Grade 12
Pre-Calculus Mathematics
Achievement Test

Booklet 2

January 2026

Manitoba

Grade 12 Pre-Calculus Mathematics Achievement Test:
Booklet 2 (January 2026)

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Available in alternate formats upon request.

Grade 12 Pre-Calculus Mathematics Achievement Test

DESCRIPTION

Time Required to Complete the Test: 3 hours
Additional Time Allowed: 30 minutes

Number and Marks by Question Type

	Selected Response	Constructed Response	Marks
Booklet 1	—	17	37
Booklet 2	**8**	**20**	**53**
Total	8	37	**90**

Note that diagrams and graphs provided in the test booklets may not be drawn to scale.

DIRECTIONS

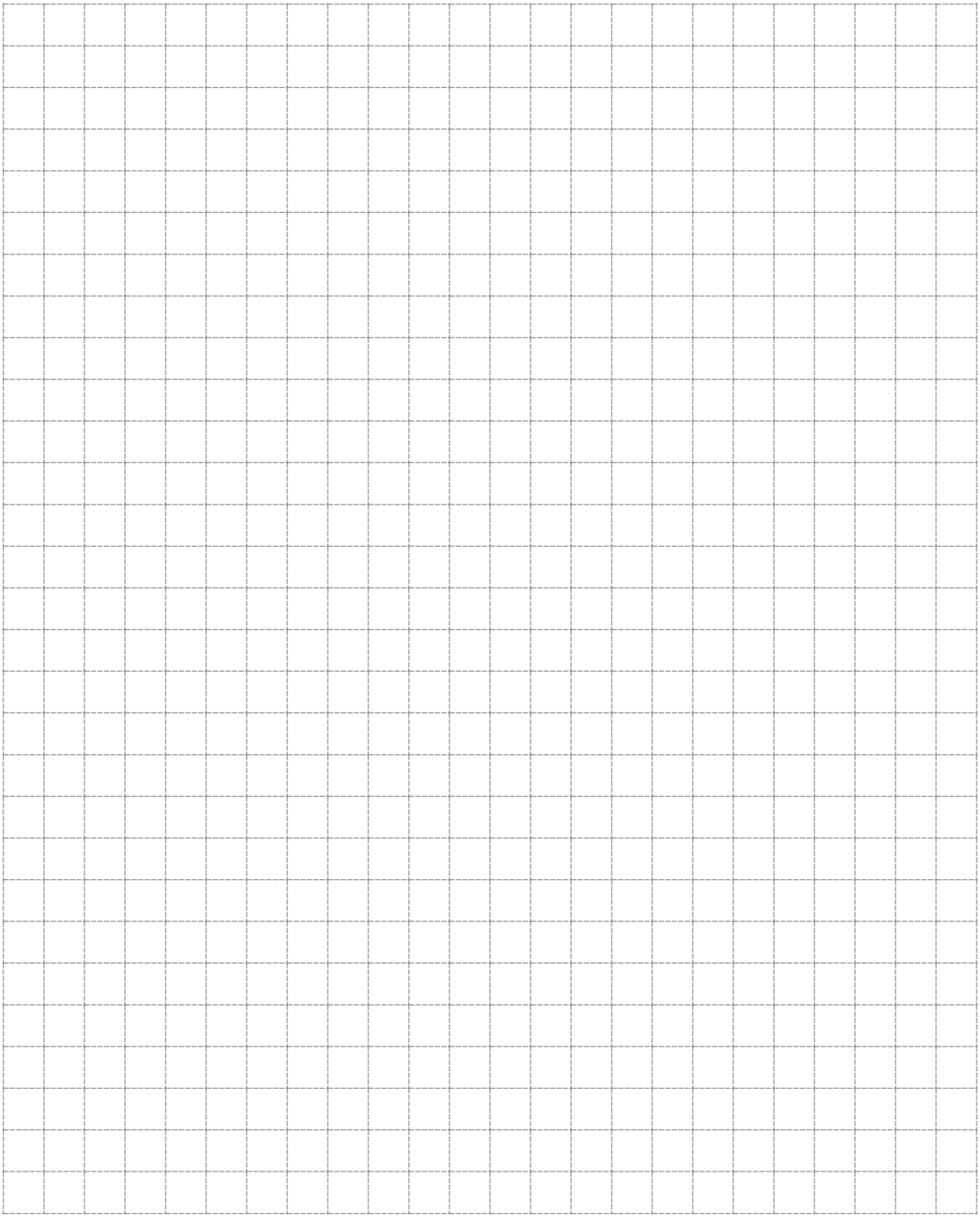
Selected Response Questions

- Calculators are **not** allowed for this part of the test.
- You may use the spaces beside each question for rough work.
- Provide only one answer per question.
- There is no penalty for guessing.
- Record your answers on the sheet provided.

