Name: _____ Date: _____

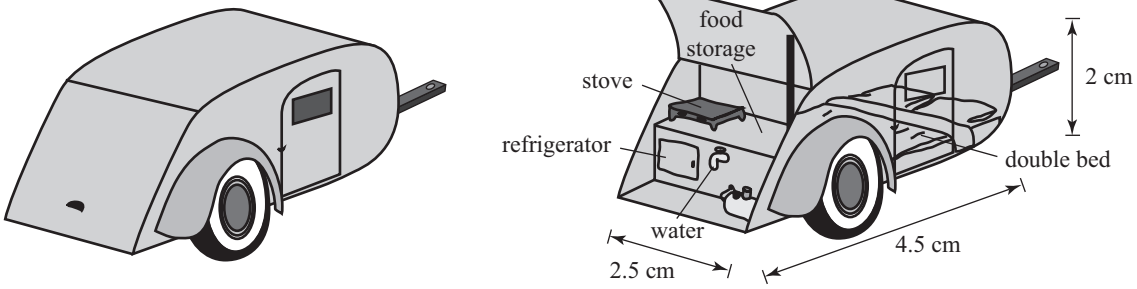
Mathematics 10 Option 2
Final Exam Multiple Choice and Numerical Response

Record your answers on the answer sheet provided.

A lot of the tools and equipment used in everyday life and in recreational activities were designed using mathematical measurements and calculations. Apply your knowledge and skills of mathematics to solve problems related to tools and equipment.

Use this information to answer #1.

Jack's parents rented a Teardrop camper trailer for an affordable summer vacation. A model of the trailer has the dimensions shown.



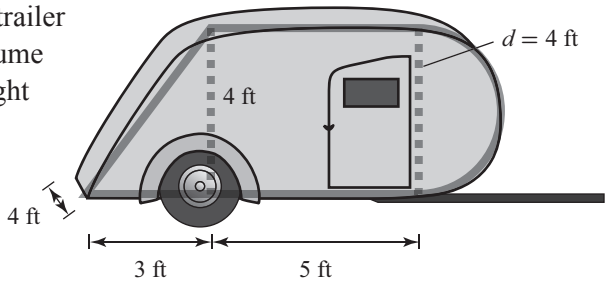
1. If 1 cm = 24 in., what are the dimensions of the camper trailer?

A 60 ft by 108 ft by 48 ft **B** 5 ft by 96 in. by 48 in.

C 5 ft by 9 ft by 4 ft **D** 5 in. by 9 in. by 4 in.

Use this information to answer #2.

The dimensions of a different model of teardrop camper trailer are 4 ft by 4 ft by 8 ft. To determine the approximate volume of the trailer, Kristi divided the trailer into a triangular right prism, a rectangular right prism, and a hemisphere.



2. If 1 $ft^3 \approx 0.0283\ m^3$, what is the approximate volume of the trailer, to the nearest cubic metre?

A 2 m^3 **B** 3 m^3 **C** 4 m^3 **D** 5 m^3

Name: _____ Date: _____

Use this information to answer #3.

The manufacturer of a fuel-efficient car decides to promote the brand. The ad includes data about the fuel consumption rating for this brand and one other brand.

Brand A: 66 mi/gal

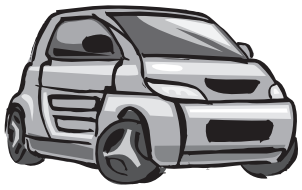
Brand B: 4.8 L/100 km

Hint: 1 mi = 1.609 km.

3. If 1 gal ≈ 3.785 L, what is the approximate difference in the fuel consumption rating for the two vehicles?

A 3 L/100 km **B** 1.2 L/100 km **C** 0.1 mi/gal **D** 10 mi/gal

Use this image to answer #4.

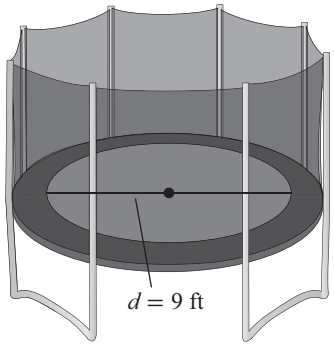


4. What is an appropriate referent for measuring the length of the car?

A a ball of string **B** a paper clip **C** a pencil **D** a shoe lace

Use this information to answer #5.

