PRACTICE EXAM #2

Value: 12 marks

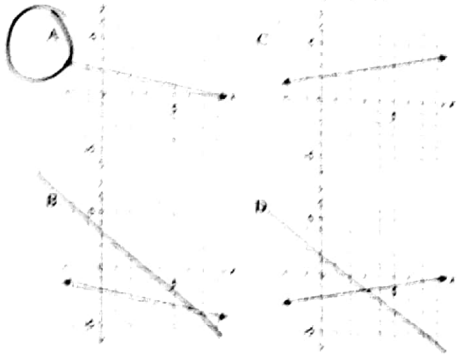
Suggested Time: 30 minutes
Allowable Time: 40 minutes

PART A: MULTIPLE-CHOICE QUESTIONS

INSTRUCTIONS: **No calculator may be used for this part of the examination.** For each question, select the **best** answer and record your choice on the **blue Answer Sheet** provided.

Using an HB pencil, completely fill in the bubble that has the letter corresponding to your answer. You have a **maximum of 40 minutes** to work on this section.

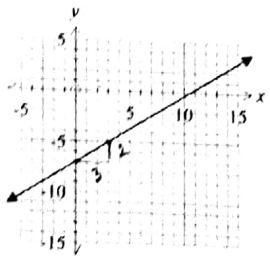
1. Which graph represents the relation $x + 4y - 8 = 0$?



y-int $(x=0)$: $x - 8 = 0$, $x = 8$, $(8, 0)$

x-int $(y=0)$: $4y = 8$, $y = 2$, $(0, 2)$

Use the following graph to answer question 2.



2. Which of the following equations describes the linear relation graphed above?

I	$y = \frac{2}{3}x - 7$ ✓
II	$3y + 21 - 2x = 0$ ✓
III	$2x - y = -21$
IV	$y + 5 = \frac{2}{3}(x + 3)$

$y = \frac{2}{3}x - 7$

$y = 2x + 21$

$y + 5 = \frac{2}{3}x + 2$

$y = \frac{2}{3}x - 3$

A. I only
B. I and II
C. I and III
D. I, II and IV

3. Solve the following system of equations.

$-5x + y = -7$ → $-10x + 2y = -14$
$-6x - 2y = -12$ → $-8x - 7y = -12$

$-13x = -26$ $x = 2$

$-5(2) + y = -7$

$y = -7 + 10$ $y = 3$

A. (2, 3)
B. (2, −17)
C. (0, −3)
D. (3, 8)

4. How many solutions does the following system of equations have?

$y = \frac{1}{2}x + 4$
$y = \frac{1}{2}x - 3$ parallel lines!

A. no solutions
B. one solution
C. an infinite number of solutions
D. cannot be determined

5. What is the least common multiple of 24 and 30?

A. 2×3
B. $2 \times 3 \times 5$
C. $2^2 \times 3 \times 5$
D. $2^3 \times 3 \times 5$

24: 2 · 12 · 2 · 3 · 4 · 2 · 3 · 2 · 2 → $2^3 \cdot 3$

30: 2 · 15 · 3 · 5 → $2 \cdot 3 \cdot 5$

LCM: $2^3 \cdot 3 \cdot 5$

6. What is the greatest common factor of 18, 20, 36, 60?

18: 2 · 9 · 3 · 3
20: 2 · 10 · 2 · 5
36: 3 · 12 · 3 · 4 · 3 · 2 · 2 · 3
60: 2 · 30 · 2 · 15 · 2 · 3 · 5

A. 900
B. 6
C. 4
D. 2

7. Simplify: $\sqrt{128}$

$\sqrt{2 \cdot 64}$
$\sqrt{2 \cdot 2 \cdot 32}$
$\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2}$
$= 2 \cdot 2 \cdot 2\sqrt{2}$

