FOMP 10 Final Review Part 1 v1

Short Answer

Use the table of conversion factors to help answer the following questions.

Imperial Unit	SI Unit
1 in.	2.54 cm
1 ft	0.3048 m
1 yd	0.9144 m
1 mi	1.609 km

Level 1-2 Questions

1. What is Canada's official measurement system?

2. The basic unit of length in the SI system is the

3. Which of the four imperial length units listed is the smallest (foot, inch,, mile, yard)?

4. What is the approximate perimeter of the figure shown below, using an appropriate SI unit?

5. What is the most appropriate SI measurement unit to use when estimating the perimeter of this figure?

6. What measuring instrument is best for measuring the length of a soccer field.

7. Identify the most suitable unit for measuring the height of a pop can.

8. A florist requires 12 in. of ribbon for each bouquet of flowers he creates. How many bouquets will he be able to create from 10 yd of ribbon?

9. A shoe is 25 cm long. Determine the shoe's length, to the nearest tenth of an inch.

10. Convert the measurement 9 yd to the nearest hundredth metre.

11. Convert the length to the nearest hundredth of a metre that is equal to 10 ft.

12. Determine the area of a rectangle that is 85 cm by 30 cm, in square feet.

**13.** What formula can be used to calculate the surface area of a right cylinder?

14. Calculate the surface area of the sphere, to the nearest tenth of a square centimetre.
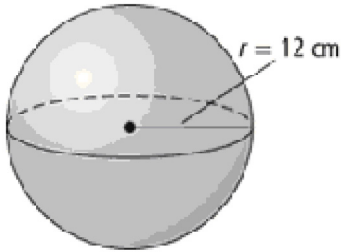
15. Which formula is used to determine the volume of a right cone?

16. A can of soup has a radius of 4 cm and a height of 8 cm. The label on the can covers the entire curved surface of the can. What is the area of the label, to the nearest centimetre?

17. In △ABC, AB = 5 cm and BC = 10 cm. Determine the tangent ratio of ∠A, to the nearest thousandth.
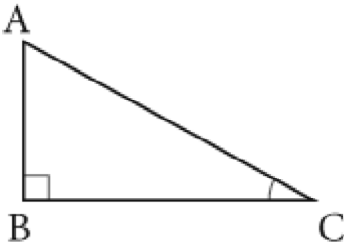
18. What is the correct formula for the cosine ratio of ∠A.

**19.** Evaluate cos 54°, to four decimal places.

20. Determine the value of sin 31°, to four decimal places.

21. In $\triangle$ TUV, UV = 14 m, $\angle$U = 90°, and $\angle$T = 43°. Determine the measure of $\angle$V, to the nearest degree

22. If sin A = $\dfrac{3}{12}$, what is the measure of $\angle$A, to the nearest degree?

23. What is $\dfrac{4^4}{2^6 - 4}$?

24. What is the next number in the sequence 3^3, 3^2, 3^1, 3^0, …?

25. Determine the value of $(-1)^0 - 7^0$.

26. Evaluate $196^{\frac{1}{2}}$.

27. Write an equivalent power to $\sqrt[3]{264}$?

28. What is $(11h)^{\frac{1}{2}}$ as an equivalent radical?

29. **a)** Determine the area of a rectangle that measures 3.5 cm by 5.5 cm, in square millimetres.
**b)** Determine the area of a rectangle that measures 35 mm by 70 mm, in square metres.

30. Determine the volume of each object, to the nearest tenth of a cubic unit.
   a) a right cone with radius 2.2 cm and height 6.4 cm
   b) a sphere with radius 5.8 ft

31. The hypotenuse is the side _____ the right angle in a right triangle.

32. Max's dog is lying on the ground 1.2 m away from him. The angle of elevation from the dog to the top of Max's head is 48°. How tall is Max, to the nearest tenth of a metre?

48°
1.2 m
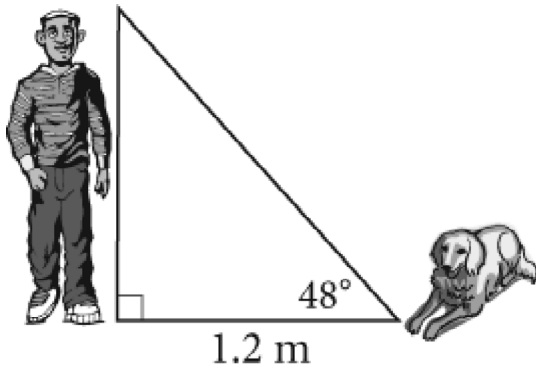
33. A 100-m cable is attached to the top of a cell phone tower and is secured to the ground 45 m from the base of the tower. Determine the angle that the cable makes with the ground, to the nearest degree.


