

Name: _____

FOUNDATIONS AND PRE-CALCULUS

MATH 10

Extra Provincial Exam Review

3 Booklets (all stapled together):


- Measurement
- Algebra and Number
- Relations and Functions



Foundations of Mathematics and Pre-Calculus 10

Sample Questions for Measurement

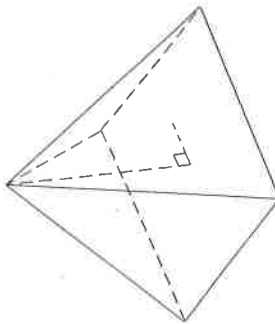
Instructions

1. You may require a protractor and a ruler (metric and imperial) for paper versions of the questions.
2. You may use math tiles.
3. When using your calculator (scientific or approved graphing calculator):
 - use the programmed value of π rather than the approximation of 3.14.
 - round only in the final step of the solution.
4. Diagrams are not necessarily drawn to scale.
5. For questions marked with , do not use your calculator.

PART A: MULTIPLE-CHOICE QUESTIONS

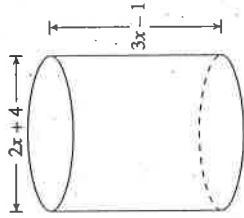
1. Which of the following examples is the best referent for one millimetre?
- A. diameter of a penny
 - B. thickness of a fingernail
 - C. length of a five-dollar bill
 - D. distance from the floor to a door knob

2. Which expression could be used to calculate the surface area of the right square-based pyramid with a base length of 10 cm and a height of 12 cm?



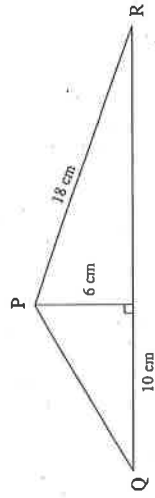
- A. $SA = 2(10)(12) + (10)^2$
- B. $SA = 2(10)(12) + (12)^2$
- C. $SA = 2(10)(13) + (10)^2$
- D. $SA = 2(10)(13) + (13)^2$

3. Which of the following expressions represents the volume of the cylinder below?



- A. $V = \pi(6x^2 + 10x - 4)$
- B. $V = \pi(3x^3 - x^2 + 12x - 4)$
- C. $V = \pi(3x^3 + 11x^2 + 8x - 4)$
- D. $V = \pi(12x^3 + 32x - 16)$

4. Determine the measure of $\angle QPR$.



- A. 59°
- B. 71°
- C. 102°
- D. 130°

5. Which net diagram represents the prism below?

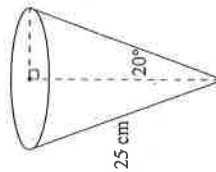


- A.
- B.
- C.
- D.

6. Raj was asked to make a cylindrical tank with a lateral surface area of 2622 m^2 and a height of 23 m . Which net diagram below would be correct for this cylinder?

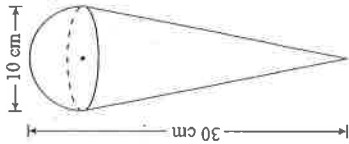
- A.
- B.
- C.
- D.

7. Calculate the volume of the right cone below.



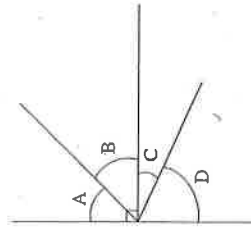
- A. 210 cm^3
 B. 1799 cm^3
 C. 1914 cm^3
 D. 2168 cm^3

8. Determine the surface area of the solid below.



- A. 481 cm^2
- B. 558 cm^2
- C. 1414 cm^2
- D. 2199 cm^2

9. Which of the following angles is an angle of depression?

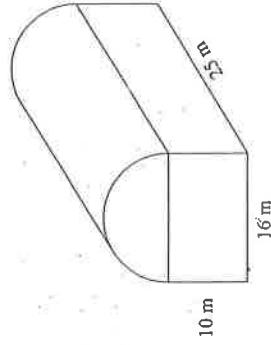


- A. A
- B. B
- C. C
- D. D

10. A cat on the ground is 50 m away from the base of a pole. An osprey's nest is on the top of the pole, which is 20 m tall. What is the measure of the angle of inclination from the cat to the osprey's nest?