A. $2\sqrt{32}$
B. $4\sqrt{8}$
C. $8\sqrt{2}$
D. $64\sqrt{2}$

8. Order the numbers from smallest value to largest value

I	$-5\sqrt{3}$
II	$\sqrt{16}$
III	$3\sqrt{2}$
IV	$-3\sqrt{5}$

$-\sqrt{75}$
$\sqrt{16}$
$\sqrt{18}$
$-\sqrt{45}$

A. IV, I, II, III
B. I, IV, II, III
C. IV, I, III, II
D. I, IV, III, II

9. Simplify: $(2x^5)^4 \bullet 5x^3$ $= 2^4 x^{20} \cdot 5x^3$ $16x^{20} \cdot 5x^3$ $80x^{23}$

A. $80x^{23}$
B. $80x^{12}$
C. $40x^{23}$
D. $10x^{12}$

10. Evaluate: $27^{-\frac{2}{3}}$ $\frac{1}{(\sqrt[3]{27})^2} = \frac{1}{(3)^2} = \frac{1}{9}$

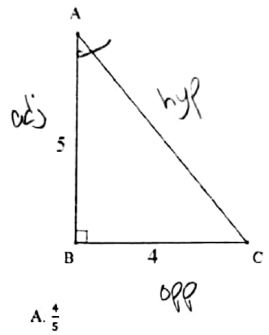
A. -9
B. $\frac{1}{9}$
C. -18
D. $\frac{1}{18}$

11. Which of the following calculations converts 18 kilograms to ounces?

I.	$18\ kg \times \frac{2.2\ lb}{1\ kg} \times \frac{16\ oz}{1\ lb}$
II.	$18\ kg \times \frac{1{,}000\ kg}{1\ g} \times \frac{1\ lb}{454\ g} \times \frac{1\ oz.}{16\ lb}$
III.	$18\ kg \times \frac{2.2\ kg}{1\ lb} \times \frac{1\ lb}{16\ oz}$
IV.	$18\ kg \times \frac{1{,}000\ g}{1\ kg} \times \frac{1\ kb}{454\ g} \times \frac{16\ oz}{1\ lb}$

A. I only
B. I and III
C. I and IV
D. I, II and IV

12. Determine the ratio of sin A. $= \frac{opp}{hyp}$ $hyp = \sqrt{5^2 + 4^2} = \sqrt{25 + 16} = \sqrt{41}$



$\sin A = \frac{4}{\sqrt{41}}$

A. $\frac{4}{5}$
B. $\frac{4}{3}$
C. $\frac{5}{\sqrt{41}}$
D. $\frac{4}{\sqrt{41}}$

This is the end of Part A (calculator not permitted).

If there is some time left, you have two options:

1. Make sure you have answered all the questions. You will not be able to go back to this section at the end of 40 minutes.
2. You may proceed to the rest of the examination without the use of a calculator; there are many questions that do not require a calculator. Make sure you flag any questions you skip to remember to go back to them later.

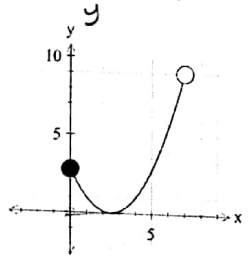
Do not access your calculator until directed by the supervisor. At the end of the 40 minutes, the supervisor will give you permission to access your calculator.

Value: 42 marks **Suggested Time: 75 minutes**

PART B: MULTIPLE-CHOICE QUESTIONS

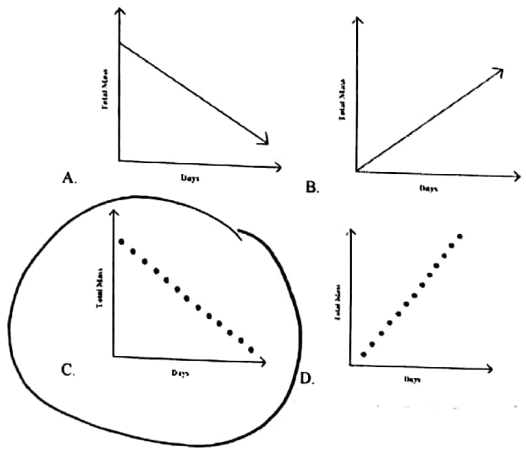
INSTRUCTIONS: For each question, select the **best** answer and record your choice on the **white Answer Sheet** provided. Using an HB pencil, completely fill in the bubble that has the letter corresponding to your answer.