Stella's family purchases a trampoline with a safety net around the outer edge. The net prevents users from bouncing over the edge.



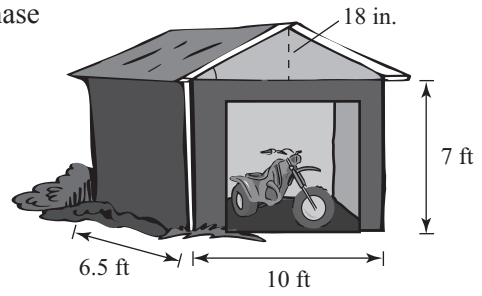
5. The surface area of the safety net is 195 ft^2. What is the approximate height of the net, to the nearest tenth of a metre?

A 2 m **B** 2.4 m **C** 3.5 m **D** 5.2 m

Name: _____ Date: _____

Use this information to answer #6–8.

Martin is building a shed to store his dirt bike. He decides to purchase doors at a later date. The opening for the doors is in the centre of the wall and measures 7.5 ft wide by 6 ft high.



6. What is the approximate amount of siding needed to build the shed, excluding the doors? Include the roof.

A 355 ft^2 **B** 269 ft^2 **C** 144 ft^2 **D** 119 ft^2

Numerical Response

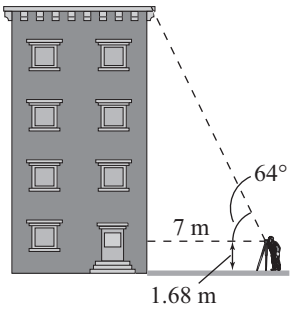
7. What is the pitch of the roof, to the nearest hundredth? Note: The pitch refers to the slope of the roof.

Numerical Response

8. What angle does the roof form with the panel above the front wall, to the nearest degree?

Use this information to answer #9–10.

A surveyor collects data to determine the height of an office tower.



Numerical Response

9. What is the height of the building, to the nearest tenth of a metre?

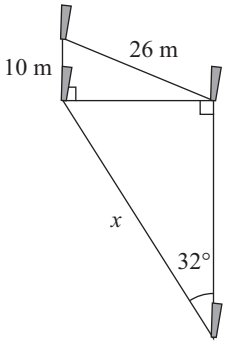
10. Suppose that the surveyor moved 3 m farther back. He determined that the height of the building from his new location was 15 m. What is the new angle of elevation?

A 29° **B** 31° **C** 53° **D** 56°

Name: _____ Date: _____

Use this information to answer #11.

Community volunteers have staked off an area in the park for a prairie garden.

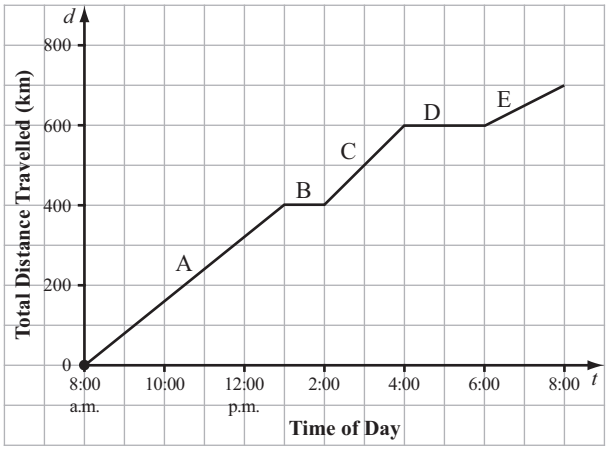


11. What is the length of x, to the nearest metre?

A 49 m **B** 45 m **C** 36 m **D** 16 m

Use this information to answer #12–13.

The Pinto family took a road trip across Canada. The graph shows one day during their trip.



12. Which statement about segment C is correct?

A The car is at rest.

B The car travelled 600 km.

C The car travelled at its highest average speed.

D The car travelled at its lowest average speed.

13. Which statement about segment D is correct?

A The car is at rest and the slope of the line is 0.

B The car is at rest and the slope of the line is undefined.

