}$, then $a =$

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

13. If $g(x) = \frac{2}{3}x + 6$, an expression for $g(2x - 1)$ is

- A. $\frac{4}{3}x + 5$
- B. $\frac{4}{3}x + \frac{16}{3}$
- C. $\frac{4}{3}x + 11$
- D. $\frac{8}{3}x + 5$

14. Consider the following functions:

1. $p(x) = x^2 - 4x - 2$ 2. $p(x) = \frac{1}{3}x + 14$ 3. $p(x) = 3x^2 + x$ 4. $p(x) = 7 - 5x$

For each function evaluate $p(-3)$, and put the expressions in order from greatest to least. The order is

- A. 4312
- B. 3412
- C. 3124
- D. none of the above

Numerical
Response

4. If $f(x) = 1 - 2x - 5x^2$, and if $f(x + 2)$ is written in the form $ax^2 + bx + c$, the value of $a - b - c$ is _____.

(Record your answer in the numerical response box from left to right)

--	--	--	--

Numerical
Response

5. $f(a) = \frac{a}{a+4}$. The exact value of $f(5) - f(5^{-1})$ written as a rational number in simplest form is $\frac{p}{q}$. The value of p is _____.

(Record your answer in the numerical response box from left to right)

--	--	--	--

15. Which of the following cannot be used to represent a function?

- A. Graph
- B. Table of Values
- C. Ordered Pairs
- D. Coordinate

Written Response - 5 marks

1. During an airshow, the path of a stunt dive of a jet can be modelled by the equation $h = t^2 - 9t + 81$, where h is the height in metres after t seconds. The end of the stunt occurs when the plane achieves its starting height.
- How high is the jet at the start of the dive?
 - How high is the jet above ground level at its lowest point?
 - When does the jet reach its lowest point in the dive?
 - How high is the jet two seconds into its dive?
 - After how many seconds does this height occur again within the jet's stunt dive?

Assignment Key

1. C 2. B 3. D 4. A 5. D 6. A 7. C 8. B
 9. C 10. C 11. C 12. A 13. B 14. B 15. D

1.

1	.	8	7
---	---	---	---

 2.

1	2		
---	---	--	--

 3.

9	8	0	0
---	---	---	---

 4.

4	0		
---	---	--	--

 5.

3	2		
---	---	--	--

Written Response

1. • 81 m
- 60.75 m
 - 4.5 sec
 - 67 m
 - 7 sec

Relations and Functions Lesson #12: Practice Test

1. Which of the following variables is discrete?
 - A. The time taken to run 50 metres.
 - B. The distance travelled by a train.
 - ☒ C. The number of animals in a zoo.
 - D. The weight of a dog.

2. Which of the following statements is false?
 - A. The domain of a relation is associated with values of the independent variable.
 - ☒ B. The dependent variable is represented by the first coordinate of an ordered pair.
 - C. The inputs of a relation are shown on the horizontal axis of a Cartesian Plane.
 - D. The range of a relation is represented on the vertical axis of the graph of the relation.

**Numerical
Response**

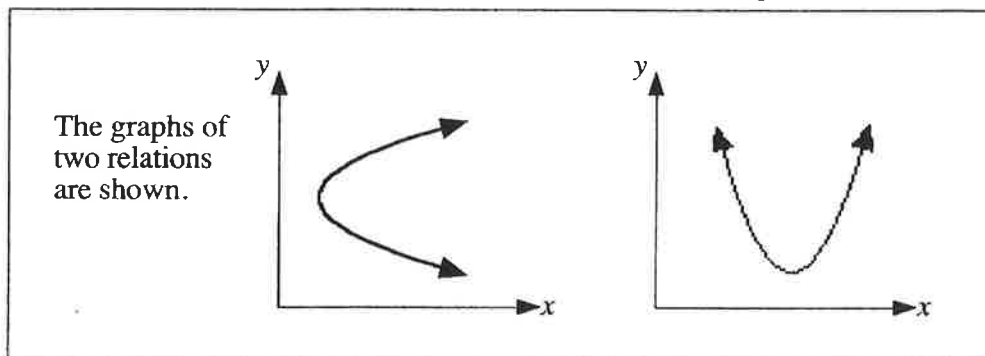
1. To the nearest hundredth, the positive x -intercept on the graph of the relation $2x^2 + 6y^2 = 7$ is _____.