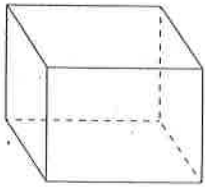
- A. 22°
- B. 24°
- C. 66°
- D. 68°

11. Calculate the volume of the shape below.



- A. $6\,513 \text{ m}^3$
- B. $9\,027 \text{ m}^3$
- C. $14\,053 \text{ m}^3$
- D. $24\,106 \text{ m}^3$

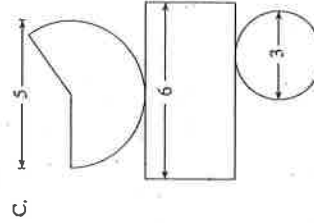
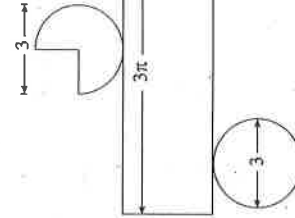
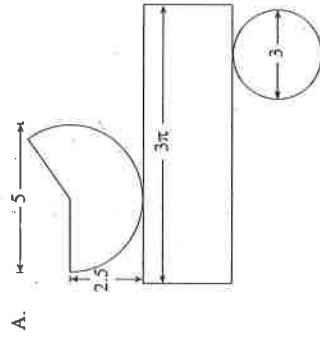
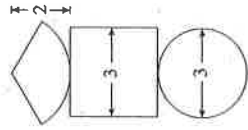
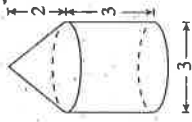
12. A wooden block is a square-based prism, as shown below:



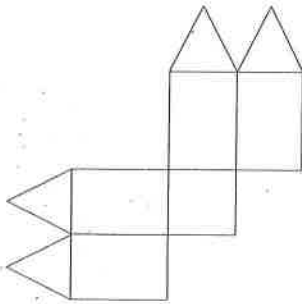
Given the base area is 50 cm^2 and the height is 12 cm , what is its surface area?

- A. 339 cm^2
- B. 439 cm^2
- C. 600 cm^2
- D. 1300 cm^2

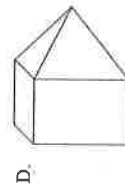
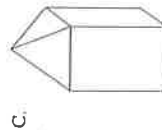
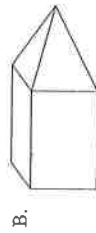
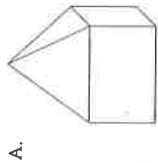
13. Which of the following net diagrams represents the figure below? Note: all diagrams drawn to scale.



14. Which prism can be formed by the net below? Note: all diagrams drawn to scale.



Note: all diagrams drawn to scale.



PART B: NUMERIC-RESPONSE QUESTIONS.

15. The lateral surface area of a cylinder is 1106 cm^2 . Given that the height is 11 cm, calculate the radius. Answer to the nearest cm.

Record your answer neatly on the Answer Sheet.

Foundations of Mathematics and Pre-Calculus 10

Sample Items – Measurement

Answer Key

Cognitive Processes

N = Knowing

P = Applying

Q = Reasoning

Question Types

= Multiple Choice – no calculator (MN)

= Multiple Choice (MC)

= Numerical Response (NR)

Topics

1. Measurement

2. Algebra and Number

3. Relations and Functions

Prescribed Learning Outcomes (PLOs)

A

B

C


Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type
1.	B	N	1	1	A1	MN
2.	C	Q	1	1	A3	MC
3.	C	Q	1	1	A3, B4	MC
4.	D	P	1	1	A4	MC
5.	A	P	1	1	A3	MC
6.	D	Q	1	1	A3	MC
7.	B	Q	1	1	A3, A4	MC
8.	B	Q	1	1	A3, A4	MC
9.	C	N	1	1	A4	MC
10.	A	P	1	1	A4	MC
11.	A	N	1	1	A3	MC
12.	B	Q	1	1	A3	MC
13.	A	Q	1	1	A3	MC
14.	C	P	1	1	A3	MC
15.	16	P	1	1	A3	NR



Foundations of Mathematics and Pre-Calculus 10

Sample Questions for Algebra and Number

Instructions

1. You may require a protractor and a ruler (metric and imperial) for paper versions of the questions.
2. You may use math tiles.
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PART A: MULTIPLE-CHOICE QUESTIONS