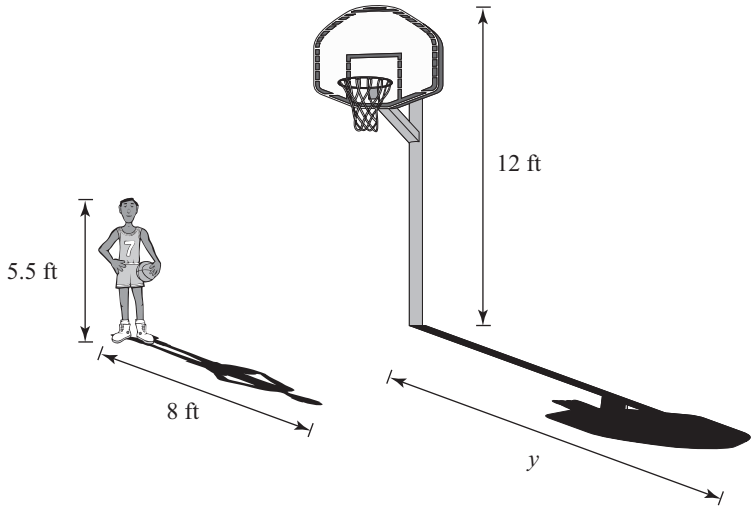
C The car travelled 600 km and the slope of the line is 2.

D The car travelled 600 km in 2 h.

Name: _____ Date: _____

Use this information to answer #14.

Jaspreet is $5\frac{1}{2}$ ft tall and casts an 8-ft shadow. The pole supporting a basketball hoop is 12 ft high.

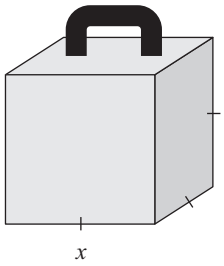


14. How long is the shadow that the pole casts, to the nearest tenth of a foot?

A 8 ft **B** 14.5 ft **C** 17.5 ft **D** 19 ft

Use this information to answer #15–16.

A carrying case for sports equipment has a surface area of 18 m^2.



Numerical Response

15. What is the length of x, to the nearest tenth of a metre?

16. A proportionally smaller box has a volume of 16 m^3. What is an exact value for the length of side x?

A $4\sqrt{2}$ **B** $3\sqrt[3]{2}$ **C** $2\sqrt{2}$ **D** $2\sqrt[3]{2}$

Use this information to answer #17.

A boat rental company uses the function $A(n) = 20n - 400$ to represent the revenue from rentals. In the equation, $A(n)$ represents the amount of money, in dollars, and n represents the number of rentals in a day.

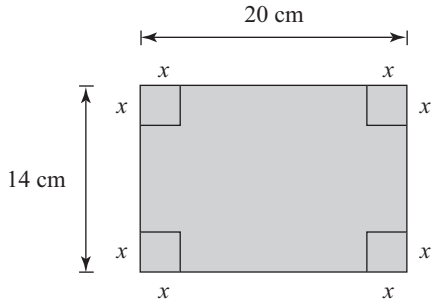
Numerical Response

17. If the boat rental revenue is \$6000, how many boats were rented?

Name: _____ Date: _____

Use this information to answer #18–19.

Avi is making an open cardboard box. The bottom of the box has dimensions 14 cm by 20 cm. The directions say to cut out the square pieces marked x, as shown, and then fold up the sides to form the box.



18. Which expression for the volume of the box is correct?

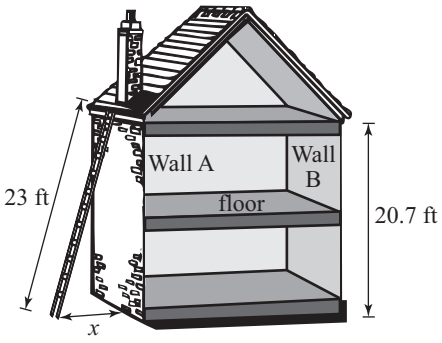
A $V = x(14)(20)$
B $V = x(14 - x)(20 - x)$
C $V = (14 - x)(20 - 2x)$
D $V = x(14 - 2x)(20 - 2x)$

Numerical Response

19. If x is 6 cm, what is the volume of the box?

Use this information to answer #20–22.

The Malcolms are renting a farm house. Mr. Malcolm needs a ladder that reaches the roof in order to rescue the family's cat.



20. How far away is the foot of the ladder from the house, to the nearest foot?

A 1 ft **B** 10 ft **C** 15 ft **D** 25 ft

21. Wall A is parallel to Wall B. What slope do these two walls have?

A undefined **B** 1 **C** 0 **D** -1

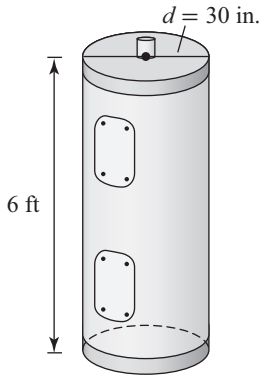
22. Which statement about the slopes of Wall B and the floor is correct?

