3

|  |  |
| --- | --- |
| Five towns (A, B, C, D and E) on a map are connected by roads as illustrated in the diagram.  The distance between these towns is calculated in km.  Road BD is parallel to road AE. |  |

What is the distance between town A and town E?

|  |  |  |  |
| --- | --- | --- | --- |
| A) | 90 km | C) | 30 km |
| B) | 67.5 km | D) | 22.5 km |

5

The two right prisms with square bases represented below are similar.



The lateral area of the smaller prism is 120 cm2 and one side of its base measures 5 cm.

If the height of the larger prism is 12 cm, what is its volume?

Show all your work.

8

Frank is building a teeter-totter for his children. He uses a board that is two metres long which he balances on a support.



What must be the height *h* of the support if the maximum height of the teeter-totter is 1.2 m?

14

Jean must make a right square-based pyramid with a volume of 384 m3 and a height of 8 m. His brother, Claude, has to make one similar but with a volume of 1296 m3.

What must be the length of the apothem (slant height) of Claude’s pyramid?

|  |  |  |  |
| --- | --- | --- | --- |
| A) | 6.7 cm | C) | 15 cm |
| B) | 12 cm | D) | 21.6 cm |

16

|  |  |
| --- | --- |
| A factory makes a certain washing machine model that has a cylindrical tub with a radius of 21 cm and a height of 60 cm, as shown in the adjacent diagram. There is a demand for a similar smaller model. |  |

What must the dimensions of the tub of the smaller model be if its volume is to be 24 630.09 cm3?

Show all your work.

21

A right triangle has a height of 15 cm and a base of 20 cm. A second triangle, similar to the first, has an area of 600 cm2.

What are the measures of base b and height h of the second triangle?

Show your work.

33

The two cylinders, shown below, are similar.



The lateral area of the large cylinder is 565.49 cm2 and its height is 10 cm.

If the radius of the smaller cylinder is 3 cm, what is its volume?

Show all your work.

34

The ratio of the areas of the bases of two similar pyramids is .

Which of the following statements is TRUE?

|  |  |
| --- | --- |
| A) | The ratio of the slant heights is . |
| B) | The ratio of the perimeters of the bases is . |
| C) | The ratio of the volumes is . |
| D) | The ratio of the volumes is . |

42

|  |  |
| --- | --- |
| In triangles ABC and AED shown on the right, ∠AED ≅ ∠ABC.  = 3 cm,  = 6 cm,   = 4 cm.  Which of the following is the measure of ? |  |

|  |  |  |  |
| --- | --- | --- | --- |
| A) | 2.75 cm | C) | 8 cm |
| B) | 4.5 cm | D) | 12 cm |

45

|  |  |
| --- | --- |
| The city of Banville built a bicycle path parallel to 9th street, as shown in the diagram on the right. |  |

According to the diagram, what is the length *x*, to the nearest metre, of the bicycle path that crosses Allard Park?

|  |  |  |  |
| --- | --- | --- | --- |
| A) | 33 m | C) | 27 m |
| B) | 31 m | D) | 12 m |

46

Triangle DEF and triangle ABC are similar.

|  |  |
| --- | --- |
|  |  |

If the ratio of the areas of ΔABC: ΔDEF is 9 : 1, what is the length of segment DE?

|  |  |  |  |
| --- | --- | --- | --- |
| A) | 36 cm | C) | 4 cm |
| B) | 5 cm | D) | cm |

48

The dimensions of two similar prisms are in the ratio of . The volume of the smaller prism is 250 cm3.

What is the volume of the larger prism?

49

Two cylindrical water glasses are of different sizes.

One glass, whose radius is 3 cm, has a maximum capacity of 135π cm3.

The other glass, 12 cm high, has a maximum capacity of 147π cm3.

Are these glasses similar solids?

Justify your answer.

54

Two right cylinders are similar. The area of the base of the small cylinder is 9π cm2. The volume of the big cylinder is 250π cm3 and its height is 10 cm.