13. What is the range of the graph below?

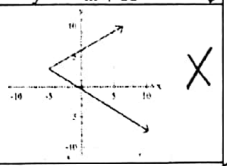


A. [0, 7)
B. (0, 7]
C. [0, 9)
D. (0, 9]

14. Jerod has a full jar of honey. Each day he removes a spoonful of honey to spread on toast. Which graph below best represents the mass of the jar as the days change?

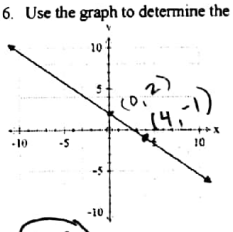


15. Which of the following relations are also functions?

I	The output is 3 less than half the input.
II	$y = -4x + 11$
III	
IV	{(2, 4), (3, 6), (4, 4), (5, 9), (6, 9)}

A. I and II
B. I, II and IV
C. II and IV
D. I, II, III and IV

16. Use the graph to determine the slope of the line.



A. $-\frac{3}{4}$
B. $-\frac{4}{3}$
C. $\frac{3}{4}$
D. $\frac{4}{3}$

17. A line has a slope of 3 and passes through the point (−2, 5). Which other point must the line pass through?

A. (1, 5)
B. (−1, 8)
C. (−5, 6)
D. (−8, 3)

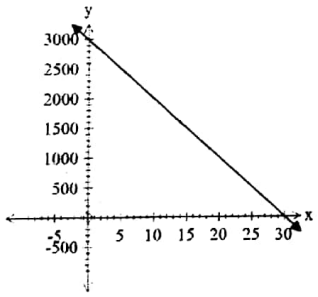
18. Which two points could be from a line with a slope of zero?

A. (2, 3) and (2, 7)
B. (4, −5) and (−9, −5)
C. (1, −6) and (−1, 6)
D. (−2, −1) and (0, 0)

19. Which of the following scenarios is linear?

A. The height of a pendulum as it swings over time.
B. The speed of a jogger through a warm up, workout, cool down and stretching.
C. The amount of bacteria in a container as it continues to double every 2 minutes.
D. The distance driven when traveling the highway at a constant rate.

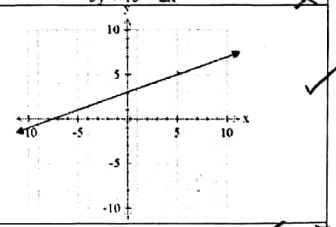
Use the following graph to answer question 20.



20. The graph above shows the amount of water in a small pool over time as it is empting. What does the *y*-intercept mean in this situation?

A. Time it takes to empty all of the water
B. Total amount of water the pool can hold
C. Rate the water empties from the pool
D. The total amount of water before the pool begins to empty

21. Which of the following relations could be produced by $y = \frac{2}{5}x + 3$.

I.	{(0, 3), (5, 5), (10, 7), (15, 9)}
II.	$5y + 15 = 2x$
III.	
IV.	$5(y - 3) = 2x$

A. I only
B. I, II and III
C. I and III
D. I, III and IV

22. Determine the slope of the linear relation: $8y + 3x + 24 = 0$

A. $-\frac{8}{3}$
B. $-\frac{3}{8}$
C. $\frac{3}{8}$
D. $\frac{8}{3}$

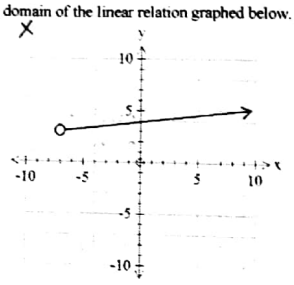
23. Which of the following lines have a positive slope?