A The product of the slope of Wall B and the floor is 1.
B The slope of Wall B is -1 and the slope of the floor is undefined.
C The slope of Wall B is undefined and the slope of the floor is 0.
D The slopes of Wall B and the floor are undefined.

Name: _____ Date: _____

Use this information to answer #23.

The hot water heater in the farm house is shown.



Numerical Response

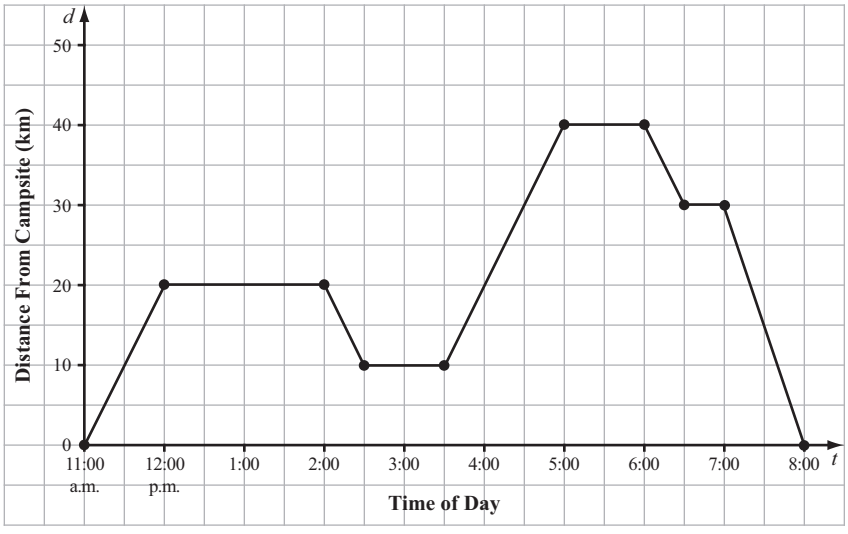
23. What is the volume of the hot water heater, to the nearest tenth of a cubic foot?

24. The hot water heater can be drained at a constant rate of 1 ft^3/min. The slope of the graph is

A 0 **B** negative **C** positive **D** undefined

Use this information to answer #25–26.

Chris decides to go biking on a trail.



25. When did Chris cover the greatest distance in the shortest time?

A from 7:00 p.m. to 8:00 p.m. **B** from 3:30 p.m. to 5:00 p.m.

C from 2:00 p.m. to 2:30 p.m. **D** from 11:00 a.m. to 12:00 p.m.

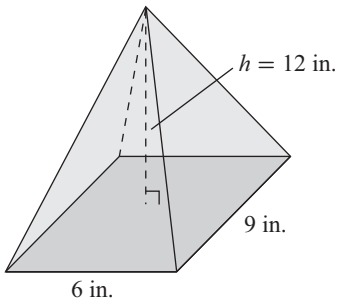
26. What is the domain of the graph?

A $0 \leq x \leq 2.5$ **B** $0 \leq x \leq 5$ **C** $0 \leq x \leq 7$ **D** $0 \leq x \leq 8$

Name: _____ Date: _____

Use this information to answer #27.

Sprint skiers rely on markers to mark the path for a race. The markers, which are shaped like right pyramids, are filled with sand and partially buried in the snow. One marker is shown.

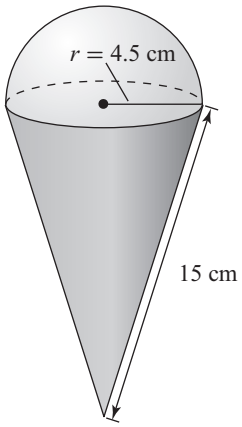


Numerical Response

27. To the nearest cubic inch, how much sand can the marker hold when filled?

Use this information to answer #28.

You order one scoop of chocolate ice cream. The exposed part of the scoop of ice cream forms a perfect hemisphere.