What is the height of the small cylinder?

Show all your work.

56

|  |  |
| --- | --- |
| The two cylinders on the right are similar.  The ratio of their areas is .  The radius of the small cylinder is 6 cm. |  |

What is the radius of the large cylinder?

|  |  |  |  |
| --- | --- | --- | --- |
| A) | 300 cm | C) | 60 cm |
| B) | 150 cm | D) | 30 cm |

61

Two prisms are similar. The volume of prism A is 27 times greater than the volume of prism B.

Given the following statements:

1. The height of prism A is 3 times the height of prism B.

2. The perimeter of the base of prism A is 6 times the perimeter of the base of prism B.

3. The lateral area of prism A is 9 times the lateral area of prism B.

Which of the statements are TRUE?

|  |  |  |  |
| --- | --- | --- | --- |
| A) | 1 and 2 only | C) | 2 and 3 only |
| B) | 1 and 3 only | D) | 1, 2 and 3 |

63

|  |  |
| --- | --- |
| In the figure on the right, triangles ABC and ADE are similar.  is parallel to ,  m  = 25 m,  m  = 35 m  and m  = 20 m.  What is the length of segment EC? |  |

65

Two prisms with square bases are similar. One prism is 15 cm high and has a volume of 960 cm3. The side of the base of the other prism measures 16 cm.

How many of the small prisms will fit inside the large prism?

Show all your work.

69

A candle maker melts down a large block of wax in the shape of a right prism with a square base to make candles that are similar to the large block of wax. Various measurements are given in the diagram below.



What is the height of each candle produced by the candle maker?

75

The two right circular cones below are similar. The height of the smaller cone is 5 cm and its volume is 45 cm3. The height of the larger cone is 10 cm and its volume is 360 cm3.



What is the ratio of the areas of the two cones?

76

A pyramid in Egypt has a height of 900 metres. Jonathan builds a replica of this pyramid that is similar in shape. His pyramid has a height of 3 metres. The area of the base of the Egyptian pyramid is 62 100 m2.

What is the volume of Jonathan's pyramid?

Show all your work.

82

The two rectangular right prisms shown below are similar. The dimensions of the smaller prism are given in the diagram below. The volume of the larger prism is 1728 cm3.



What is the height of the larger prism?

Show all your work.

84

The square-based right prisms given below are similar.

The volume of the bigger prism is 1080 cm3. The edges of its base each measure 6 cm.

The height of the smaller prism is 12 cm.



What is the volume of the smaller prism?

|  |  |  |  |
| --- | --- | --- | --- |
| A) | 27.648 cm3 | C) | 172.8 cm3 |
| B) | 69.12 cm3 | D) | 432 cm3 |

88

The ratio of the lateral areas of two similar cones is .

What is the ratio of the volumes of these cones?

|  |  |  |  |
| --- | --- | --- | --- |
| A) |  | C) |  |
| B) |  | D) |  |

91

A layer cake is made up of three similar cylinders. The total height of the cake is 22 cm.

The height of the top layer is 4 cm. Its radius is 5 cm.

The radius of the bottom layer is 15 cm.



What is the radius of the cake’s middle layer?

Show all your work.

96

The *Chunky Meal in a Can* soup is available in two sizes: the single serving size and the family size. The cans are similar solids.

|  |  |
| --- | --- |
|  |  |

The area of the base of the smaller can is 16 cm2 and its volume is 240 cm3.

The area of the base of the larger can is 25 cm2.

What is the volume of the larger can to the nearest cubic centimetre?

Show all your work.

105

The cylinders below are similar solids.



The area of the base of the smaller cylinder is 16 cm2, and its volume is 72 cm3.

The area of the base of the larger cylinder is 144 cm2.

What is the volume of the larger cylinder to the nearest cubic centimetre?

110

George has determined that two solids are similar. One solid is 9 cm in height and has a volume of 810 cm3. The second solid has a volume of 240 cm3.

What is the height of the second solid?

Show all your work.