1. Which of the following powers is a perfect cube?

- A. 3^2
- B. 5^6
- C. 6^4
- D. 9^2

2. Write as a single power: $\frac{12^3}{4^3}$

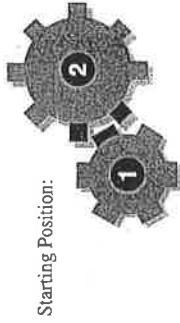
- A. 3^0
- B. 3^3
- C. 8^3
- D. 48^6

3. Given $x > 1$, arrange from the least to the greatest:

$$\sqrt{x}, \frac{1}{\sqrt[3]{x}}, \sqrt[3]{x^2}$$

- A. $\frac{1}{\sqrt[3]{x}}, \sqrt{x}, \sqrt[3]{x^2}$
- B. $\frac{1}{\sqrt[3]{x}}, \sqrt[3]{x^2}, \sqrt{x}$
- C. $\sqrt{x}, \sqrt[3]{x^2}, \frac{1}{\sqrt[3]{x}}$
- D. $\sqrt[3]{x^2}, \frac{1}{\sqrt[3]{x}}, \sqrt{x}$

4. Two gears are shown below in their starting position.
- Gear 1 has 6 teeth.
 - Gear 2 has 8 teeth.
 - As Gear 1 turns, it causes Gear 2 to turn at a different rate.
 - Gear 1 is rotated until the two gears are back to this starting position.



What is the minimum number of rotations Gear 1 requires to return to this starting position?

- A. 48 rotations
- B. 24 rotations
- C. 4 rotations
- D. 2 rotations

5. Three students were asked to show steps for simplifying $\sqrt[3]{1080}$ to $6\sqrt[3]{5}$.

Jean	Sally	Mark
$\begin{aligned} \sqrt[3]{1080} &= \sqrt[3]{2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5} \\ &= (2 \times 3) \sqrt[3]{5} \\ &= 6\sqrt[3]{5} \end{aligned}$	$\begin{aligned} \sqrt[3]{1080} &= \sqrt[3]{216 \times 5} \\ \sqrt[3]{216} &= 6 \\ \therefore \sqrt[3]{1080} &= 6\sqrt[3]{5} \end{aligned}$	$\begin{aligned} \sqrt[3]{1080} &= \sqrt[3]{27 \times 5 \times 8} \\ &= 3 \times \sqrt[3]{5} \times 2 \\ &= 6\sqrt[3]{5} \end{aligned}$

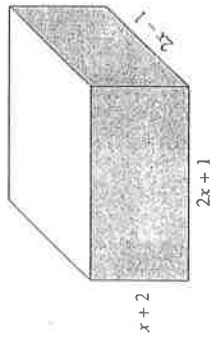
Which student made a mistake, if any?

- A. Jean
- B. Sally
- C. Mark
- D. All of them show correct work.

6. Simplify: $\left(\frac{-54x^6y}{2x^{-3}y^4}\right)^{\frac{4}{3}}$

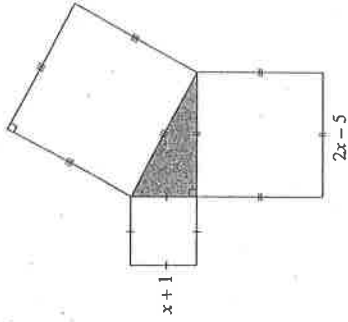
- A. $-36x^4y^4$
- B. $-\frac{36x^{12}}{y^4}$
- C. $81x^4y^4$
- D. $\frac{81x^{12}}{y^4}$

7. Determine a simplified expression for the lateral surface area of the prism below.



- A. $8x^2 + 16x$
- B. $8x^2 + 20x + 8$
- C. $16x^2 + 16x - 2$
- D. $4x^3 + 8x^2 - x - 2$

8. Determine an expression for the area of the largest square in the diagram below.



- A. $4x^2 + 25$
- B. $4x^2 - 20x + 25$
- C. $5x^2 + 26$
- D. $5x^2 - 18x + 26$

9. Derek expanded and simplified $(x-3)(2x^2+5x-8)$ as shown below.

x	-3		
$2x^2$	$2x^2$	$-6x^2$	Step I
$+5x$	$5x^2$	$-15x$	Step II
-8	$-8x$	-24	Step III
	$= 2x^3 - x^2 - 23x - 24$		Step IV

In which step is Derek's first mistake?

