Secondary Mathematics Assessment

Sampler
521-B

Instructions for Students

Description

This sample test includes 15 Selected Response and 5 Constructed Response questions. Each Selected Response has a value of 1. The value for each Constructed Response is given at the bottom of the page in the right-hand corner. The questions are from the following strands:

- Algebra and Number
- Relations and Functions
- Trigonometry

The actual assessment was developed to be completed in two and half hours; however, you may take an additional thirty minutes to complete the test.

Instructions

- During the test session, do not proceed until instructed to do so.
- If you receive a damaged or misprinted booklet, raise your hand and the exam supervisor will give you a new one.
- You are expected to remain in the room for the first hour and a half of the test session. You may only leave before that time for exceptional circumstances, such as illness. Should you need to temporarily leave the room, you will be accompanied by a teacher.
- To write the test you should only have the test materials, pencils, an eraser, a foreign language dictionary (if required), a ruler, and an approved calculator.
- All work must be completed in the Examination Booklet. Tear-out Formula Sheets are provided in your Examination Booklet.
- You may not discard any materials. The Examination Booklets with the exception of the Formula Sheets, must remain intact.
- You may not leave the room with any test materials.
- You will not receive assistance from, nor give assistance to, another student. If you require something during the test, raise your hand and the exam supervisor will come to you.
- During the test, the exam supervisor can only help you with the directions, not the test questions.
- Electronic communication through phones, email, or file sharing during the test is strictly prohibited. Turn off your cell-phones and all other prohibited electronic devices at this point.

Selected Response

- You must use a pencil to fill in the bubbles on the Bubble Sheet. Make sure that the question number from the Examination Booklet corresponds with the same number on the Bubble Sheet. Shade only one circle for each question. If you want to change an answer, completely erase the shaded circle and fill in your new choice.
- Although you are encouraged to show your work for the Selected Response questions in your Examination Booklet, **only the answers on the Bubble Sheet will be recorded and marked**.
- Remember to attempt all Selected Response questions. Marks will not be deducted for incorrect responses.

Constructed Response

- For the Constructed Response questions, all work must be done in the Examination Booklet and points are earned for correct work so ensure that you show all your work.
- The value for each Constructed Response is given at the bottom of the page in the right-hand corner.
- The Answer Box is reserved for your final answer and/or summary statement. Use the blank space to show your calculations and process.
- When units are used in a question, it is expected that you include units in your answer.
- The word “solve” implies solving the problem algebraically.
- When instructed to so do, round off appropriately.

Test-Taking Strategies

- Remember that diagrams are not necessarily drawn to scale.
- Always read each question carefully.
- Study the diagrams and graphs, paying particular attention to measures, markings, and relationships before attempting an answer.
- Draw a picture or diagram to help you solve some problems.
- If you get stuck on a question, go on to the next question. Come back to any skipped questions at the end.
- Re-read the question if necessary.
- Answer every question, even if you are unsure that you are correct.
- Use any extra time to check your answers.
- Ensure that your calculator is in degrees.

1) Determine the measure of angles in standard position ($0° < \theta < 360°$), that have a reference angle $\theta_R = 15°$.

Ⓐ 15°
105°
195°
285°

Ⓑ 15°
105°
195°
345°

Ⓒ 15°
165°
195°
285°

Ⓓ 15°
165°
195°
345°

2) The point $(6, -8)$ lies on the terminal arm of an angle, θ, in standard position. Determine the exact trigonometry ratio for $\sin\theta$. .

Ⓐ $-\frac{4}{3}$

Ⓑ $-\frac{4}{5}$

Ⓒ $\frac{3}{5}$

Ⓓ $\frac{4}{5}$

3) A 14 m flagpole is starting to lean as its base erodes. To prevent the flagpole from falling, a cable is attached 4 m from the top of the flagpole and is secured in the ground 10 m from the base of the flagpole. If the flagpole is leaning 5° from the vertical, how long is the cable, rounded to the nearest tenth of a metre?

