PRACTICE EXAM #1

**Value: 12 marks**

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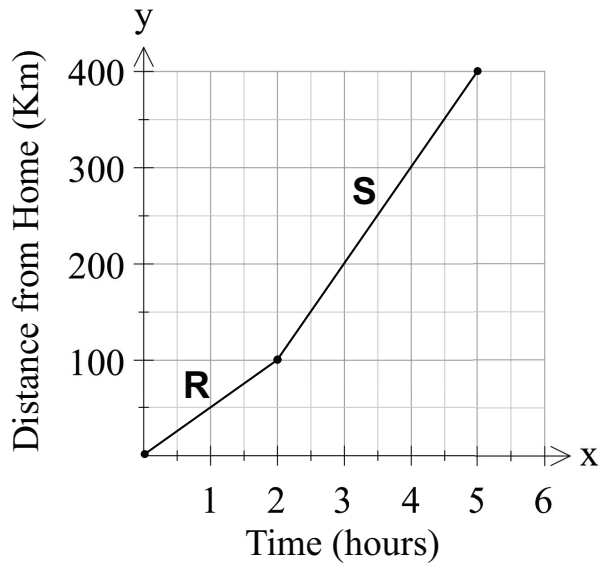
Using an HB pencil, completely fill in the bubble that has the letter corresponding to your answer. You have a **maximum of 40 minutes** to work on this section.

Use the following graph to answer question 1.
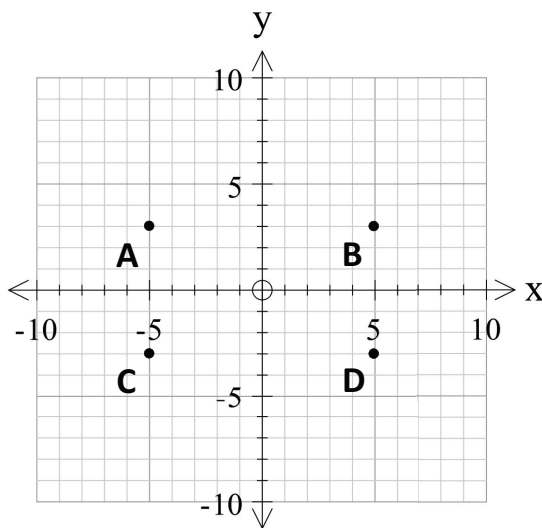
1. The line $x - 5y + 10 = 0$ passes through which point on the graph?

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

2. The graph below models a car's distance from home over time.

Calculate the change in the speed of the car from segment R to segment S.

A. Decreased by 30 km/h   B. Increased by 50 km/h

C. Increased by 30 km/h   D. Decreased by 50 km/h

3. Determine the equation of a line, in slope-intercept form, that passes through the points $(2, 9)$ and $(10, -7)$.

A. $y = -\dfrac{1}{2}x + 4$

B. $y = -\dfrac{1}{2}x - 2$

C. $y = -2x + 8$

D. $y = -2x + 13$

4. Solve for y in the following system of equations:

$$x - y = -5,$$
$$4x + 4y = 20$$

A. 2

B. 3

C. 5

D. 9

5. Which of the following statements are true?

I.	$\sqrt[3]{64} = 4$ since $4 \times 4 \times 4 = 64$
II.	$\sqrt{4} = 2$ since $2 + 2 = 4$
III.	$\sqrt{25} = 5$ since $5 \times 5 = 25$
IV.	$\sqrt[3]{27} = 9$ since $9 + 9 + 9 = 27$

A. I and III only

B. I and IV only

C. II and III only

D. II and IV only

Math-Help-Services.com
495

6.   What is the least common multiple of 15 and 27?

   A. 3

   B. 3×5

   C. $3^3 \times 5$

   D. $3^4 \times 5^2$

7.   Order the numbers from the smallest value to the largest value.

I.	$2\sqrt{5}$
II.	$3\sqrt{2}$
III.	$\sqrt{12}$
IV.	$\sqrt{45}$

   A. IV, I, II, III

   B. III, I, II, IV

   C. II, III, IV, I

   D. III, II, I, IV

8. Simplify: $\left(3x^2\right)^3 \cdot 2x^5$

    A. $18x^{10}$

    B. $54x^{10}$

    C. $18x^{11}$

    D. $54x^{11}$

9. What pattern could be used to predict 2^{-3}?

A.

2^3	8
2^2	4
2^1	2
2^0	1
2^{-1}	$\dfrac{1}{2}$
2^{-2}	$\dfrac{1}{4}$

B.

2^3	6
2^2	4
2^1	2
2^0	0
2^{-1}	$-\dfrac{1}{2}$
2^{-2}	$-\dfrac{1}{4}$

C.

2^3	8
2^2	4
2^1	2
2^0	1
2^{-1}	-2
2^{-2}	-4

D.

2^3	6
2^2	4
2^1	2
2^0	0
2^{-1}	-2
2^{-2}	-4

10. The senior boys cross-country race was over a distance of 6.3 km. What is
    this distance in miles?
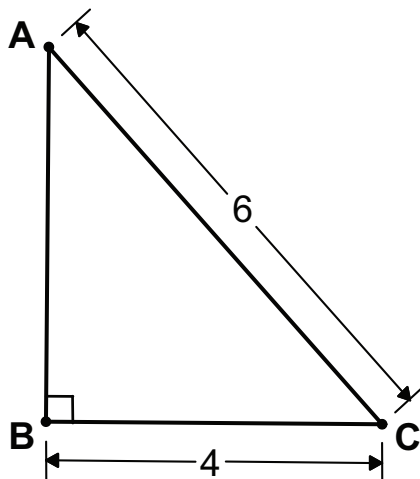
    A. 10.1 miles