Constructed Response Questions

- Calculators are **not** allowed for this part of the test.
- Write each solution in the space provided.
- For full marks, your answer must show all pertinent diagrams, calculations, and explanations.
- Your solutions should be neat, clear, and well organized.

NO MARKS WILL BE AWARDED FOR WORK DONE ON THIS PAGE.



Question 18 — 1 mark

Given $\theta = 240°$, identify the coordinates of the point, $P(\theta)$, on the unit circle.

a. $\left(-\frac{\sqrt{3}}{2}, -\frac{1}{2}\right)$

b. $\left(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$

c. $\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$

d. $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$

Question 19 — 1 mark

Given the functions, $f(x) = -3x + 5$ and $g(x) = x^2 + x - 1$, identify the value of $g(f(2))$.

a. −10

b. −5

c. −3

d. −1

Question 20 — 1 mark

Given $f(x)=\sqrt{x}+5$, identify the equation of the transformed graph that has the same *y*-intercept.

a. $y=f(x-3)$

b. $y=-3f(x)$

c. $y=f(-3x)$

d. $y=f(x)-3$

Question 21 — 1 mark

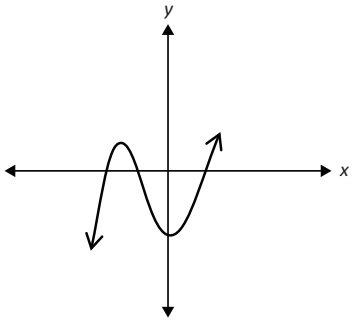
Given the graph of $p(x)=ax^3+bx^2+cx+d$, identify the statement that is true.

a. $a>0,\ d<0$

b. $a>0,\ d>0$

c. $a<0,\ d<0$

d. $a<0,\ d>0$



Question 22 — 1 mark

Identify the general solution of the equation, $\csc\theta = -1$.

a. $\theta=\frac{\pi}{2}+k\pi,\ k\in\mathbb{Z}$

b. $\theta=\frac{3\pi}{2}+2k\pi,\ k\in\mathbb{Z}$

c. $\theta=\frac{3\pi}{2}+k\pi,\ k\in\mathbb{Z}$

d. $\theta=\pi+2k\pi,\ k\in\mathbb{Z}$

Question 23 — 1 mark

Identify the equation of a radical function with a domain of $[-6,\infty)$ and a range of $(-\infty,3]$.

a. $y=-\sqrt{x+6}-3$

b. $y=-\sqrt{x+6}+3$

c. $y=\sqrt{-(x+3)}-6$

d. $y=\sqrt{x-6}+3$

Question 24 — 1 mark

Identify the value of n in the equation, ${}_nC_3 = {}_nC_7$.

a. 3

b. 4

c. 7

d. 10

Question 25 — 1 mark

Identify the remainder when $p(x)=x^5-1$ is divided by $(x+1)$.

a. −2

b. −1

c. 0

d. 4

Question 26 — 2 marks

Match each function with its corresponding graph.

Write the corresponding letter in this column.