(Record your answer in the numerical response box from left to right)

1	.	8	7
---	---	---	---

$$\begin{aligned}
 y &= 0 & 2x^2 &= 7 \\
 & & x^2 &= \frac{7}{2} \\
 & & x &= \sqrt{\frac{7}{2}} = 1.87
 \end{aligned}$$

Use the following information to answer the next question.



3. Which of the following statements is true?
 - A. The domains are the same, but the ranges are different.
 - B. The ranges are the same, but the domains are different.
 - C. The domains are the same, and the ranges are the same.
 - ☒ D. The domains are different, and the ranges are different.

Numerical
Response

2. The graph of the relation $4x^2 - 3y = 12$ has x -intercepts a and b , and y -intercept c . The value of the product abc is _____.

(Record your answer in the numerical response box from left to right)

1	2		
---	---	--	--

x -intercepts

$$y = 0$$

$$4x^2 = 12$$

$$x^2 = 3$$

$$x = \pm\sqrt{3}$$

y -intercept

$$x = 0$$

$$-3y = 12$$

$$\frac{-3y}{-3} = \frac{12}{-3}$$

$$y = -4$$

$$abc = (\sqrt{3})(-\sqrt{3})(-4) = 12$$

Use the following information to answer the next two questions.

The cost (\$ C) of publishing a school newspaper is partially fixed and partially depends on the number (n) of newspapers printed. The cost is given by the formula $C = 98 + 0.12n$.

4. The cost of publishing 780 newspapers is

- (A) \$191.60
B. \$773.76
C. \$94.58
D. \$9 458.00

$$C = 98 + 0.12(780) = 191.6$$

Numerical
Response

3. The domain of the relation can be expressed in the form $n \geq x$, and the range can be expressed in the form $C \geq y$. Write the value of y in the first two boxes, and the value of x in the last two boxes.

(Record your answer in the numerical response box from left to right)

9	8	0	0
---	---	---	---

$$n \geq 0 \quad C \geq 98$$

5. The function $f(x) = 3 - 2x^2$, has domain $\{-6, -4, 0, 2, 5\}$. Which of the following is an element of the range of the function?

A. 35

B. 27

C. 1

(D) -29

$$3 - 2(-6)^2 = -69$$

$$3 - 2(-4)^2 = -29$$

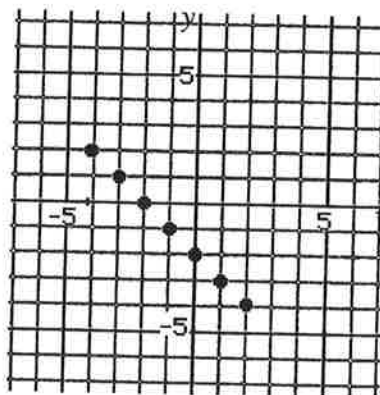
$$3 - 2(0)^2 = 3$$

$$3 - 2(2)^2 = -5$$

$$3 - 2(5)^2 = -47$$

Use the following information to answer the next question.

The diagram shows the graph of the function $y = f(x)$.



6. The diagram shows the graph of the function $y = f(x)$.
The value of $f(-2) + f(2)$ is

- (A) -4
B. -2
C. 0
D. $f(0)$

$$f(-2) = 0 \quad f(2) = -4$$

$$0 + (-4) = -4$$

Use the following information to answer questions #7 and #8.

Consider the function $P(x) = 5x + 2$.