    B. 4.7 miles

    C. 3.9 miles

    D. 1.6 miles

11. Which of the following calculations converts 4 metres into inches?

I.	$4 \text{ m} \times \dfrac{1 \text{ yd.}}{0.9144 \text{ m}} \times \dfrac{36 \text{ in.}}{1 \text{ yd.}} =$
II.	$4 \text{ m} \times \dfrac{100 \text{ cm}}{1 \text{ m}} \times \dfrac{1 \text{ in.}}{2.54 \text{ cm}} =$
III.	$4 \text{ m} \times \dfrac{1 \text{ m}}{100 \text{ cm}} \times \dfrac{2.54 \text{ cm}}{1 \text{ in.}} =$
IV.	$4 \text{ m} \times \dfrac{100 \text{ cm}}{1 \text{ m}} \times \dfrac{1 \text{ ft.}}{30.48 \text{ cm}} \times \dfrac{12 \text{ in.}}{1 \text{ ft.}} =$

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

12. Determine the ratio of sin C.

A. $\sin C = \dfrac{4}{2\sqrt{5}}$ B. $\sin C = \dfrac{2\sqrt{5}}{6}$ C. $\sin C = \dfrac{4}{6}$ D. $\sin C = \dfrac{6}{4}$

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.
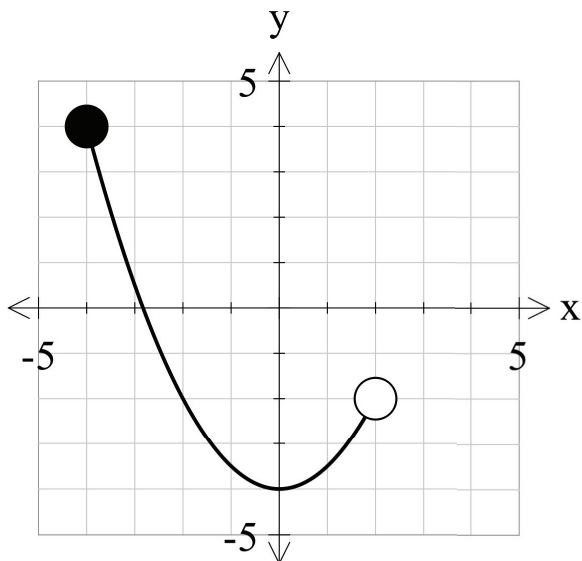
13. A storage tank containing 800 gallons of water is being drained at a rate of 50 gallons per hour. Which of the following lines best represents this situation?
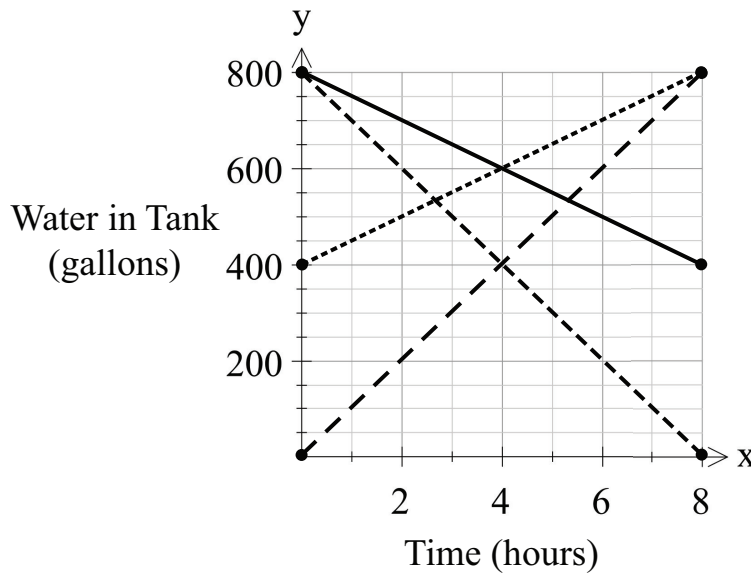
A. •••••••••• •   B. • – – – •   C. • – – – – •   D. •————•

14. What is the domain of the graph below?

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

15. Which of the following relations are also functions?

I.	$y = \dfrac{1}{2}x + 6$
II.	$\left\{(0,0),(1,50),(2,100),(3,150),(4,200)\right\}$
III.	The output is five more than twice the input.
IV.	$y = x$

A. I only   B. I, III and IV only

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

16. Two right triangles have the same height. The slope of the hypotenuse of triangle A is double the slope of the hypotenuse of triangle B. How do the lengths of their bases compare?

    A.   The base of A is half that of B

    B.   The base of A is double that of B

    C.   The base of A is one-fourth that of B

    D.   The base of A is quadruple that of B

17. A line with a slope of -1 passes through the points $(-2, 1)$ and (p, q). Which of the following points could be (p, q)?

    A. $(2,1)$

    B. $(-1,4)$

    C. $(1,-2)$

    D. $(0,-4)$

18. A video game programmer needs to simulate a straight golf putt on a gaming screen. The putt needs to have a slope of $\frac{3}{2}$ to a target at (250, 250). If the golfer has a horizontal position of 150, what would be the golfer's position on the screen?

A. $(150, 25)$

B. $(150, 75)$

C. $(150, 100)$

D. $(225, 150)$

Video Screen

(250 , 250)

Vertical

300

200

100

100   200   300

Horizontal
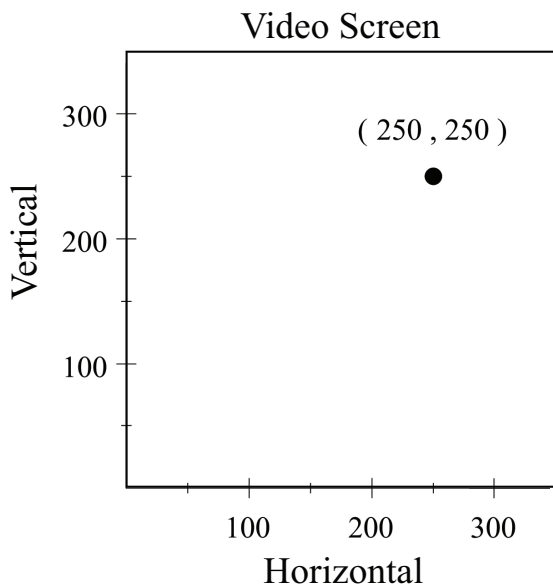
19. Based on the graph, what is the cost of hiring a plumber for 8 hours?