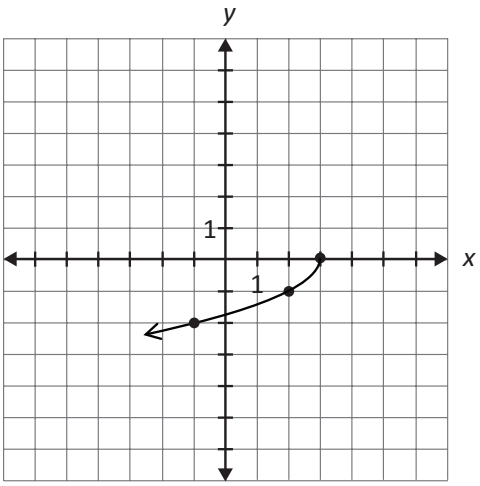
$y = \sqrt{x} - 3$ _____

$y = \sqrt{-x} + 3$ _____

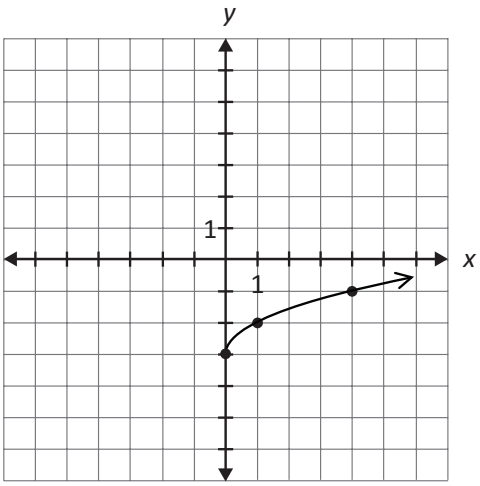
$y = -\sqrt{x+3}$ _____

$y = -\sqrt{-(x-3)}$ _____

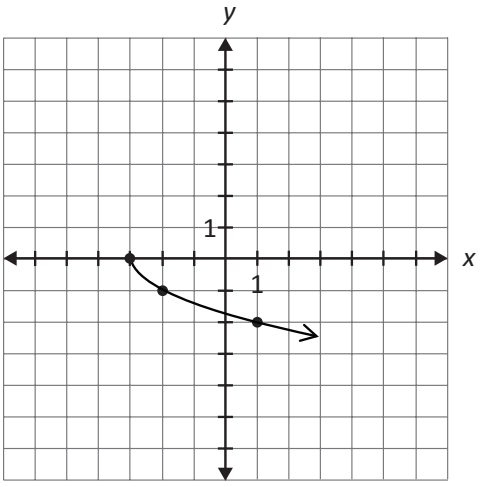
A)



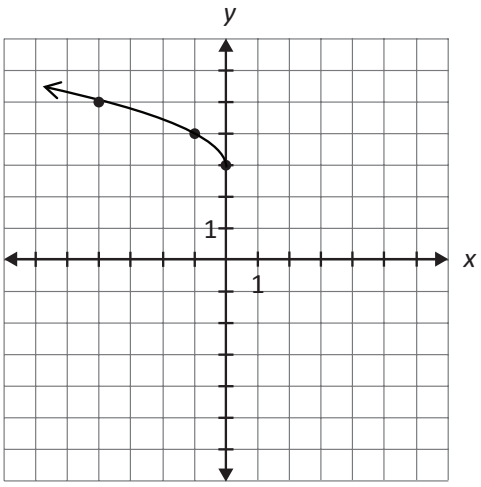
B)



C)



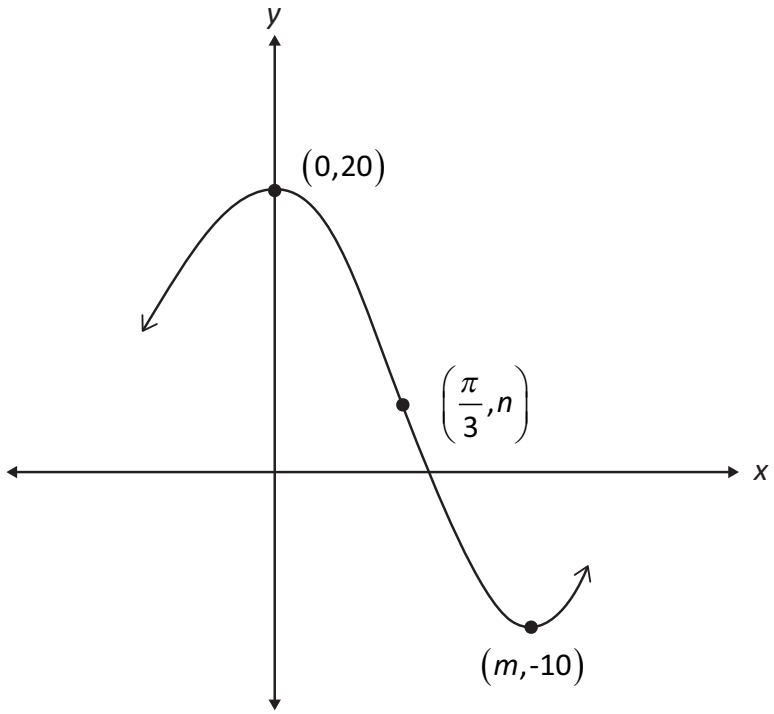
D)



Question 27 — 2 marks

123

The amplitude, A, of the sinusoidal function can be determined using the equation $A = 20 - n$.
State the values of m and n.