100 m
45 m
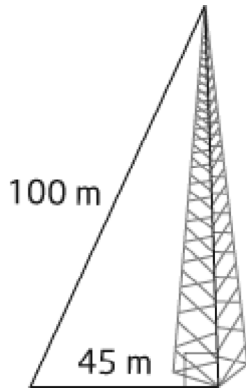
**34.** Evaluate $\sqrt{9604}$.

35. Determine the area of a square with each side length.
 a) 10 km
 b) 20 mm

36. Express each entire radical as a mixed radical in simplest form.
 a) $\sqrt{252}$
 b) $\sqrt[3]{40}$
 c) $\sqrt{567}$

Level 3-4 Questions

37. A tire has a diameter of 2 ft. How many times will it rotate in order to roll across a field that is 252 yd long? Round your answer to the nearest tenth, if necessary.

38. It is 851 km from Whitehorse to Inuvik. How long would it take to fly from Whitehorse to Inuvik in a de Havilland Beaver at a speed of 143 mph, if you did not have to stop to refuel?

39. A circular swimming pool has a diameter of 9.9 m. It is filled with water to a height of 1.8 m. How much water is in the pool, to the nearest hundred litres? Hint: $1000 \text{ L} = 1 \text{ m}^3$.
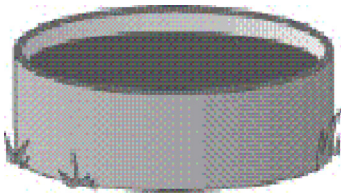
40. What is the surface area of the right pyramid, to the nearest square millimetre?
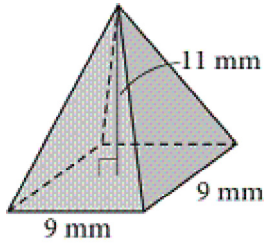

41. A right rectangular prism has a surface area of 946 mm². It has length 22 mm and width 11 mm. Determine the height of the prism.

42. Determine the volume of a right cone with radius 2.2 in. and height 1.2 ft. Express the answer to the nearest cubic inch.

43. What is the height of a right cone with volume 27.5 mm³ and radius 2.7 mm? Express the answer to the nearest tenth of a millimetre.

44. A wheelchair ramp is being built for the entrance to a school. If the ramp makes an angle of 4° with the ground and has a horizontal length of 3 m, determine the height of the ramp, to the nearest tenth of a metre.

45. A ladder leans against a vertical wall and makes an angle of 72° with the ground. The foot of the ladder is 1.4 m from the base of the wall. Determine the vertical distance from the ground to the top of the ladder, to the nearest tenth of a metre.

46. If cos A = 0.1329, then the measure of ∠A, to the nearest degree, is

47. If cos B = 0.7615, then the measure of ∠B, to the nearest degree, is

48. In the triangle, BC = 12 cm and cos B = 0.823. Determine the length of AC, to the nearest centimetre.

A

C   B
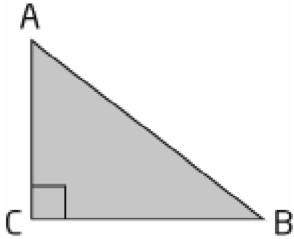
49. Determine the measure of ∠F, to the nearest degree.

F

15   12

D   E
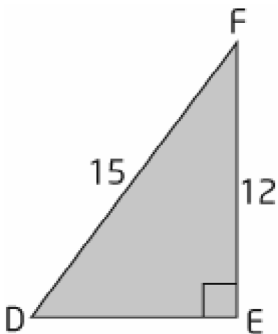
50. Determine the cube root of $216n^3$.