A. $600

B. $650

C. $675

D. $700

y

Cost of Hiring a
Plumber vs. Time

Cost ($)

500

400

300

200

100

1   2   3   4   5

Time (h)

x
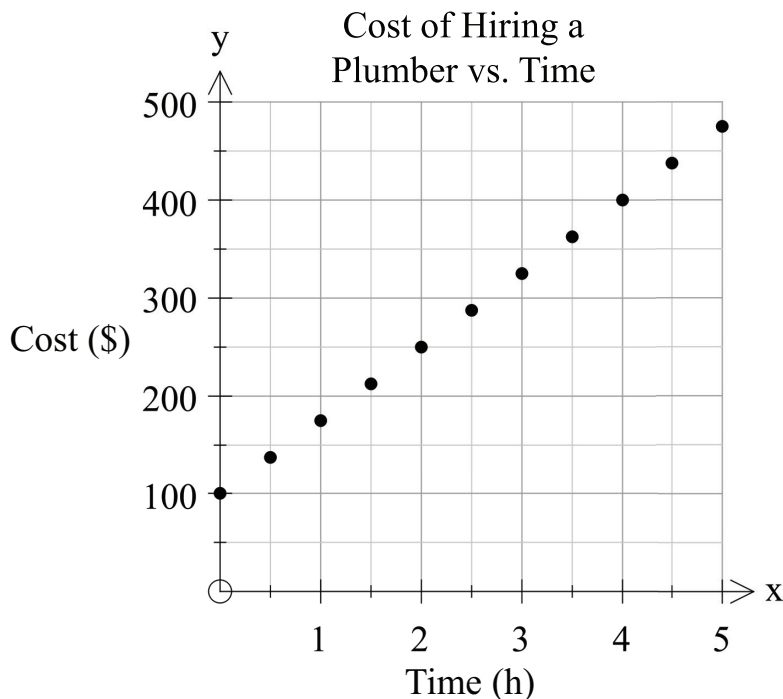
20. Which of the following relations could be produced by $y = -\dfrac{4}{3}x + 2$?

I.	$3y + 4x - 6 = 0$
II.	$y - 6 = -\dfrac{4}{3}(x + 3)$
III.	$(-3, 6), (0, 2), (3, -2), (6, -6)$

   A. I only   B. I and III only

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

21. Which of the following coordinates are intercepts of the linear relation $2y + 3x - 6 = 0$?

I.	(3, 0)
II.	(0, 3)
III.	(2, 0)
IV.	(0, 2)

   A. I and III only   B. II and III only

   C. I and IV only   D. II and IV only

22. The graph on the right shows the relationship between the amount of water remaining in a 60 000 L swimming pool and the time it takes to drain it.
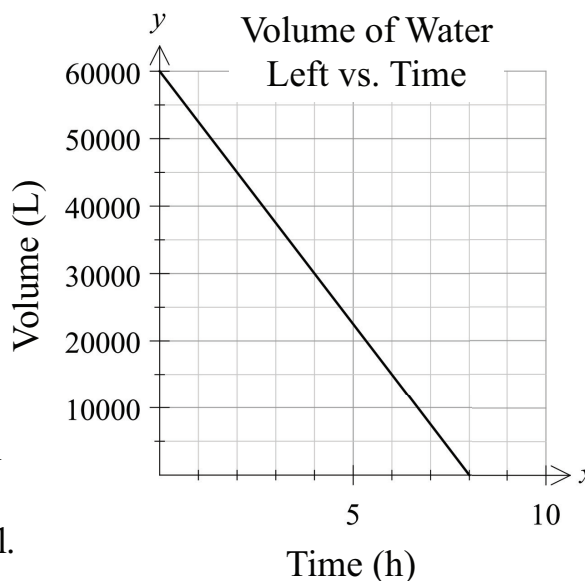
    What does the x-intercept represent in this situation?

    Volume of Water Left vs. Time

    A. The volume of the swimming pool

    B. The time it takes to empty the pool.

    C. The rate, $\dfrac{L}{h}$, at which the pool empties.

    D. The time left before the pool is empty.

23. Mark explained his method for graphing the linear relationship, $y = \dfrac{x}{5} - 6$.

I.	Place a dot on the y-axis at -6.
II.	Move up 1 on the y-axis to -5.
III.	Move right 5 on the x-axis to 5 and place a dot.
IV.	Draw a line through the two dots.

Where did Mark make the first mistake in his explanation?

A. Step I   B. Step III

C. Step II   D. There is no mistake

24. Given the equation $Ax + By + C = 0$, which of the following conditions must be true for the graph of the line to have a negative slope and a negative y-intercept?

I.	$A > 0,\ B > 0,\ C > 0$
II.	$A < 0,\ B < 0,\ C < 0$
III.	$A > 0,\ B < 0,\ C > 0$
IV.	$A < 0,\ B > 0,\ C < 0$

A. I or II   B. I only

C. III or IV   D. III only

25. Which equation represents a line that is perpendicular to the line shown in the graph below?

A. $y = -\dfrac{x}{5}$

B. $y = 5x$

C. $y = -5x$

D. $y = \dfrac{x}{5}$
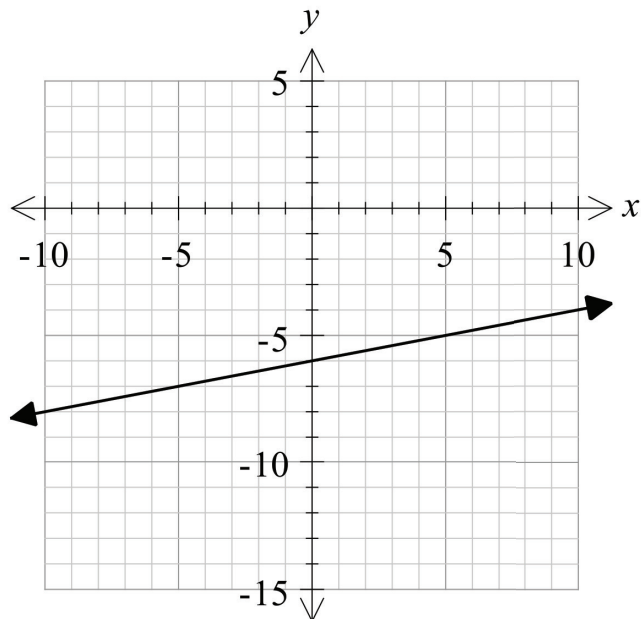
26. Which of the following statements are true for $3y - 4x - 9 = 0$?