Question 28 — 3 marks — 124

Solve, algebraically.

$${}_{n-1}P_2 = 20$$

Question 29 — 3 marks — 125

Determine the exact value of $\sin\left(\frac{23\pi}{12}\right)$.

Question 30 — 1 mark

126

Cameron was asked to solve the equation, $\log_3(x-4)=2$.

Cameron's solution:

$x - 4 = 2^3$

$x - 4 = 8$

$x = 12$

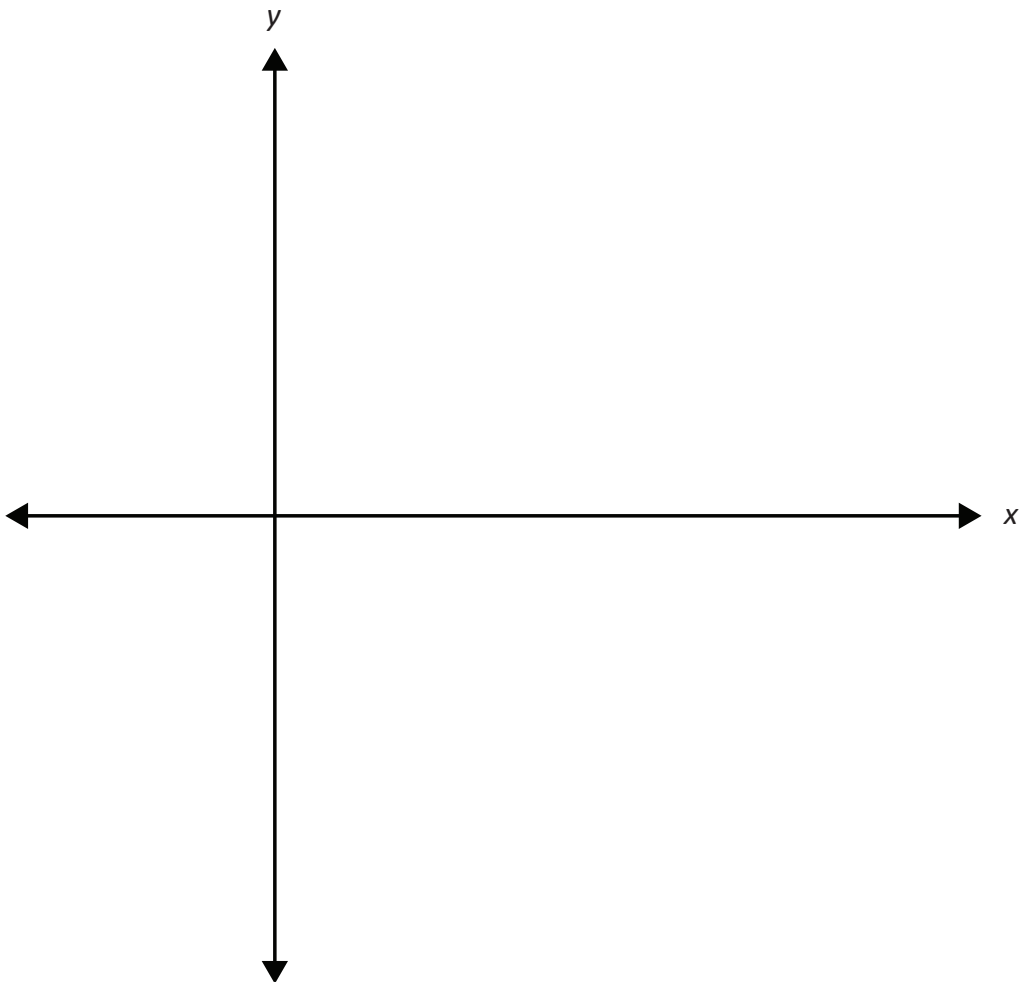
Describe Cameron's error.