Ⓐ 0.9 m

Ⓑ 14.1 m

Ⓒ 14.7 m

Ⓓ 17.9 m

4) Compare the quadratic function $y = -3(x-4)^2 - 7$ to the quadratic function $y = x^2$.

Ⓐ The parabola opens down, is narrower and has been translated horizontally 4 units to the right and vertically 7 units downward.

Ⓑ The parabola opens down, is wider and has been translated horizontally 4 units to the left and vertically 7 units downward.

Ⓒ The parabola opens up, is narrower and has been translated horizontally 4 units to the left and vertically 7 units downward.

Ⓓ The parabola opens up, is wider and has been translated horizontally 4 units to the right and vertically 7 units downward.

5) A movie store sells movies for $4 each. At this price, their weekly sales are approximately 100 movies. Research says that for every $2 increase in price, the store will sell 5 fewer movies. Determine the price that will give the maximum revenue.

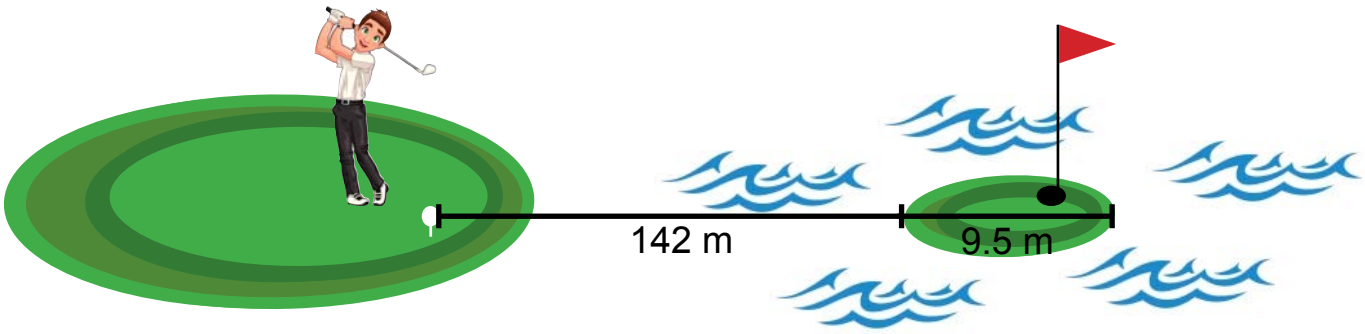
Ⓐ $9

Ⓑ $18

Ⓒ $22

Ⓓ $1210

6) A golf ball follows the path of the equation $h(d) = d - 0.006125d^2$ where $h(d)$ is the height of the ball in metres and d is the horizontal distance in metres. If the golfer is 142 m from a circular island that has a diameter of 9.5 m, does the ball land on the island?



Ⓐ Yes. The ball lands on the island.

Ⓑ No. The ball lands in the water before the island.

Ⓒ There is not enough information provided to draw a conclusion.

Ⓓ No. The ball passes over the island and lands in the water on the farside.