I.	The y-intercept is -3.
II.	The line is parallel to $y = \dfrac{4}{3}x$.
III.	The slope-intercept form of the line is $y = \dfrac{3}{4}x + 3$.
IV.	The range is all real numbers.

   A. II and IV   B. I and IV

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

27. Which of the following graphs has a positive *x*-intercept and a negative *y*-intercept?

   A. ⟷

   B. ⟵------⟶

   C. ⟵·······⟶

   D. ⟵ – – – ⟶
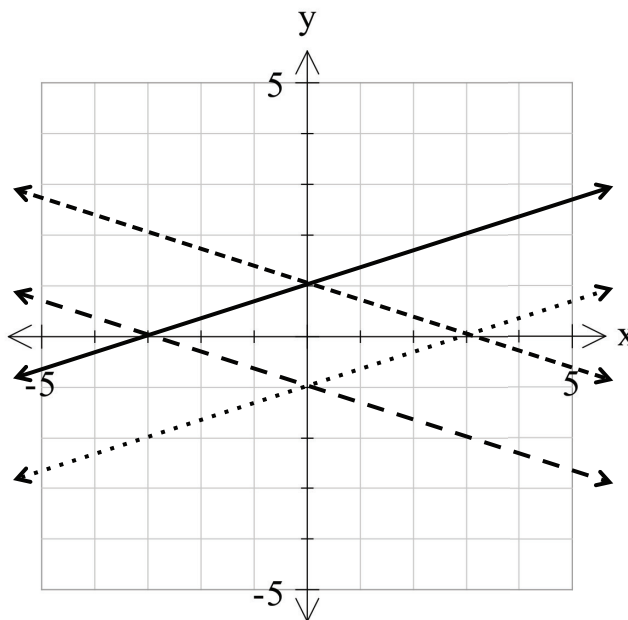
28. You have $100 to spend on a barbeque where you want to serve chicken and steak. Chicken costs $3.50 per kg and steak costs $7.50 per kg. Which equation below represents the amount of chicken (c) and the amount of steak (s) you can buy.

   A. $3.5\,c - 7.5\,s = 100$

   B. $3.5\,c + 7.5\,s = 100$

   C. $3.5\,c + 7.5\,s = -100$

   D. $3.5\,c - 7.5\,s = -100$

29. Which ordered pair represents $f(5) = -2$?

   A. $(2, -5)$

   B. $(-5, 2)$

   C. $(-2, 5)$

   D. $(5, -2)$

30. Angela bought 5 kg of apples. Some were priced at \$4.40/kg and the others were priced at \$5.50/kg. She spent a total of \$25.30.

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

    A. $4.4\,x + 5.5\,y = 25.3$
    $y + x = 5$

    B. $4.4\,x + 5.5\,y = 5$
    $y + x = 25.3$

    C. $x + 5.5\,y = 5$
    $y + 4.4x = 25.3$

    D. $x + 4.4\,y = 25.3$
    $y + 5.5x = 5$

31. Which of the following systems of linear equations has a solution of $(5, -1)$?

    A. $\begin{cases} x + 3y = 2 \\ y = 3x - 14 \end{cases}$

    B. $\begin{cases} 2x - 3y = 13 \\ y = x - 3 \end{cases}$

    C. $\begin{cases} 3x + y = 14 \\ 2x - y = 9 \end{cases}$

    D. $\begin{cases} 2x + y = 9 \\ 3x - y = 16 \end{cases}$

32. Which two numbers have the following properties?

    - Their GCF is 12
    - Their LCM is 120

    A. 12 and 36

    B. 12 and 30

    C. 24 and 36

    D. 24 and 60

33. Which of the following number lines best represents the placement of X, Y, Z, given:

    $$X = 3\sqrt{5}$$
    $$Y = \text{ cube root of } 108$$
    $$Z = \sqrt[4]{81}$$

A.

B.

C.

D.
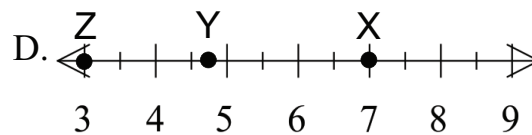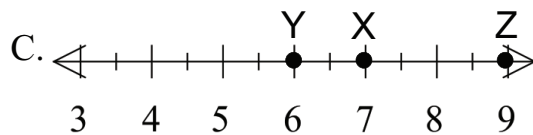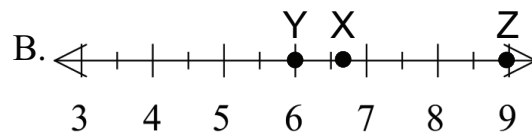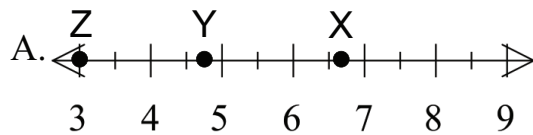
34. Simplify: $\sqrt[3]{1296}$