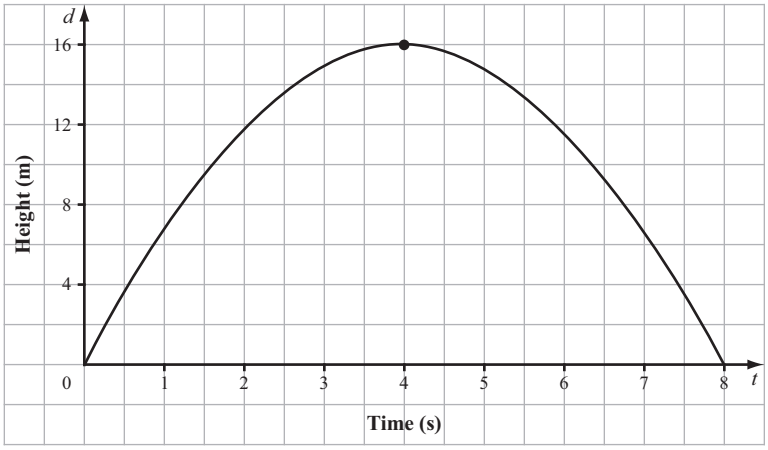
28. What is the exposed surface area of the scoop of ice cream and the cone, to the nearest square centimetre?

A 110 cm^2 **B** 289 cm^2 **C** 339 cm^2 **D** 403 cm^2

Name: _____ Date: _____

Use this information to answer #29–30.

The graph shows the path of a soccer ball kicked into the air.



29. Which statement is true?

A The soccer ball reaches a minimum height at 8 s.

B The soccer ball reaches a minimum height at 4 s.

C The soccer ball reaches a maximum height at 5 s.

D The soccer ball reaches a maximum height at 4 s.

30. When is the soccer ball at rest?

A 0 s and 4 s **B** 0 s and 5 s **C** 0 s and 6 s **D** 0 s and 8 s

Connections

Many of the concepts that you study in mathematics are related and can help you solve different kinds of problems. Connect the concepts and skills you have learned to solve problems.

31. Which of the following is an irrational number?

A 4^{-2} **B** $(0.5)^2$ **C** $\sqrt{54}$ **D** $\sqrt[4]{81}$

Use this information to answer #32.

Compare the following expressions.

$-4\sqrt{7}$	9	$5\sqrt{6}$	$4\sqrt{3}$	$-3\sqrt{17}$
1	**2**	**3**	**4**	**5**

32. Using the numerals 1 to 5, what is the correct order of the expressions from least to greatest value?

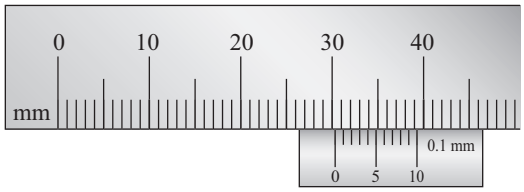
A 5, 1, 4, 2, 3 **B** 5, 1, 2, 4, 3 **C** 1, 5, 2, 4, 3 **D** 1, 5, 4, 2, 3

Name: _____ Date: _____

33. Brent simplified $(x + a)(x + b)$, where $a < 0$, $b > 0$, and $a + b > 0$, to the form $x^2 + mx + n$. Which statement about m and n is true?

A $m < 0$ and $n > 0$ **B** $m < 0$ and $n < 0$ **C** $m > 0$ and $n < 0$ **D** $m > 0$ and $n > 0$

Use the SI caliper to answer #34.



Numerical Response

34. What is the reading on the caliper, to the nearest tenth of a millimetre?

Numerical Response

35. If $\tan \theta = 0.3512$, what is the measure of θ, to the nearest tenth of a degree?

36. What is the greatest common factor of $4x^5y^2$, $12x^3y^2$, and $6x^2y^4$?

A $12x^5y^4$ **B** $4x^2y$ **C** $3x^2y^2$ **D** $2x^2y^2$

37. Which expression is a factor of $x^2 - 9x - 36$?

A $x - 3$ **B** $x - 4$ **C** $x - 6$ **D** $x - 12$

38. The expression, $\frac{\sqrt{x^5}}{\sqrt[3]{x^2}}$, when simplified is

A $\sqrt[8]{x}$ **B** $\sqrt[5]{x^2}$ **C** $\sqrt[6]{x^{11}}$ **D** $\sqrt{x^3}$

39. What is $(4a^3)^2(12a^2)^0$ when simplified?

A $48a^7$ **B** $16a^6$ **C** $8a^6$ **D** $6a^5$

40. A line passes through $(3, -2)$ and is perpendicular to the line segment going through $(3, 2)$ and $(-3, -4)$. What is the equation of the line in slope-intercept form?