I.	$-4x + 7y = 14$
II.	$y - 6 = \frac{2}{3}x$
III.	$y + 2 = -\frac{1}{2}(x + 5)$

$y = \frac{4}{7}x + 2$

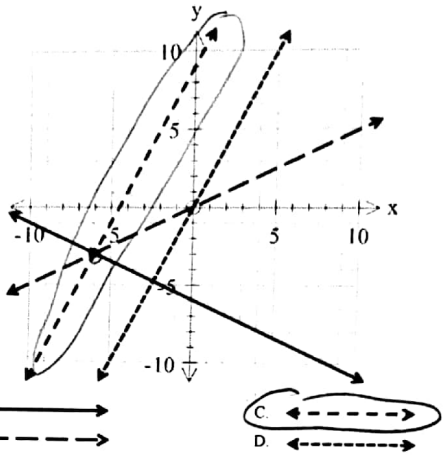
A. II only
B. I and II
C. II and III
D. I, II and III

24. Determine the domain of the linear relation graphed below.



A. $[-7, \infty)$
B. $(-7, \infty)$
C. $[3, \infty)$
D. $(3, \infty)$

25. Which of the following graphs represent a line that passes through $(-6, -3)$ and is perpendicular to $y = -\frac{1}{2}x$?



26. An ice cream shop owner makes a profit of $240 when she sells 200 ice cream cones. She has a $45 loss if she only sells 10 ice cream cones. Which linear relation represents her profit?

x	y
200	240
10	-45

190 < 285

285
190

A. $y = 0.83x$
B. $y = 2x - 60$
C. $y = 1.5x - 60$
D. $y = 0.75x + 90$

27. Determine the slope-intercept form of a line that is parallel to $y = \frac{2}{3}x + 4$ and passes through the point $(0, -1)$.

same slope

$y + 1 = \frac{2}{3}(x - 0)$

$y = \frac{2}{3}x - 1$

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

28. Which ordered pair represents $f(-3) = 8$?

A. $(-3, 8)$
B. $(-8, 3)$
C. $(3, -8)$
D. $(8, -3)$

29. Hannah bought 4 kg of peppers. Some were red and some were green. The green ones were priced at $2.99/kg and the red ones were priced at $5.39/kg. She spent a total of $18.48.

Which of the following systems of linear equations could represent the given situation?

A. $2.99x + 5.39y = 18.48$, $x + y = 4$
B. $2.99x + 5.39y = 4$, $x + y = 18.48$
C. $x + 5.39y = 18.48$, $y + 2.99x = 4$
D. $y + 2.99x = 18.48$, $x + 5.39y = 4$

30. In which quadrant do the graphs of $x = 3$ and $y = \frac{1}{2}x - 5$ intersect?

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

31. Which one of the following sets of numbers contains only rational numbers?

A. $\left\{-\frac{2}{5}, 5.333333\ldots, \sqrt{20}\right\}$
B. $\left\{-6.4, \frac{\sqrt{36}}{3}, \pi\right\}$
C. $\left\{-\frac{1}{2}, \frac{\sqrt{16}}{5}, -3.111111\ldots\right\}$
D. $\left\{\frac{4}{7}, \sqrt{24}, 5.111211112111112\ldots\right\}$

32. Which two numbers have the following properties?

- Their LCM is ten times as large as the GCF
- The GCF is a multiple of 3

12 & 72

6 6 6 90

18 = 3 · 3 · 2

30 = 2 · 3 · 5

24 = 3 · 2 · 2 · 2

36 = 2 · 2 · 3 · 3

A. 18 and 30
B. 24 and 36
C. 16 and 40
D. 18 and 45

16 = 2 · 2 · 2 · 2

40 = 2 · 2 · 2 · 5

45 = 3 · 3 · 5

33. Jasmine placed $3000 into two savings accounts. One account earns 4% and the other earns 2%. The first year she earned $100. How much money did she initially place in the bank account earning 4%?

x - money 4% y - money 2%

$0.04x + 0.02y = 100$

$x + y = 3000 \rightarrow y = -x + 3000$

A. $500
B. $1000
C. $2000
D. $2500

$0.04x + 0.02(-x + 3000) = 100$

$0.04x - 0.02x + 60 = 100$

$0.02x = 40$

$x = 2000$

34. Caleb made a mistake when simplifying the expression $\frac{(4b^3)(-5b^8)}{2b^6}$

Steps	
I	$\frac{-20(b^3)(b^8)}{2b^6}$
II	$\frac{-20b^{24}}{2b^6}$
III	$-10\frac{b^{24}}{b^6}$
IV	$-10b^4$

Which steps contain a mistake?