**51.** Simplify $\left(\dfrac{2}{9}\right)^4$ (9).

52. One side of a square is $15g$ in length. What is the area of the square?

**53.** Write an equivalent power to $\sqrt[4]{160^5}$?

8

54. Which expression cannot be evaluated: $\sqrt[3]{-81}$, $-64^{\frac{2}{3}}$, $9^{-\frac{2}{3}}$, $\sqrt{-25^3}$?

55. The root of a number can be represented by

56. Initially, 3 people have a bacterial infection. The next day, every infected person infects one more person. If this pattern continues, how many days will it take for 24 people to be infected?

57. Express $\sqrt{539}$ as an equivalent mixed radical.

58. Express $\sqrt{4j^{11}}$ as a power with a rational exponent.

59. Order these irrational numbers from least to greatest: $3\sqrt{18}$, $2\sqrt{30}$, $\sqrt[3]{84}$, $4\sqrt{8}$.

60. The height of Melvin's house is 20 m. His friend John lives next door in a house that is 21 m tall. If John's house casts a shadow that is 12 m long, how long is the shadow cast by Melvin's house at the same time of day? Round to the nearest metre, if necessary.

61. Jeric and his family are making a return trip to the southern United States this winter break. Driving at an average speed of 70 mph, the trip takes 25 h each way.
a) Calculate the total number of miles driven.
b) What is the distance in kilometres?

62. Determine the surface area of each solid, to the nearest tenth of a square unit.

a)

30 cm

24 cm

24 cm

b)

30 ft

$r = 11$ ft

c)

$d = 13$ m
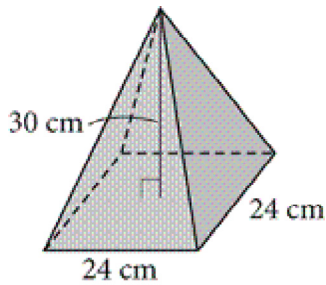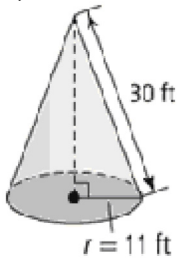
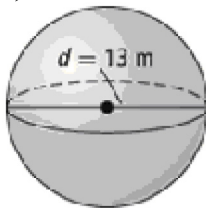**63.** A volleyball fits exactly into a cubic box with edge length 20.5 cm. What is the volume of the volleyball, to the nearest cubic centimetre?

64. Write and evaluate an expression using exponents for the total area of each pair of squares.
a) Square A has side lengths of 5.1 m and square B has side lengths of 3.5 m.
b) Square C has side lengths of 4.3 yd and square D has side lengths of 9.3 yd.

65. Simplify, then evaluate. Express the answer to four decimal places, where necessary.

a) $\left[\left(\dfrac{2}{3}\right)^2\right]^{-3}$

b) $\left[\left(\dfrac{1}{4}\right)^{-3} \div \left(\dfrac{1}{4}\right)^2\right]^{-2}$

66. An open-topped cubical box has a volume of 216 cm³. Determine the total surface area of the five faces of the box.
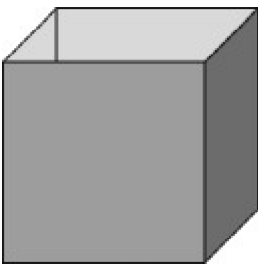

**67.** 1024 as a power of 4 is _____ .

Level 5-6 Questions

68. Raj measures the distance from his house to Jacob's house using a yardstick. He finds that the distance equals exactly 114 yd. If he walks at a constant rate of 1 m/s, how soon will he get back home, to the nearest second?

69. A cone has a radius of 2.3 cm and a height of 12.3 cm. The cone is filled with soft ice cream and then topped with a hemispherical scoop of hard ice cream. Determine the total volume of ice cream, to the nearest cubic centimetre.

70. A juice carton is shaped like a right triangular prism on top of a right rectangular prism. It is filled to 77% of the total volume of the container. How much juice is in the carton, to the nearest cubic centimetre?
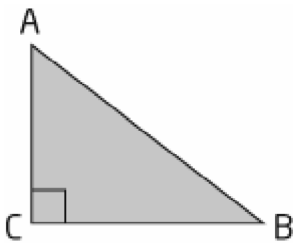
5 cm

22 cm

8 cm

8 cm
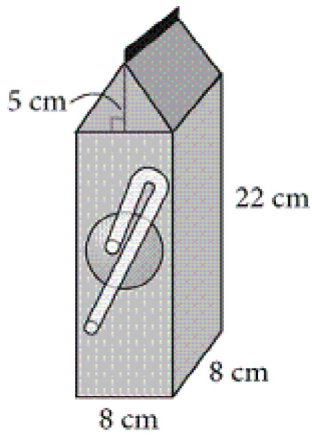
71. What is the correct formula for the sine ratio of $\angle A$.