A $y = -x - 5$ **B** $y = \frac{2}{3}x + \frac{1}{3}$ **C** $y = -x + 1$ **D** $y = \frac{1}{2}x - 2$

41. What is the equation $y = \frac{3}{2}x + 7$ written in general form?

A $\frac{-3}{2}x - 7 + y = 0$ **B** $3x + 2y + 7 = 0$

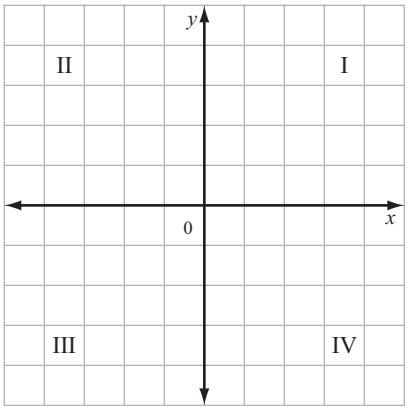
C $\frac{3}{2}x - y + 7 = 0$ **D** $3x - 2y + 14 = 0$

42. What is the y-intercept of $3x - 4y = 7$?

A -4 **B** -3 **C** $\frac{-7}{4}$ **D** $\frac{4}{7}$

Name: _____ Date: _____

Use this diagram to answer #43.



43. In which quadrant do the graphs of $x = -4$ and $y = 3x + 2$ intersect?

A quadrant I **B** quadrant II **C** quadrant III **D** quadrant IV

Use this information to answer #44.

Maria was given the equation $2x + 4y = -8$. She made the following conclusions:

1 The y-intercept is 2.

2 The range is all real numbers.

3 The line is parallel to $y = \frac{-1}{2}x$.

4 The equation of the line in slope-intercept form is $y = \frac{-1}{2}x + 2$.

44. Which conclusions are correct?

A 1 and 4 **B** 1 and 3 **C** 2 and 3 **D** 3 and 4

45. What is the slope of a line with a run of 6 and a rise of -15?

A $\frac{6}{15}$ **B** $\frac{2}{5}$ **C** $\frac{-5}{2}$ **D** $\frac{-15}{1}$

46. If $y = -3x + 7$, what are the coordinates of the point on the line when $x = -2$?

A $(-2, 13)$ **B** $(1, 13)$ **C** $(13, -2)$ **D** $(13, 1)$

47. What is the value of m in the linear equation $2m - 3m(2m - 4) = -2m(3m - 8) + 2$?

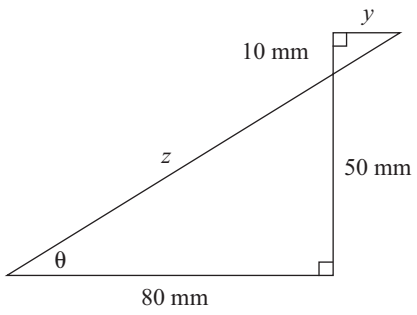
A 8 **B** 4 **C** -1 **D** -4

48. What is the equation $E = mc^2$ expressed in terms of c?

A $c = E - m$ **B** $c = \sqrt{E - m}$ **C** $c = \sqrt{\frac{m}{E}}$ **D** $c = \sqrt{\frac{E}{m}}$

Name: _____ Date: _____

Use this diagram to answer #49–51.



49. What is the length of z, to the nearest millimetre?

A 89 mm **B** 94 mm **C** 110 mm **D** 130 mm

Numerical Response

50. The length of y, to the nearest millimetre is

51. What is the measure of angle θ, to the nearest degree?

A 32° **B** 41° **C** 56° **D** 68°

Use this information to answer #52.

The path that a volleyball takes as it travels from one end of the court to the other end can be represented by $h(d) = -0.03d^2 + 0.3d$, where h is height and d is the distance the ball travels.

52. Which ordered pair satisfies the function $h(6) = 0.72$?

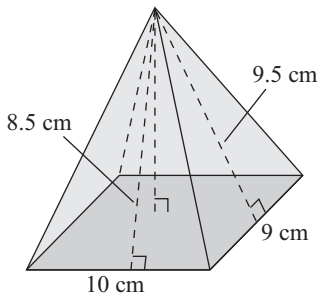
A (0.72, 6) **B** (0.72, 3) **C** (6, 0.72) **D** (3, 0.72)

Numerical Response

53. What is the edge length of a cube with surface area 54 cm^2?

Use this diagram to answer #54.