Question 31 — 1 mark — 127

Given the identity $\sin^2\theta = \dfrac{\tan\theta\sin\theta}{\sec\theta}$, state the non-permissible value of θ over the interval $[\pi, 2\pi]$.

Question 32 — 4 marks — 128

Sketch the graph of $y = -5\cos\left(\frac{\pi}{2}x\right) + 2$ over the domain $[0,5]$.



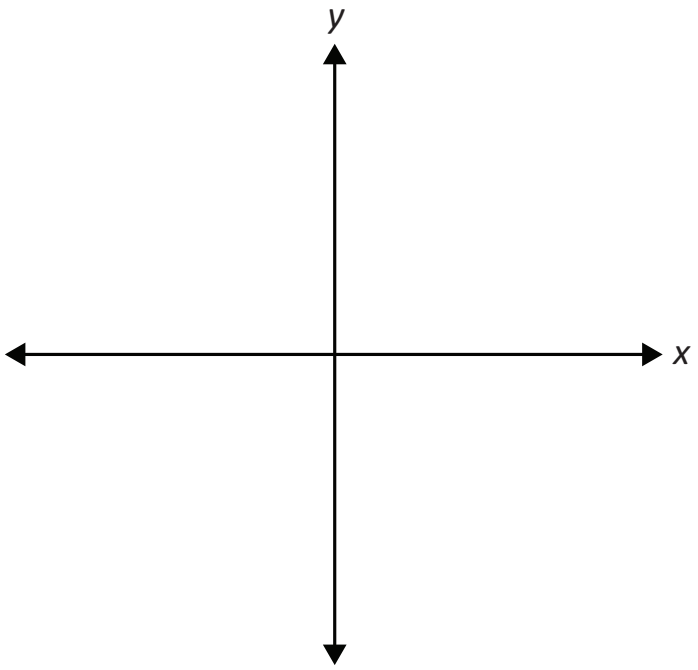
Question 33 — 1 mark

129

Describe the behaviour of the graph of the polynomial function, $p(x) = (x-3)^2(x-1)$, as it approaches the x-intercept at $x = 3$.

Question 34 — 1 mark — 130

Sketch the angle of 4 radians in standard position.



Question 35 — 4 marks

131

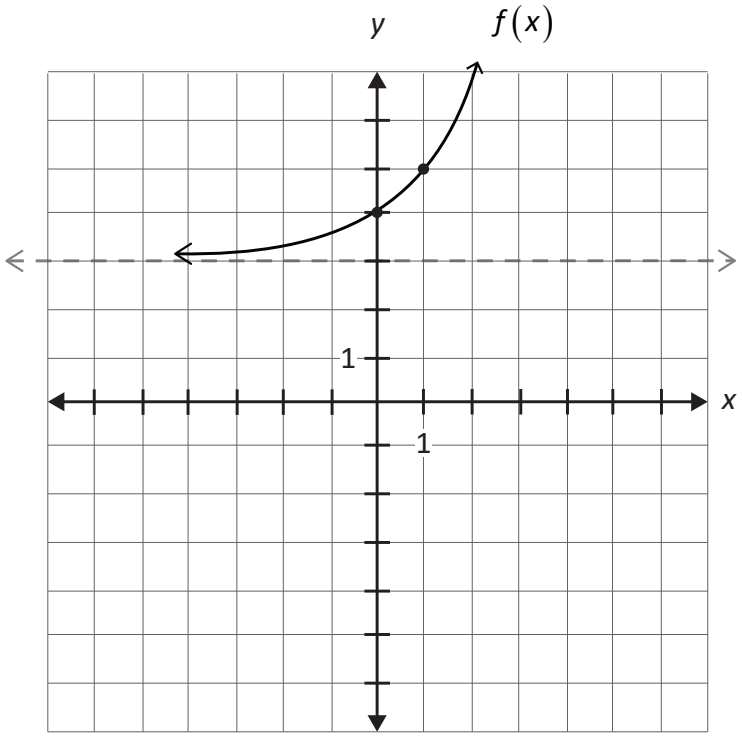
Solve, algebraically.

$$\log_5 12 + 2\log_5 x = \log_5 48$$

Question 36 — 2 marks

132

State the equation of the exponential function represented by the graph of $f(x)$.