A. II only
B. III only
C. II and IV
D. II, III and IV

35. Simplify: $(2y^5)^3(5y^8)^0$

A. $6y^8$
B. $8y^{15}$
C. $36y^9$
D. $40y^{15}$

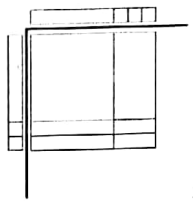
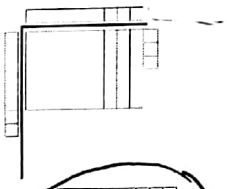
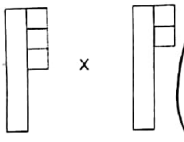
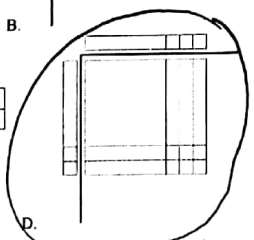
36. Simplify: $(\frac{4k^8}{8k^m})^{-2}$

A. $4k^{2m-16}$
B. $\frac{4}{k^{2m-16}}$
C. $-4k^{m-8}$
D. $\frac{4}{k^{-14m}}$

37. Simplify: $8\sqrt{x^5} \div 4\sqrt[3]{x^7}$

A. $\frac{1}{2}\sqrt[6]{x}$
B. $2\sqrt[6]{x}$
C. $\frac{1}{2}\sqrt[12]{x^{15}}$
D. $2\sqrt[12]{x^{15}}$

38. Which of the following diagrams best represents the expansion of $(x + 2)(x + 3)$?

A. 
B. 
C. 
D. 

39. Expand and Simplify: $(x-5)^3$

A. $x^3 - 15x^2 + 75x - 125$
B. $x^3 + 15x^2 - 75x - 125$
C. $x^3 - 15x^2 - 75x - 125$
D. $x^3 - 125$

40. Factor: $3x^2 - 48$

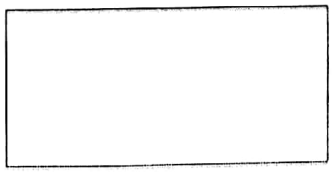
A. $3(x-4)^2$
B. $3(x+4)^2$
C. $3(x+4)(x-4)$
D. $3(x+4)(x+2)(x-2)$

41. Which of the following expressions have a factor of $x - 3$?

I	$7x - 21$
II	$x^2 - 9$
III	$x^2 - 8x - 33$
IV	$2x^2 - 5x - 3$

A. I only
B. II only
C. I, III
D. I, II, IV

42. Given that the area of the rectangle is $3x^2 + 5x - 28$, determine the length of the rectangle.



A. $3x - 7$
B. $3x + 7$
C. $3x - 5$
D. $3x^2 + 4x - 24$

43. While converting from 9 kilometres to feet, Molly wrote down the following steps.

I	$9\ km \times \frac{1000\ m}{1\ km} = 9000\ m$
II	$9000\ m \times \frac{0.9144\ m}{1\ yd} = 8229.6\ yd$
III	$8229.6\ yd \times \frac{3\ ft.}{1\ yd} = 24688.8\ ft.$

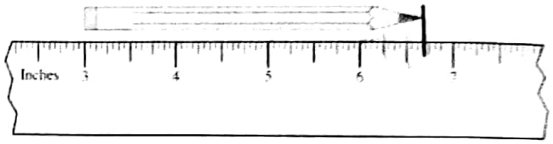
Which step, if any, contains a mistake?

A. I
B. II
C. III
D. No mistakes were made

44. Which could be used to estimate the length of a millimetre?

A. the width of a hair
B. the width of a finger
C. the width of your hand
D. the length of your arm

45. Using the ruler below, determine the length of the pencil.



A. $3\frac{3}{4}$ in.
B. $3\frac{11}{16}$ in.
C. 3.11 in.
D. $6\frac{11}{16}$ in.

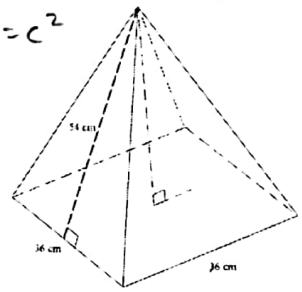
46. Which measurement below is the largest?