    A. $6\sqrt[3]{36}$

    B. 11

    C. $6\sqrt[3]{6}$

    D. 36

35. Simplify: $\left(4x^3\right)^3\left(3x^2\right)^0$

    A. $192\,x^{11}$

    B. $64\,x^9$

    C. $192\,x^9$

    D. $64\,x^6$

36. Simplify: $\left(x^3\right)^{-\frac{1}{2}}$

    A. $\dfrac{1}{\sqrt[3]{x^3}}$

    B. $\dfrac{1}{\sqrt{x^3}}$

    C. $-\dfrac{1}{2x^3}$

    D. $x^{\frac{3}{2}}$

37. Simplify: $\dfrac{\sqrt{x^4}}{\sqrt[4]{x^3}}$

    A. $x^{\frac{4}{3}}$

    B. $x^{-\frac{5}{6}}$

    C. x^{-1}

    D. $x^{\frac{5}{4}}$

38. Determine an expression to represent the shaded area below.

A. $10x^2 - 2$

B. $12x^2 + 4x$

C. $10x^2 + 4x + 2$

D. $10x^2 + 8x + 2$

$x + 1$ $3x + 1$

$2x + 2$

$4x$
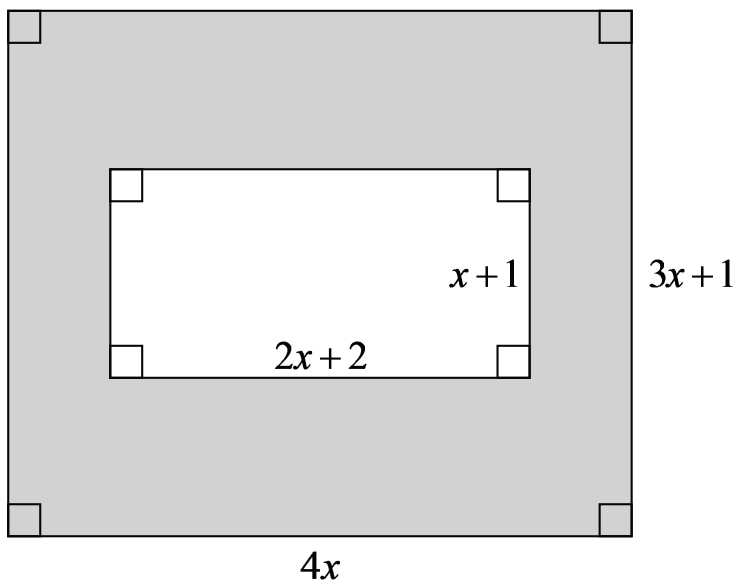
39. Determine the greatest common factor of $20x^4y^2$, $4x^2y^2$ and $10x^3y$.

A. $2xy$

B. $4x^2y$

C. $2x^2y$

D. $4xy^2$

40. Which polynomial expansion is represented by the picture?
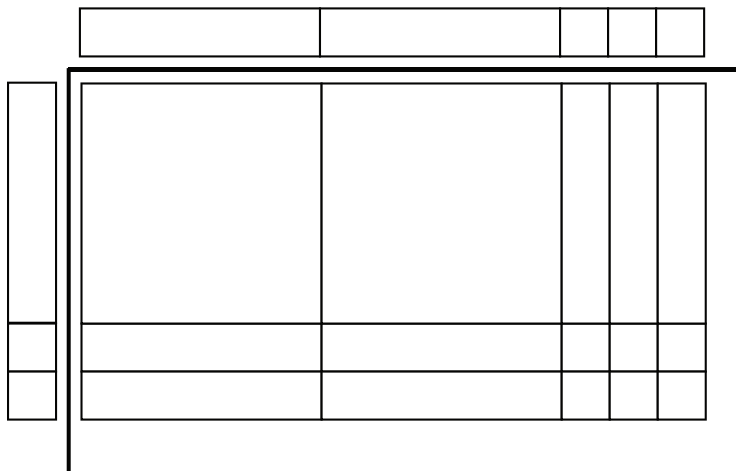
A. $(2x+2)(x+3)=2x^2+8x+6$ B. $(2x+3)(x+2)=2x^2+7x+6$

C. $(x^2+3)(x+2)=x^3+5x^2+6$ D. $(3x+2)(2x+1)=6x^2+5x+2$

41. Factor: a^2-36

A. $(a-6)^2$

B. $(a+6)^2$

C. $(a+6)(a-6)$

D. $(x-4)(x+9)$

42. Which of the following expressions have a factor of $x - 2$?

I.	$x^2 - 4$
II.	$x^2 - 3x - 10$
III.	$x^2 - 4x + 4$

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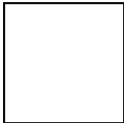
C. I and II only   D. I, II and III

43. Shannon was asked to factor $4x^2 + 2x - 6$ and represent it with math tiles.

How many of each tile would she need to represent the two factors and the product?

A.	4	0	8	0	2	8
B.	0	0	4	0	3	2
C.	4	0	6	0	3	8
D.	4	0	6	4	2	6

44. A jeweler is using a Vernier caliper to measure the diameter of a gold pipe from which he cuts rings.
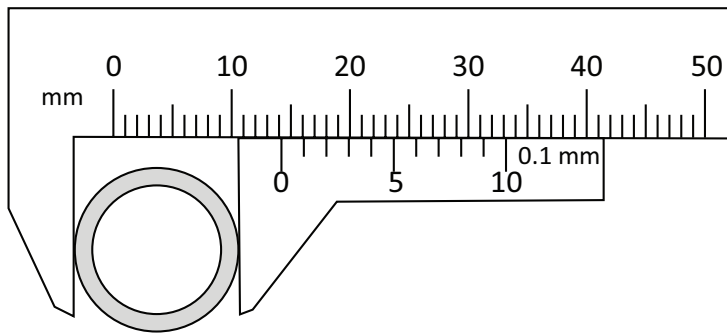
    What is the diameter of the gold pipe?