$f(x) =$ _____

Question 37 — 3 marks

133

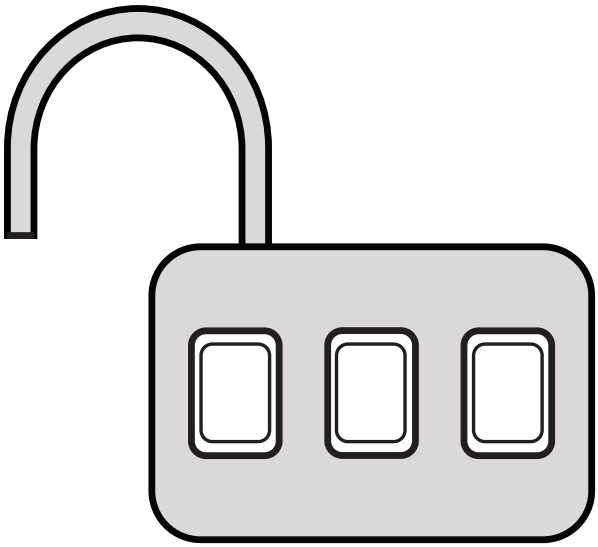
Evaluate.

$$\cos\left(\frac{11\pi}{3}\right)+\csc\left(-\frac{\pi}{3}\right)\cot\left(\frac{11\pi}{6}\right)$$

Question 38 — 1 mark

134

Min Li has a 3-digit code for his lock. Determine the number of possible codes for his lock, if repetition is allowed.



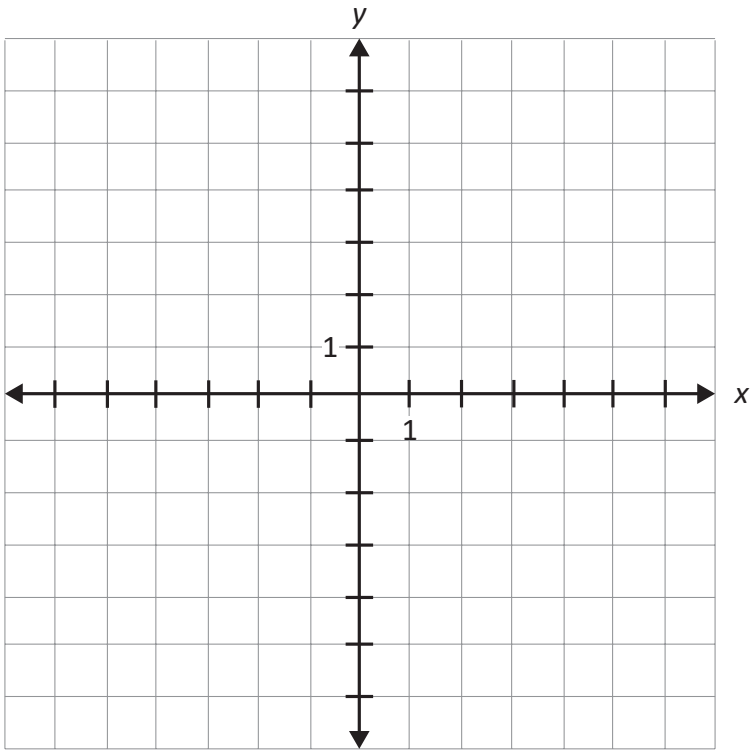
Question 39 — 2 marks — 135

Solve, algebraically.

$$\left(\frac{1}{6}\right)^{3x+2} = 6^{2x}$$

Question 40 — 4 marks — 136

Sketch the graph of $f(x)=\dfrac{5}{(x-1)(x+3)}$ and state the y-intercept.



y-intercept: _____

Question 41 — 2 marks

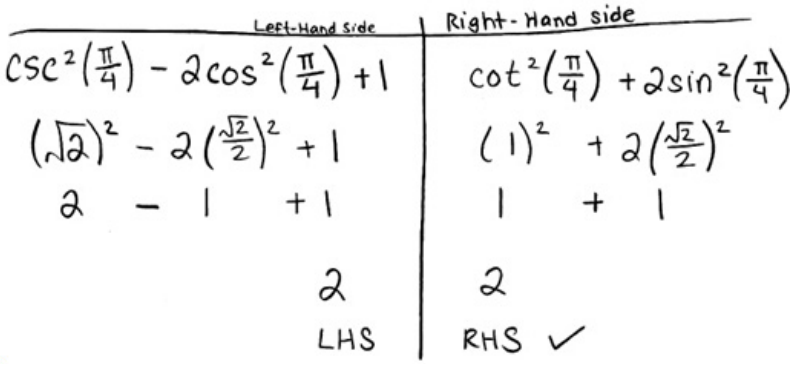
137

Given $\log_2 x = 5$, determine the value of $\log_4 (2x)$.