A paperweight has the shape of a right pyramid with slant heights of 8.5 cm and 9.5 cm.



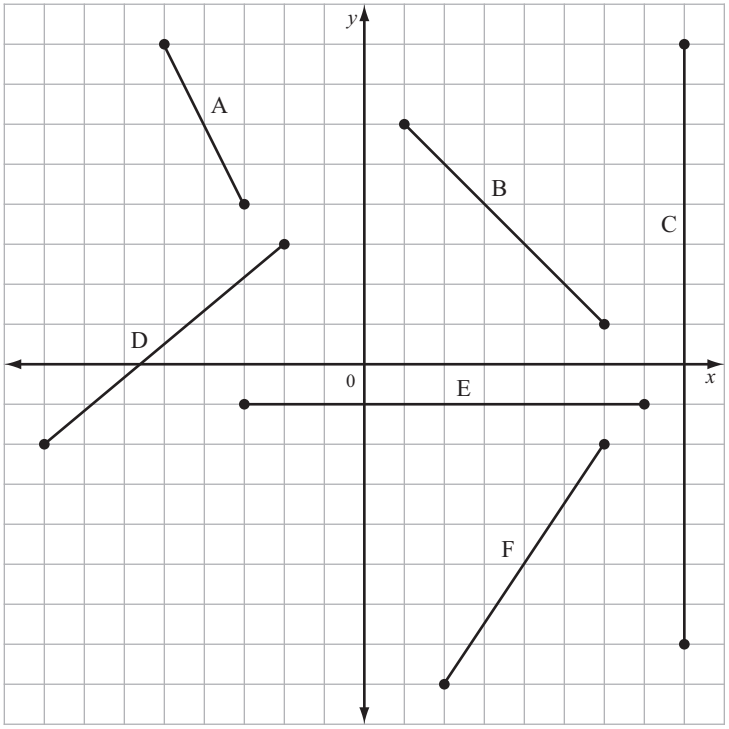
54. What is the surface area of the paperweight, to the nearest tenth of a square centimetre?

A 170.5 cm^2 **B** 260.5 cm^2 **C** 261.5 cm^2 **D** 297 cm^2

Name: _____ Date: _____

Use this graph to answer #55.

The graph shows a set of line segments.



55. Which line segments have a positive slope?

A line segments A and B **B** line segments A, B, and D

C line segments A, C, and F **D** line segments D and F

56. Given that $4x - By - 3 = 0$ passes through point (2, 1), what is the value of B?

A -8 **B** -5 **C** 5 **D** 8

Use this information to answer #57–58.

The prime factorization of a number, x, is $3 \times 3 \times 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 3 \times 2 \times 2 \times 5$.

Numerical Response

57. What is the cube root of x?

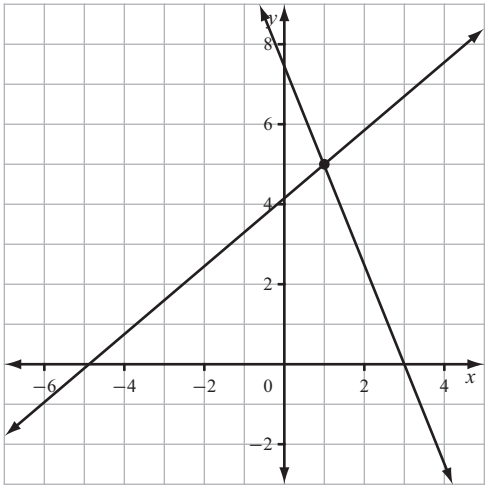
Numerical Response

58. What is the value of $x^{\frac{2}{3}}$?

Name: _____ Date: _____

Use this graph to answer #59–60.

The graph shows a linear system.



59. Which point is the solution to the linear system?

A $(-5, 0)$ **B** $(1, 5)$ **C** $(3, 0)$ **D** $(5, 1)$

60. Which linear system does the graph represent?

A $y = -x + 4$ and $y = -2x + 7$

B $y = -x + 4$ and $y = 2x + 4$

C $y = x + 4$ and $y = 2x + 4$

D $y = x + 4$ and $y = -2x + 7$