- A. Step I
- B. Step II
- C. Step III
- D. Step IV

10. When $5x^2 - 20$ is factored, how many factors are in the result?

- A. 2
- B. 3
- C. 4
- D. 5

11. One of the factors of $(3x^2 - 16x + k)$ is $(x - 7)$. Determine the value of k .

- A. -35
- B. -9
- C. 5
- D. 63

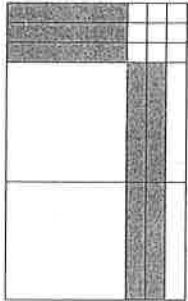
12. When factoring $x^2 - 7x + 6$ to the form $(x + a)(x + b)$, which two of the following characteristics are true?

I.	$ab = -7$	$a + b = 6$
II.	$ab = 6$	$a + b = -7$
III.	$a > 0$ and $b > 0$	
IV.	$a < 0$ and $b < 0$	
V.	$a > 0, b < 0$ or $a < 0, b > 0$	

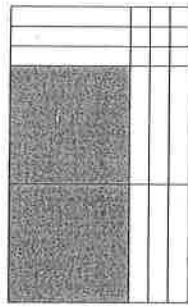
- A. I and III
- B. I and IV
- C. II and IV
- D. II and V

13. Which of the following areas formed by math tiles is factorable?

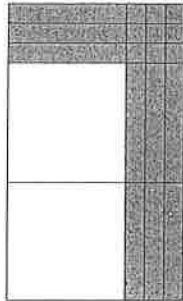
A.



B.



C.

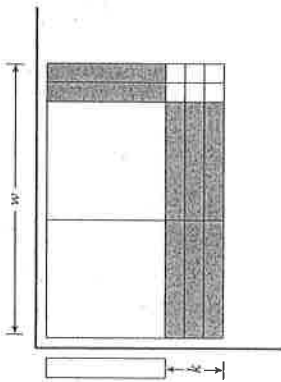


D.



PART B: NUMERIC-RESPONSE QUESTIONS

14. Determine the missing tiles, labelled w , in the tile model below.



- A.
- B.
- C.
- D.

15. Given $\sqrt[n]{x^{10}} = x^2$, determine the value of n . Answer to the nearest integer.

Record your answer neatly on the Answer Sheet.

16. When $\left(\sqrt[4]{7^9}\right)\left(\sqrt[5]{7^3}\right)$ is simplified to 7^n , determine the value of n . Answer to two decimal places.

Record your answer neatly on the Answer Sheet.

Foundations of Mathematics and Pre-Calculus 10

Sample Items — Algebra and Numbers

Answer Key

Cognitive Processes

N = Knowing

P = Applying

Q = Reasoning

Question Types

= Multiple Choice – no calculator (MN)

= Multiple Choice (MC)

= Numerical Response (NR)

Topics

1. Measurement

2. Algebra and Number

3. Relations and Functions

Prescribed Learning Outcomes (PLOs)

A

B

C


Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type
1.	B	N	1	2	B1	MN
2.	B	N	1	2	B3	MN
3.	A	Q	1	2	B3	MC
4.	C	P	1	2	B1	MC
5.	A	P	1	2	B2	MC
6.	D	P	1	2	B3	MC
7.	A	Q	1	2	B4, A3	MC
8.	D	Q	1	2	B4, A4	MC
9.	C	P	1	2	B4	MC
10.	B	N	1	2	B5	MC
11.	A	Q	1	2	B5	MC
12.	C	Q	1	2	B5	MC
13.	D	P	1	2	B5	MC
14.	B	N	1	2	B5	MC
15.	5	N	1	2	B3	NR
16.	2.85	P	1	2	B3	NR



Foundations of Mathematics and Pre-Calculus 10

Sample Questions for Relations and Functions

Instructions

1. You may require a protractor and a ruler (metric and imperial) for paper versions of the questions.
2. You may use math tiles.
3. When using your calculator (scientific or approved graphing calculator):
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PART A: MULTIPLE-CHOICE QUESTIONS

1. Determine the x-value of the point of intersection for the system represented by $f(x) = 3$ and $g(x) = \frac{5}{2}x + 1$.