Question 42 — 1 mark — 138

Henry was asked to prove the identity, $\csc^2\theta - 2\cos^2\theta + 1 = \cot^2\theta + 2\sin^2\theta$, for all permissible values of θ.

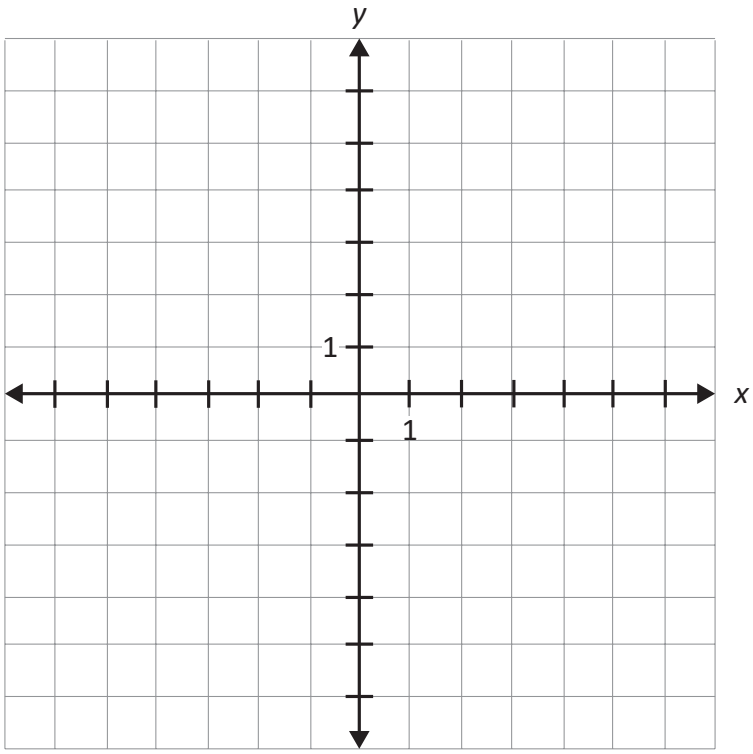
His work:



Explain why his proof is insufficient.

Question 43 — 4 marks

Sketch the graph of $y-2=-\sqrt{x-1}$.



Question 44 — 2 marks — 140

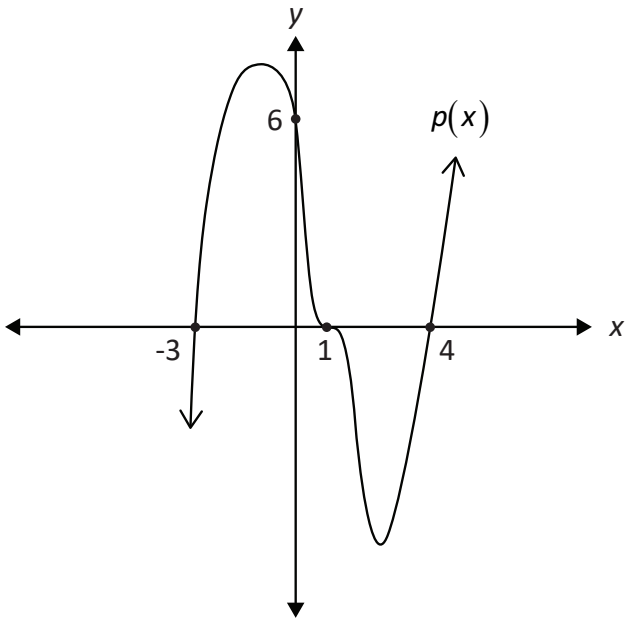
Evaluate.

$$\log_3 54 - \log_3 6$$

Question 45 — 2 marks

141

Determine, algebraically, the equation of the graph of the polynomial function, $p(x)$.



$p(x)$ = _____

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