A. 0.5 kg
B. 300 g
C. 1.3 lb.
D. 14 oz

$0.5\ kg \cdot \frac{2.2\ lb}{1\ kg} = 1.1\ lb$

less than 1 lb

47. Determine the volume of the pyramid with a slant height of 54 cm.



$a^2 + b^2 = c^2$

$\sqrt{54^2 - 18^2}$

$= \sqrt{2592}$

$= 50.9112$

$V = \frac{1}{3}(l \cdot w)(h)$

$= \frac{1}{3}(36 \cdot 36)(\sqrt{2592})$

$= 21993.85\ cm^3$

A. 17387.7 cm³
B. 21988.8 cm³
C. 23328 cm³
D. 65966.4 cm³

48. The surface area of a cylinder is approximately 1570 cm². The length of the radius is $\frac{2}{3}$ of the length of the height. Determine the height of the cylinder.

$r = \frac{2}{3}h$

$SA = 2\pi r^2 + 2\pi rh$

$1570 = 2\pi\left(\frac{2}{3}h\right)^2 + 2\pi\left(\frac{2}{3}h\right)h$

$1570 = 2\pi\left(\frac{4}{9}h^2 + \frac{2}{3}h^2\right)$

$\frac{1570}{2\pi} = \frac{4}{9}h^2 + \frac{6}{9}h^2$

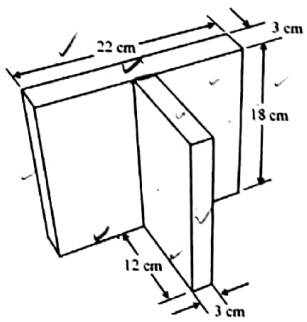
$\frac{1570}{2\pi} \cdot \frac{9}{10} = \frac{10}{9} \cdot \frac{9}{10} h^2 \rightarrow \sqrt{\frac{9}{10} \cdot \frac{1570}{2\pi}} = h$

A. 10 cm
B. 15 cm
C. 20 cm
D. 30 cm

49. What is the volume of the smallest cube that a gumball with a diameter of 2 cm can be packaged inside?

A. 3 cm³
B. 8 cm³
C. 10.7 cm³
D. 64 cm³

50. Determine the surface area of the figure below.

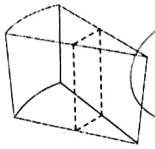


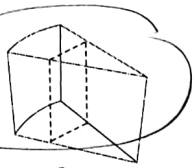
$3(3 \cdot 18)$
$2(3 \cdot 12)$
$2(3 \cdot 22)$
$2(18 \cdot 22)$
$+ 2(12 \cdot 18)$

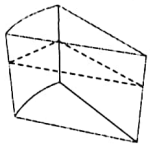
Subtract overlap
$3(18)$

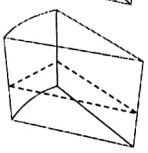
A. 1536 cm²
B. 1644 cm²
C. 1728 cm²
D. 1836 cm²

51. Glenn and Delores want to share a piece of cake. Which choice shows a dotted line where the cut should be made so that both friends get an approximately equal-sized piece?

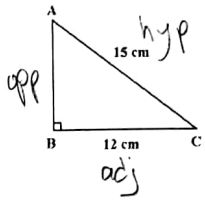
A. 

B. 

C. 

D. 

52. Use the diagram below to determine the measure of angle C.



hyp
opp
adj

$\cos\theta = \frac{12}{15}$

$C = \cos^{-1}\left(\frac{12}{15}\right)$

A. 37°
B. 39°
C. 51°
D. 54°

53. While Ritesh is driving he sees a sign that says the road has a 12% grade. This means that the road will rise 12 metres over a 100 metre horizontal distance. Which of the following expressions will calculate the angle between the road and the horizontal?