7) Express in simplest form: $\frac{5\sqrt{3}+\sqrt{7}}{2\sqrt{3}-\sqrt{7}}$

Ⓐ $\frac{25}{9}$

Ⓑ $\frac{10+7\sqrt{21}}{4}$

Ⓒ $\frac{37+7\sqrt{21}}{19}$

Ⓓ $\frac{37+7\sqrt{21}}{5}$

8) Solve: $\sqrt{x+1} + 3 = 5$

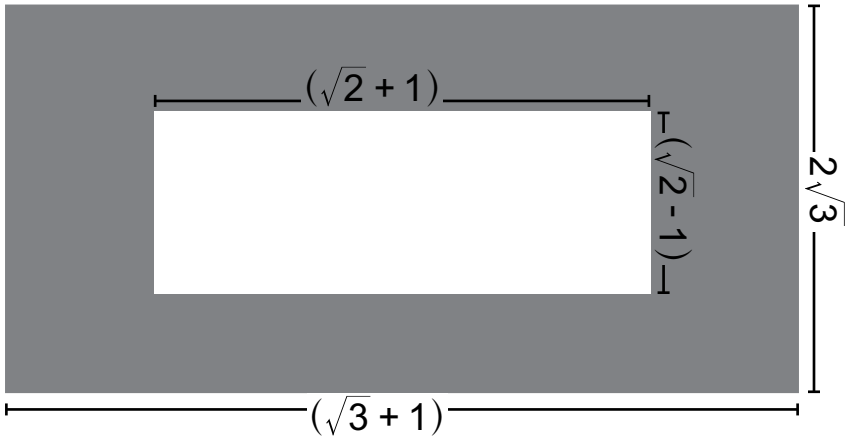
Ⓐ x = 1

Ⓑ x = 3

Ⓒ x = 5

Ⓓ No Solution

9) A grey piece of tile with dimensions $(\sqrt{3}+1)$ by $2\sqrt{3}$ has a white piece of tile with dimensions $(\sqrt{2}+1)$ by $(\sqrt{2}-1)$ placed on top of it as shown in the diagram below. What is the area of the grey tile which remains exposed?



Ⓐ 1

Ⓑ $-1+5\sqrt{3}$

Ⓒ $5+2\sqrt{3}$

Ⓓ $6+2\sqrt{3}$

10) Solve: $\frac{x}{x-3} = \frac{-6}{x^2-8x+15}$

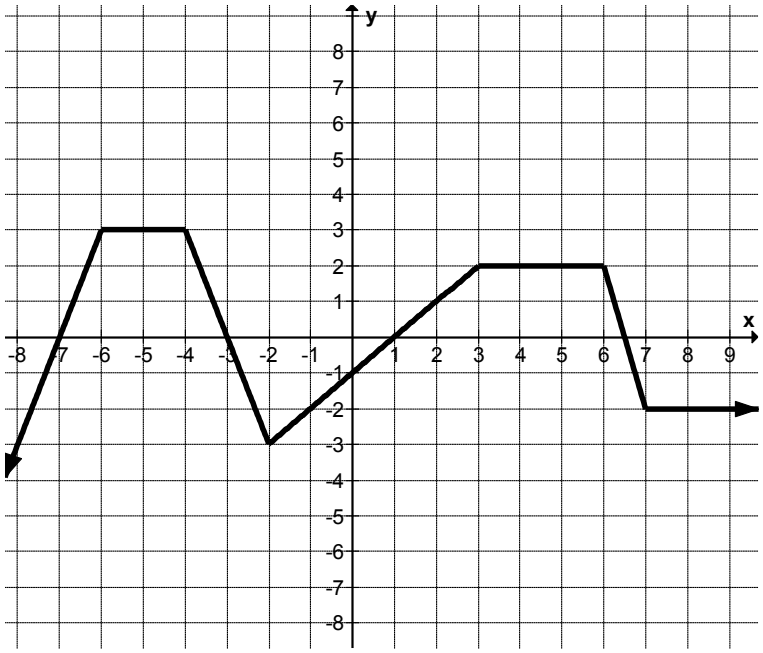
Ⓐ $x = 2$

Ⓑ $x = 3$

Ⓒ $x = 2$
$x = 3$

Ⓓ $x = 6$
$x = -1$

11) A grade 11 math class was challenged with this question: A function $y = f(x)$ is graphed, as shown below; how many vertical asymptote(s) does the reciprocal function have?



Ⓐ 1

Ⓑ 2

Ⓒ 3

Ⓓ 4

12) Solve the system of equations:

$$5x - 2y + 14 = 0$$
$$y = -3x^2 + x - 6$$

Ⓐ no solution

Ⓑ (0, -6)

Ⓒ (-2, -20) and (3, -30)

Ⓓ (0, 6) and (-2, 2)

13) What is the solution to the inequality $6x^2 - x - 2 > 0$?