72. Determine the length of x and the length of y, to the nearest tenth of a metre.

12

y

x

37°

42°
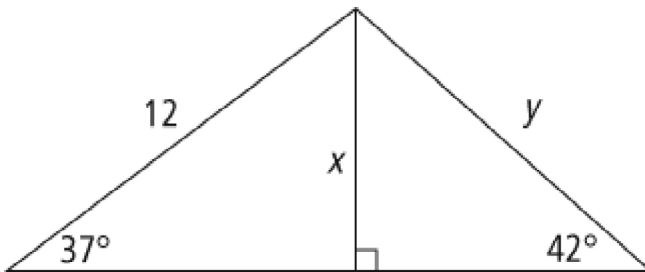
73. In the triangle, $BC = 14$ cm and $\tan B = \dfrac{9}{14}$. Determine the area of $\triangle ABC$, to the nearest square centimetre.

A

C   B

74. A computer game disk with the handbook needs a box 19 cm by 14 cm by 1.5 cm in size. What is the total amount of plastic wrapping needed to cover the entire box if 66 cm² is needed to allow for the overlapping at the edges?

75. In the figure below, the hole in the end extends straight through the block. Determine the total surface area of the block.


3 cm

1 cm

2 cm

3 cm

8 cm
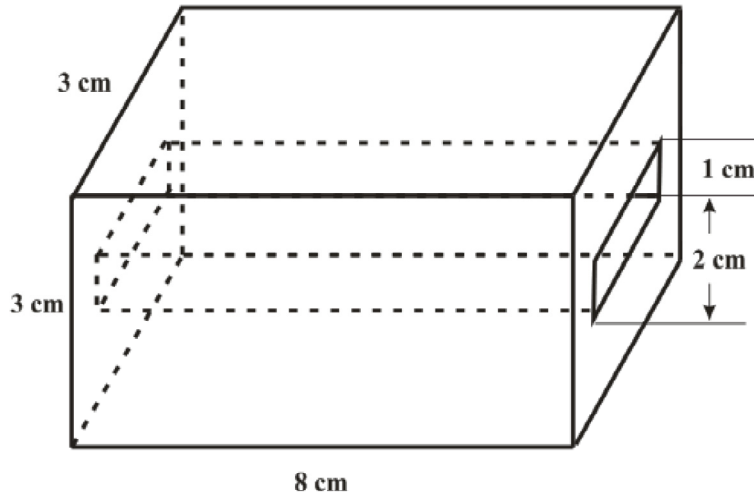
76. A roof is shaped like an isosceles triangle. The slope of the roof makes an angle of 24° with the horizontal, and has an altitude of 3.5 m. Determine the width of the roof, to the nearest tenth of a metre.