    A. 10.2 mm   B. 14.2 mm
    C. 10.5 mm   D. 18.2 mm

45. Which of the following estimates is closest to the distance from a doorknob to the bottom of a typical door?

    A. 1 yard

    B. 2 feet

    C. 20 inches

    D. 1.5 metres
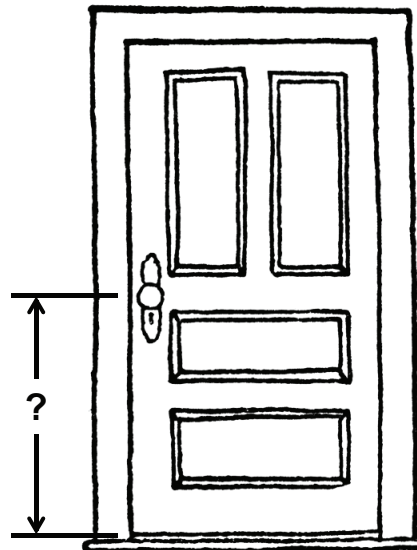
46. On a quiz, students were asked to convert 3 feet 6 inches to a metric length.

	Joanna's Solution	Celine's Solution
Step 1	$6 \text{ in.} \times \dfrac{1 \text{ ft.}}{12 \text{ in.}} = 0.5 \text{ ft.}$	$3 \text{ ft.} \times \dfrac{12 \text{ in.}}{1 \text{ ft.}} = 36 \text{ in.}$
Step 2	$3.5 \text{ ft.} \times \dfrac{1 \text{ yd.}}{3 \text{ ft.}} \approx 1.17 \text{ yd.}$	$36 \text{ in.} + 6 \text{ in.} = 42 \text{ in.}$
Step 3	$1.17 \text{ yd.} \times \dfrac{0.9144 \text{ m}}{1 \text{ yd.}} \approx 1.07 \text{ m}$	$42 \text{ in.} \times \dfrac{2.54 \text{ cm}}{1 \text{ oz}} \approx 107 \text{ cm}$

How should the teacher mark these two solutions?

A. Only Joanna's solution is correct.

B. Only Celine's solution is correct.

C. Both Joanna and Celine gave a correct solution.

D. Neither Joanna nor Celine gave a correct solution.

47. A cube-shaped box has a volume of 27 000 cm^3. What is the volume of the largest sphere that can fit inside of it?
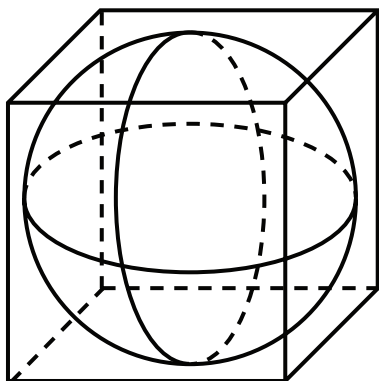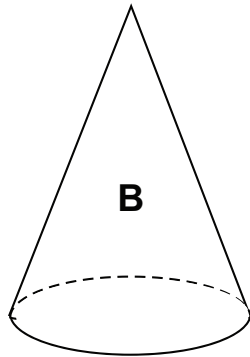

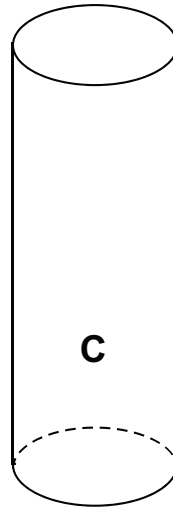A. 14 137 cm^3

B. 18 424 cm^3

C. 22 711 cm^3

D. 27 000 cm^3

48. Which of the following shapes has a volume three times larger than the cone below?
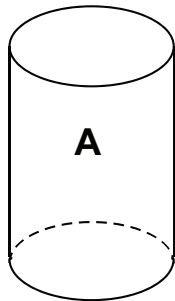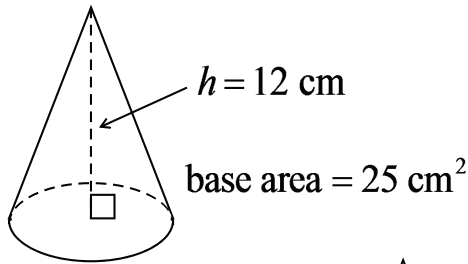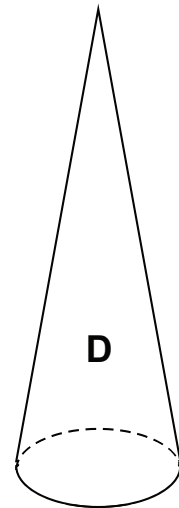
$h = 12$ cm

base area $= 25$ cm^2

| A | B | C | D |

base area $= 25$ cm^2 base area $= 36$ cm^2 base area $= 25$ cm^2 base area $= 25$ cm^2
$h = 12$ cm $h = 17$ cm $h = 24$ cm $h = 24$ cm

49. A 50-ml graduated cylinder has 30 ml of water. A marble is dropped into the cylinder and the water rises an amount equal to the volume of the marble.
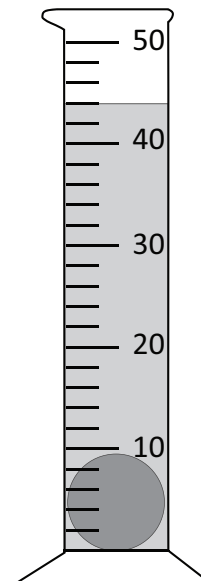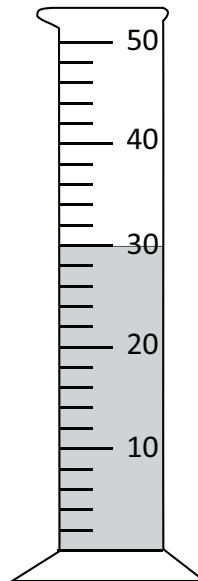
Which expression shows how to calculate the diameter of the marble?