12 opp
adj
100

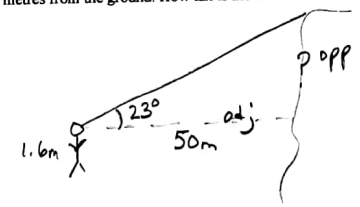
$\frac{12}{100} = \frac{3}{25}$

$\tan^{-1}\frac{3}{25}$

A. $\tan\frac{3}{25}$
B. $\sin\frac{12}{100}$
C. $\tan^{-1}\frac{3}{25}$
D. $\sin^{-1}\frac{12}{100}$

54. Yanni was looking up at the top of a small waterfall through binoculars at an angle of 23° from the horizontal. She was 50 metres from the waterfall and held the binoculars 1.6 metres from the ground. How tall is the waterfall?

A. 21.2 metres
B. 22.8 metres
C. 51.6 metres
D. 119.4 metres



$\tan\theta = \frac{opp}{adj}$

$\tan 23° = \frac{opp}{50}$

$50\tan 23° = opp$

$21.2237m = opp$

$21.2237m + 1.6m = 22.8237m$

Value: 6 marks **Suggested Time: 15 minutes**

PART C: NUMERICAL-RESPONSE QUESTIONS

INSTRUCTIONS: When answering numerical-response questions on your Answer Sheet:

- Print digits as illustrated:

0	1	2	3	4	5	6	7	8	9

- Shade the bubble with the negative symbol if the answer is negative; shade or leave blank the bubble with the positive symbol if the answer is positive.
- Write your answer in the spaces provided using one digit per box, noting proper place value.
- Leave unused boxes blank.
- For example, –70.2 will be written as:

		7	0	.	2	

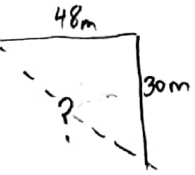
- For example, 4 will be written as:

			4	.		or				4	.	

- For example, 2/3, answered to two decimal places, will be written as:

			0	.	6	7	or			0	.	6	7

55. To get past a pond, you must walk 30 metres north and 48 metres west. How many metres would have been saved if there was a bridge that joined the starting and ending points? Answer, with a positive value, to the nearest tenth.



$a^2 + b^2 = c^2$

$48^2 + 30^2 = c^2$

$\sqrt{48^2 + 30^2} = c$

$56.6\text{m} = c$

long way $48 + 30 = 78\text{m}$

$78\text{m} - 56.6\text{m} = 21.4\text{m}$ saved

56. Solve for x.

$5x + 2y = -9$

$x = -4y$

$5(-4y) + 2y = -9$

$-20y + 2y = -9$

$-18y = -9$

$y = \frac{1}{2}$

$x = -4\left(\frac{1}{2}\right)$

$x = -2$

57. The temperature of the earth's crust rises with increasing depth according to the following linear function.

$$f(x) = 0.01x + 15$$

If x is the depth in metres, determine the value of x if the temperature is $f(x) = 80°C$.

$80 = 0.01x + 15$ (−15 −15)

$\frac{65}{0.01} = \frac{0.01x}{0.01}$

$6500\text{m} = x$

58. How many integer values are there for k for which $2x^2 - kx + 7$ is factorable?

$ac = 14 \rightarrow -14 \cdot 1$, $-7 \cdot 2$

$b = -k$

so one + and one neg.

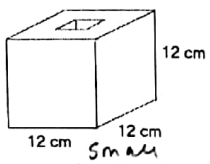
bigger factor is negative

59. Convert 4.2 kilometres into yards. Answer to the nearest yard.

$4.2\text{km} \cdot \frac{1\text{ mi}}{1.609\text{ km}} \cdot \frac{1760\text{ yards}}{1\text{ mi}}$

$= 4594\text{ yds}$

60. A square hole with side lengths of 4 cm was cut through the cube shown below. Determine the volume of what is remaining from the cube.



big − small

$V = lwh - lwh$

$= 12 \cdot 12 \cdot 12 - 4 \cdot 4 \cdot 12$

$= 1536\text{ cm}^3$