A

3.5 m

B 24°   24° C

D
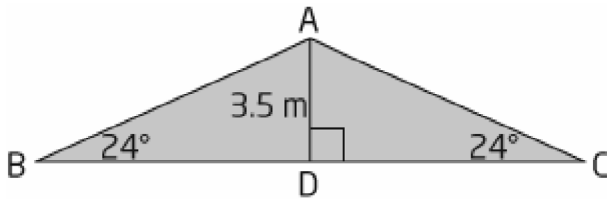
77. In △XYZ, XY and XZ have equal lengths of 16 cm. The base of the triangle, YZ, is 26 cm. Using trigonometry, determine the height of the triangle, XW, to the nearest tenth of a centimetre.
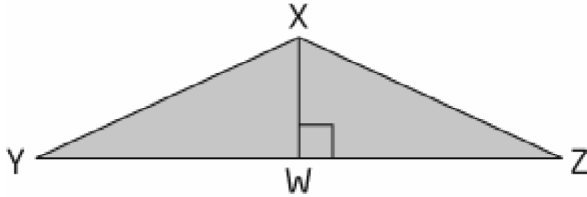
78. A telephone pole is secured with two cables. The first cable is attached to the top of the pole and makes an angle of 80° with the ground. The cable is secured to the ground 7 m from the bottom of the pole. The second cable is attached to the top of the pole and secured to the ground three times as far from the pole as the first cable is, on the same side of the pole. Determine the angle the second cable makes with the ground, to the nearest degree.
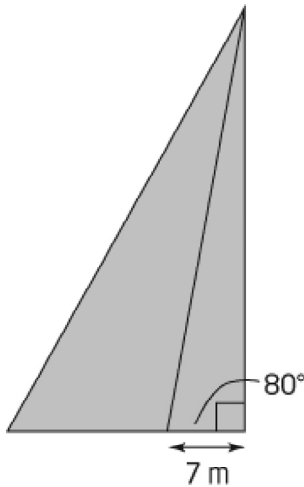
79. A cube has a square hole all the way through it. If the volume of wood used to construct the object is 3072 mm³, what are the dimensions of the cube and the hole?
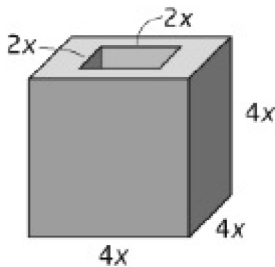
80. Develop three questions that have a solution of p^6. For each question, choose a different exponent law and apply it.

81. Matthew's pay increases by 10% every month. If his first pay is $400, determine the amount of his pay in month 6.

Level 7-8 Questions

82. A right triangular prism has height 5 cm and equilateral triangle bases with sides measuring 6 cm. What is the surface area of the prism, to the nearest tenth of a square centimetre?

83. Calculate the surface area of a right pyramid with a rectangular base measuring 12 cm by 13 cm and a height of 16 cm. Express the answer to the nearest tenth of a square centimetre.

84. The half-life of a certain radioactive element can be modelled by the formula $M = M_0 \left(\dfrac{1}{8}\right)^{\frac{t}{18}}$, where M_0 is the initial mass, in grams, t is the elapsed time, in hours, and M is the remaining mass after t hours. What is the half-life of the element?

85. A right cylindrical bird feeder, with radius r and height h, is hung from a tree. Three circles, each with radius r, have been cut from the curved surface of the cylinder in order for the birds to feed. Write and simplify an equation to represent the surface area of the feeder to be painted.

86. Explain the effects of each of the following changes on the volume of a right cone with radius r and height h.
a) The radius is doubled.
b) Both the radius and height are doubled.
c) The radius is doubled and the height is halved.

87. The radius of the planet Neptune is ten times the radius of the planet Mercury.
a) What is the ratio of the surface area of Neptune to the surface area of Mercury?
b) What is the ratio of the volume of Neptune to the volume of Mercury?

88. The percent grade of a road is the ratio of the vertical rise of the road to the horizontal distance, expressed as a percent. A road in the mountains has a vertical rise of 80 m over 1 km of horizontal distance.
a) Determine the percent grade of the road, to the nearest percent.
b) What is the angle of elevation of the road, to the nearest degree?

89. A farmer uses a conveyor belt to move grain from ground level into a storage silo. The conveyor has a length of 9 metres. Its angle of elevation can be adjusted from 5° to 20°. The silo has an opening that can accommodate the conveyor belt at its lowest and highest settings. Determine the size of the opening of the silo, to the nearest tenth of a metre.
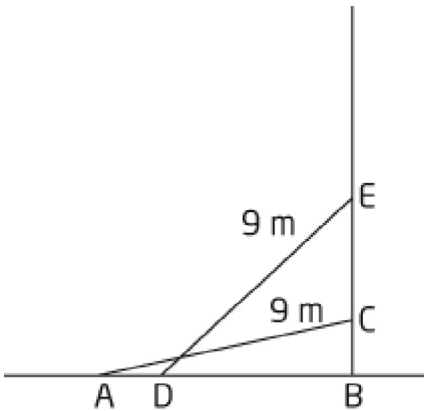
90. The string on Yuri's kite is 30 m long and makes an angle of 47° with the ground. Yuri's friend, Abdul, is standing directly below the kite.
a) How far apart are Abdul and Yuri now, to the nearest tenth of a metre?
b) Abdul runs away from Yuri, so that the angle of elevation between Abdul and the kite is 22°. How far apart are Abdul and Yuri, to the nearest tenth of a metre?