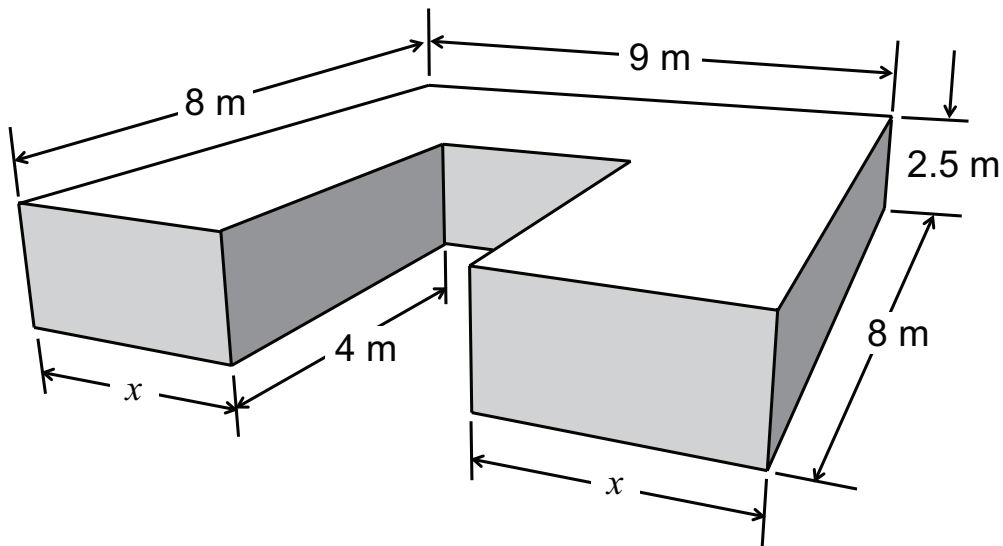A. $\sqrt[3]{\dfrac{(12)(3)\pi}{4}}$

B. $2\left(\sqrt[3]{\dfrac{(12)(3)\pi}{4}}\right)$

C. $\sqrt[3]{\dfrac{(14)(3)}{4\pi}}$
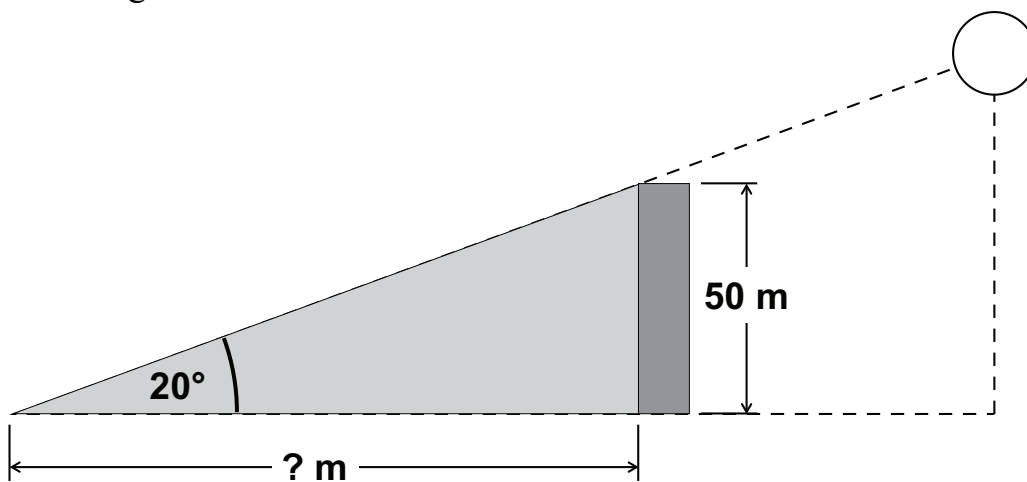
D. $2\left(\sqrt[3]{\dfrac{(14)(3)}{4\pi}}\right)$

50. The volume of the object below is 150 cm³. Calculate the length of x.

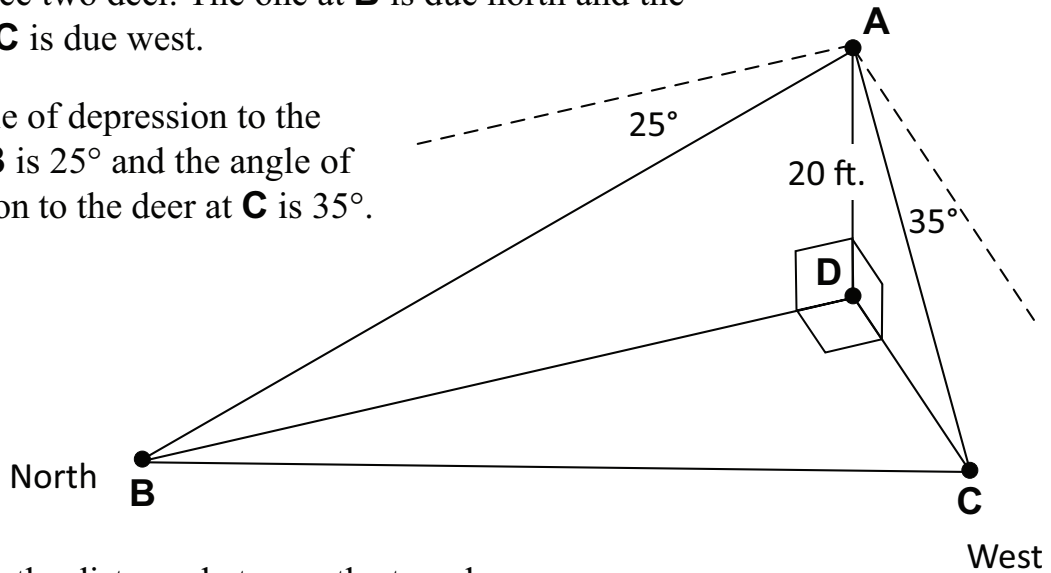   A. 2.0 m   B. 2.5 m   C. 3.0 m   D. 3.5 m

51. If the angle of elevation of the sun is 20°, what is the length of the shadow of a building that is 50 m tall?

   A. 18 m   B. 54 m   C. 102 m   D. 137 m

52. A hunter, **A**, is in a blind 20 feet above the ground, **D**.
He can see two deer. The one at **B** is due north and the
other at **C** is due west.