7. The value of $P(6)$ is

- A. $\frac{8}{5}$
B. $\frac{4}{5}$
(C) 32
D. 58

$$P(6) = 5(6) + 2$$

$$= 32$$

8. If $P(b) = 6$, then $b =$

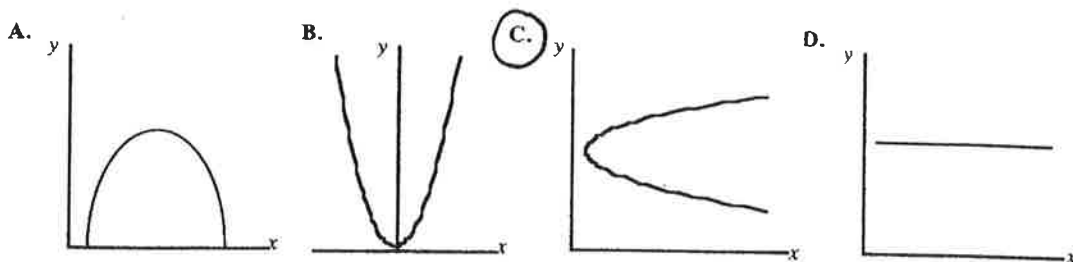
- A. $\frac{8}{5}$
(B) $\frac{4}{5}$
C. $\frac{5}{4}$
D. 32

$$P(b) = 5b + 2 = 6$$

$$5b = 4$$

$$b = \frac{4}{5}$$

9. Which of the following diagrams shows a relation which is not a function?



10. Consider the graph of the function $f(x) = 4x - 10$. The x -intercept of the graph of f is

- A. -10
B. -2.5
C. 2.5
D. 10
- x_{int} $f(x) = 0$ $0 = 4x - 10$
 $10 = 4x$
 $x = 2.5$

11. Given a function g defined by $g(x) = px + q$ with $g(0) = 2$ and $g(1) = 3$ then

- A. $p = 1, q = 0$
B. $p = 3, q = 2$
C. $p = 1, q = 2$
D. $p = 3, q = 0$
- $2 = (p)(0) + q$ $q = 2$
 $3 = (p)(1) + q$ $p + q = 3$
 $p + 2 = 3$ $p = 1$

12. If $f(x) = 3^x$ and $f(-a) = \frac{1}{81}$, then $a =$

- A. 4
B. -4
C. $-\frac{1}{4}$
D. $\frac{1}{4}$
- $3^{-a} = \frac{1}{81}$ $81 = 3^a$
 $\frac{1}{3^a} = \frac{1}{81}$ $a = 4$

13. If $g(x) = \frac{2}{3}x + 6$, an expression for $g(2x - 1)$ is

- A. $\frac{4}{3}x + 5$
B. $\frac{4}{3}x + \frac{16}{3}$
C. $\frac{4}{3}x + 11$
D. $\frac{8}{3}x + 5$
- $g(2x - 1) = \frac{2}{3}(2x - 1) + 6$
 $= \frac{4}{3}x - \frac{2}{3} + 6$
 $= \frac{4}{3}x + \frac{16}{3}$

14. Consider the following functions:

1. $p(x) = x^2 - 4x - 2$ 2. $p(x) = \frac{1}{3}x + 14$ 3. $p(x) = 3x^2 + x$ 4. $p(x) = 7 - 5x$

For each function evaluate $p(-3)$, and put the expressions in order from greatest to least. The order is

A. 4312
 (B.) 3412
 C. 3124
 D. none of the above

1. $p(-3) = (-3)^2 - 4(-3) - 2 = 19$
 2. $p(-3) = \frac{1}{3}(-3) + 14 = 13$
 3. $p(-3) = 3(-3)^2 + (-3) = 24$
 4. $p(-3) = 7 - 5(-3) = 22$