- A. 0.8
- B. 1.6
- C. 5
- D. 8

2. In which quadrant does the following system contain a solution?

$$y = 2x + 1$$

$$y - 1 = \frac{1}{2}(x - 2)$$

- A. Quadrant I
- B. Quadrant II
- C. Quadrant III
- D. Quadrant IV

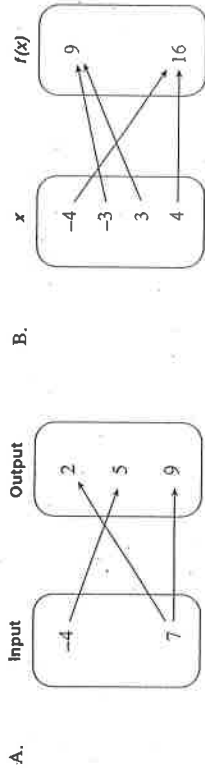
3. Determine the solution to the following linear system:

$$y = -2x + 5$$

$$4x + 2y - 15 = 0$$

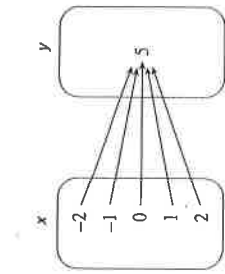
- A. (5, -5)
- B. (5, -2.5)
- C. There is no solution.
- D. There are infinite solutions.

4. Which of the following relations is **not** a function?



- B. 

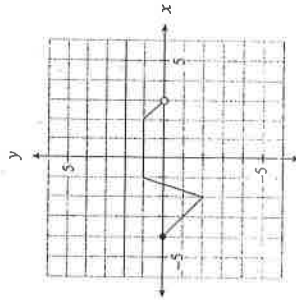
- C. 



5. The altitude of a plane is a function of the time since takeoff. Identify the dependent variable.

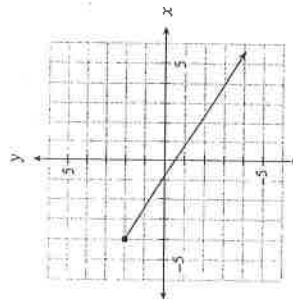
- A. time
- B. speed
- C. altitude
- D. acceleration

6. Determine the domain of the following relation.



- A. $(-4, 3)$
- B. $[-4, 3]$
- C. $(-4, 3]$
- D. $[-4, 3)$

7. Determine the range of the following relation.



- A. $(-\infty, \infty)$
- B. $(-\infty, 2]$
- C. $[-4, \infty)$
- D. $(2, \infty)$

8. A bag of caramel candies has a total mass of 180 g, excluding the mass of the bag. Each candy has a mass of 6 g. As a candy is taken out of the bag and eaten, the mass of the remaining candies is plotted versus how many candies are left in the bag. Determine the range for this relation.

- A. $\{0, 1, 2, 3, \dots, 30\}$
- B. $\{0, 6, 12, \dots, 180\}$
- C. $\{0, 1, 2, 3, 4, 5, 6\}$
- D. all real numbers

9. Determine the equation of the line that passes through $A(6, 0)$ and is perpendicular to the line formed by $B(-4, 9)$ and $C(-7, 10)$.

- A. $y = 3x - 18$
- B. $y = 3x + 18$
- C. $y = \frac{1}{3}x + 2$
- D. $y = \frac{1}{3}x - 2$

10. A boat took 3 hours to travel 24 km with the current. On the return trip, the boat took 5 hours to travel 24 km against the current. Determine the speed of the current.

- A. 1.6 km/h
- B. 4 km/h
- C. 6.4 km/h
- D. 24 km/h

PART B: NUMERIC-RESPONSE QUESTIONS

11. Two acid solutions are to be mixed together.
- Solution A is 30% acid by volume.
 - Solution B is 70% acid by volume.

How much of solution A is needed to mix with solution B to make an 800 mL mixture that is 54% acid by volume? Answer to the nearest millilitre.

Record your answer neatly on the Answer Sheet.

Foundations of Mathematics and Pre-Calculus 10
 Sample Items — **Relations and Functions**
 Answer Key

Cognitive Processes

N = Knowing

P = Applying

Q = Reasoning

Question Types

= Multiple Choice – no calculator (MN)

= Multiple Choice (MC)

= Numerical Response (NR)

Topics

1. Measurement

2. Algebra and Number

3. Relations and Functions

Prescribed Learning Outcomes (PLOs)

A

B

C

Question Number	Keyed Response	Cognitive Process	Mark	Topic	PLO	Question Type
1.	A	N	1	3	C8	MN
2.	C	P	1	3	C9	MN
3.	C	P	1	3	C9	MC
4.	A	N	1	3	C2	MC
5.	C	P	1	3	C4	MC
6.	B	N	1	3	C1	MC
7.	B	N	1	3	C5	MC
8.	B	P	1	3	C5	MC
9.	A	P	1	3	C7	MC
10.	A	Q	1	3	C9	MC
11.	320	Q	1	3	C9	NR