The angle of depression to the
deer at **B** is 25° and the angle of
depression to the deer at **C** is 35°.

Calculate the distance between the two deer.

A. About 42 ft.   B. About 52 ft.   C. About 62 ft.   D. About 72 ft.

53. In $\triangle ABC$, $\angle C = 90°$, $AB = 29$ cm and $AC = 16$ cm.
Calculate the measure of $\angle ABC$.

A. 28.9°
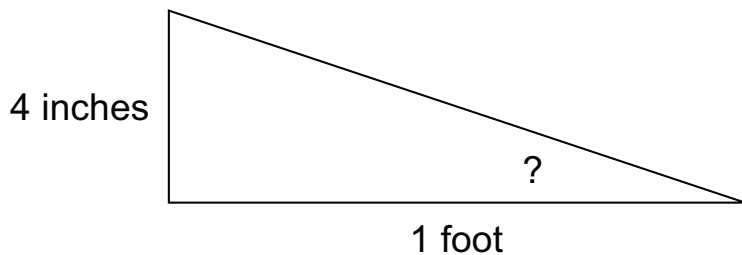
B. 33.5°

C. 55.2°

D. 56.5°

54. The roof on a house has a vertical rise of 4 inches for every foot of horizontal run. Which of the following expressions will calculate the angle of the roof's pitch?

A. $\tan\left(\dfrac{4}{12}\right)$

B. $\tan\left(\dfrac{4}{1}\right)$ 4 inches

C. $\tan^{-1}\left(\dfrac{4}{12}\right)$

D. $\tan^{-1}\left(\dfrac{4}{1}\right)$

?

1 foot

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.
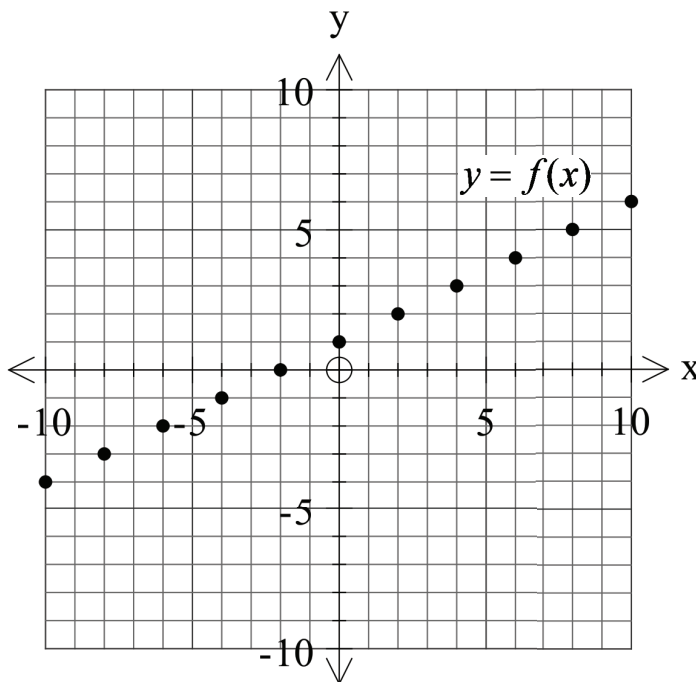
- For example, –70.2 will be written as:

  + ○ – ● [ ][ ][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. Given the graph of $y = f(x)$ below, determine the value of x for which $f(x) = -3$.

56. The slope of PQ is $-\dfrac{3}{4}$. The slope of RS is $\dfrac{R}{24}$. Given that $PQ \perp RS$ determine the value of R.
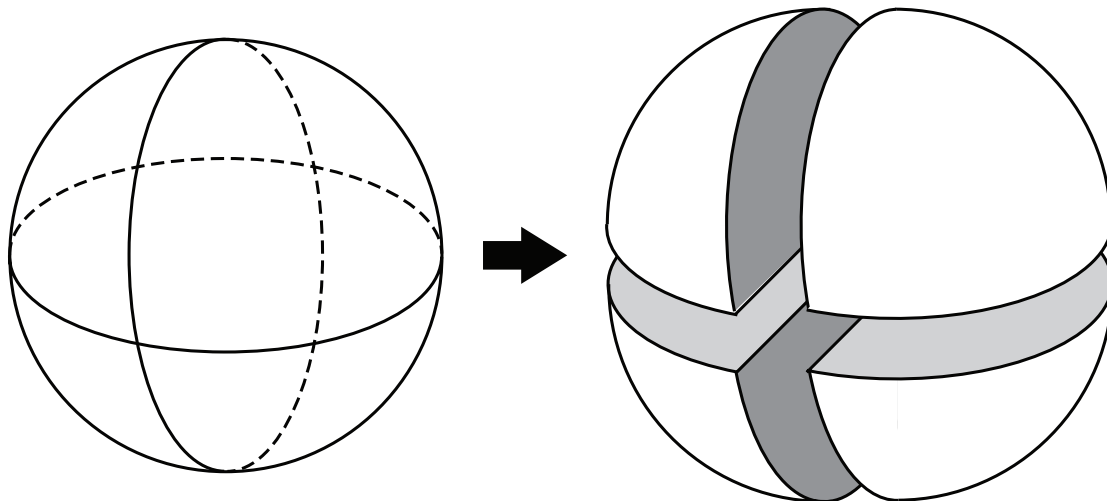
57. Solve for x.

$$5x + 3y = 2$$

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

58. A certain type of bacteria, given a favorable growth medium, doubles in population every 6 hours. Given that there were approximately 100 bacteria to start with, how many bacteria will there be in a day and a half?

59. A solid sphere with a diameter of 30 cm is sliced into 4 equal pieces. What is the surface area of one piece? Round to the nearest cm^2.

60. Calculate the area of ΔABC. Round to the nearest square centimetre.

A

20 cm   36.9°

30.0°

D   C   B