Numerical Response

4. If $f(x) = 1 - 2x - 5x^2$, and if $f(x+2)$ is written in the form $ax^2 + bx + c$, the value of $a - b - c$ is _____.

(Record your answer in the numerical response box from left to right)

4	0		
---	---	--	--

$$\begin{aligned}
 f(x+2) &= 1 - 2(x+2) - 5(x+2)^2 \\
 &= 1 - 2x - 4 - 5(x^2 + 4x + 4) & a &= -5 \\
 &= 1 - 2x - 4 - 5x^2 - 20x - 20 & b &= -22 \\
 &= -5x^2 - 22x - 23 & c &= -23 \\
 & & a - b - c &= -5 - (-22) - (-23) \\
 & & &= 40
 \end{aligned}$$

Numerical Response

5. $f(a) = \frac{a}{a+4}$. The exact value of $f(5) - f(5^{-1})$ written as a rational number in simplest form is $\frac{p}{q}$. The value of p is _____.

(Record your answer in the numerical response box from left to right)

$$f(5) = \frac{5}{5+4} = \frac{5}{9} \quad f(5^{-1}) = \frac{5^{-1}}{5^{-1}+4} = \frac{\frac{1}{5}}{\frac{1}{5}+4} = \frac{1}{21}$$

3	2		
---	---	--	--

$$\frac{5}{9} - \frac{1}{21} = \frac{32}{63}$$

$$p = 32$$

15. Which of the following cannot be used to represent a function?

- A. Graph
 B. Table of Values
 C. Ordered Pairs
 (D.) Coordinate

Written Response - 5 marks

1. During an airshow, the path of a stunt dive of a jet can be modelled by the equation $h = t^2 - 9t + 81$, where h is the height in metres after t seconds. The end of the stunt occurs when the plane achieves its starting height.

- How high is the jet at the start of the dive?

$$t = 0 \quad h = 81 \quad 81 \text{ m}$$

- How high is the jet above ground level at its lowest point?

$$\text{Use "minimum" feature. } y\text{-coord} \quad 60.75 \text{ m}$$

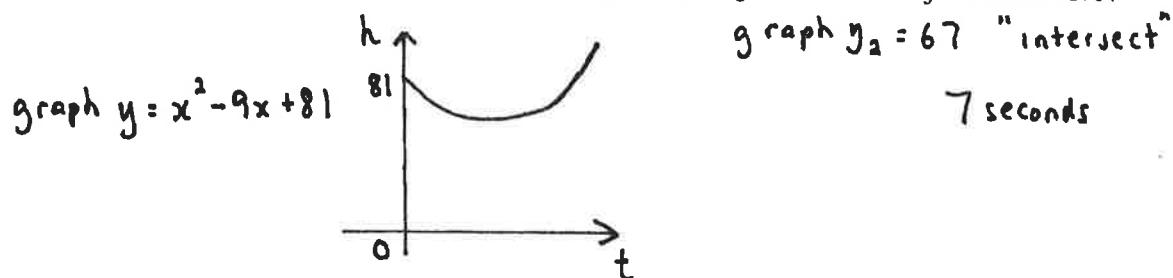
- When does the jet reach its lowest point in the dive?

$$x\text{-coord of minimum point} \quad \text{After } 4.5 \text{ sec}$$

- How high is the jet two seconds into its dive?

$$x = 2 \quad 67 \text{ m}$$

- After how many seconds does this height occur again within the jet's stunt dive?



Assignment Key

1. C 2. B 3. D 4. A 5. D 6. A 7. C 8. B
9. C 10. C 11. C 12. A 13. B 14. B 15. D

1.

1		8	7
---	--	---	---

2.

1	2		
---	---	--	--

3.

9	8	0	0
---	---	---	---

4.

4	0		
---	---	--	--

5.

3	2		
---	---	--	--

Written Response

1. • 81 m

- 60.75 m

- 4.5 sec.

- 67 m

- 7 sec.