Ⓐ $x < \frac{1}{2},\ x > -\frac{2}{3}$

Ⓑ $x < -\frac{1}{2},\ x > \frac{2}{3}$

Ⓒ $-\frac{2}{3} < x < \frac{1}{2}$

Ⓓ $-\frac{1}{2} < x < \frac{2}{3}$

14) On the first day of each month, Michael places money in his piggy bank. The first month he places $5 in the piggy bank. The second month he places $7 in the piggy bank, and the next month he places $9 in the piggy bank. If this pattern continues, how much money will Michael have placed in the piggy bank during a two year period?

Ⓐ $51

Ⓑ $636

Ⓒ $672

Ⓓ $696

15) The population of a community was 82 000 at the beginning of 2010. Assuming that the population increases at a rate of 1.6% per year since 2010, what will the population be at the beginning of 2035?

Ⓐ 120 023

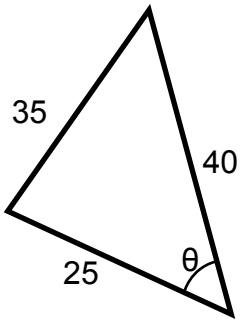
Ⓑ 121 943

Ⓒ 2 496 431

Ⓓ 2 618 375

Constructed Response

16) Find θ. Round the answer to the nearest degree.



Answer: _____°

16.

For Department Use Only

Value of 1

17) Use a quadratic function to model and solve the given problem:

A landscaper is designing a 6 m by 8 m rectangular garden that will then be surrounded by a uniform border of crushed stone. She has enough crushed stone to cover 72 m². What is the width of the border if she uses all of the crushed stone?

Answer:

17. For Department Use Only

Value of 3

18) Solve and identify all non-permissible values.

$$\frac{9x-3}{x^2-x-6}-\frac{6}{x-3}=2$$

Answer:

18.

For Department Use Only

Value of 3

19) Solve : $|x^2 + 5x| = 2x$

Answer:

19.

For Department Use Only

Value of 3

20) The monthly production of crude oil, in barrels, for the first four months for a test well at Hebron is given below. In theory, what is the expected lifetime production of the well, to the nearest barrel?

Month	# of Barrels
1	40 000
2	34 000
3	28 900
4	24 565

Answer:

20.

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Value of 2

Tear-out Page

Pre-Calculus 11 Formula Sheet

$t_n = t_1 + (n-1)d$

$t_n = t_1 r^{n-1}$

$y = a(x-p)^2 + q$

$S_n = \frac{n}{2}(t_1 + t_n)$

$S_n = \frac{rt_n - t_1}{r-1}$

$y = ax^2 + bx + c$

$S_n = \frac{n}{2}[2t_1 + (n-1)d]$

$S_n = \frac{t_1(r^n - 1)}{r-1} = \frac{t_1(1-r^n)}{1-r}$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

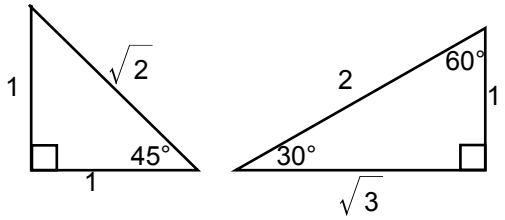
$q = c - ap^2$

$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$

$S_\infty = \frac{-t_1}{r-1} = \frac{t_1}{1-r}$

$p = \frac{-b}{2a}$

$c^2 = a^2 + b^2 - 2ab\cos C$



Fold and tear along perforation.

The grid (below) can be used to help you with any questions. It is suggested that you place the grid paper under the question sheet and trace over it so you can reuse the grid throughout the assessment.