

h 1 Exam Review

Name: _____

Multiple Choice

Identify the choice that best completes the statement or answers the question.

- C 1. Convert 7 yd. to inches. $7 \text{ yd.} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} \cdot \frac{12 \text{ in}}{3 \text{ ft}} =$
 a. 43 in. b. 84 in. c. 252 in. d. 21 in.
- b 2. Convert 100 in. to yards, feet, and inches.
 a. 4 yd. 2 ft. 2 in. c. 4 yd. 0 ft. 4 in.
b. 2 yd. 2 ft. 4 in. d. 1 yd. 1 ft. 4 in.
 $100 \text{ in.} \cdot \frac{1 \text{ ft}}{12 \text{ in}} \cdot \frac{1 \text{ yd}}{3 \text{ ft}} = 2.7 \text{ yd}$
 $0.7 \text{ yd.} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} = 2.1 \text{ ft}$
- d 3. Marie has 17 yd. of material that she will cut into strips 19 in. wide. How many strips can Marie make?
 a. 10 b. 2 c. 21 d. 32
 $17 \text{ yd.} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} \cdot \frac{12 \text{ in}}{1 \text{ ft}} = 612 \text{ in}$
 $612 \div 19 = 32.2$
- C 4. Oscar is building a fence around his rectangular garden. His garden measures 18 ft. 6 in. by 8 ft. 5 in. The fencing material is sold by the yard. It costs \$3.75/yd. What is the cost of material before taxes?
 a. \$33.75 b. \$66.25 c. \$67.50 d. \$63.75
 $P = 52 \text{ ft } 22 \text{ in}$
 $P = 53 \text{ ft } 10 \text{ in}$
- d 5. Paul plans to replace 487 in. of wood railing along the top of his patio fence. The wood is sold in 8-ft. lengths. How many 8-ft. lengths does Paul need to purchase?
 a. 5 b. 7 c. 61 d. 6
 $487 \text{ in.} \cdot \frac{1 \text{ ft}}{12 \text{ in}} = 40.583 \text{ ft}$
 $40.583 \div 8 = 5.07$
- a 6. Baseboards are sold in 8-ft. lengths. Nelia requires 73 yd. of baseboard. How many 8-ft. lengths does Nelia need to purchase?
a. 28 b. 26 c. 29 d. 27
 $73 \text{ yd.} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} = 219 \text{ ft}$
 $219 \div 8 = 27.375$
- d 7. Mike ran 1 mi. in 4 min. On average, how far did he run every 10 s? Give your answer in yards and feet.
 a. 220 yd. 0 ft. c. 293 yd. 1 ft.
 b. 7 yd. 1 ft. d. 73 yd. 1 ft.
- A 8. Which referent could you use for 1 m?
a. The length of your stride
 b. The width of a classroom in your school
 c. The length of a dinner fork
 d. The width of a computer keyboard
- b 9. Which referent could you use for 1 cm?
 a. The depth of a kitchen sink
b. The width of your shortest finger
 c. The length of a public swimming pool
 d. The length of a walking stick
- d 10. Which referent could you use for 1 mm?
 a. The length of a sheet of loose-leaf paper
 b. The diameter of a beach ball
 c. The distance between British Columbia and Manitoba
d. The width of the head of an ant
- C 11. Which SI unit is most appropriate for measuring the length of a soccer field?
 a. Millimetres b. Centimetres c. Metres d. Kilometres
- b 12. Which imperial unit is most appropriate for measuring the length of a hockey rink?

- a. Miles **(b.)** Yards c. Inches d. Feet

C 13. An indoor lacrosse goal is 4 ft. high. What is this measurement to the nearest tenth of a metre? $4 \text{ ft} \cdot \frac{30.48 \text{ cm}}{1 \text{ ft}} = \frac{121.92 \text{ cm}}{100 \text{ cm}} = 1.2 \text{ m}$
 a. 1.3 m b. 12.0 m **(c.)** 1.2 m d. 13.3 m

d 14. The Skeena River is the second longest river entirely in B.C. It is approximately 354 mi. long. What is this length to the nearest kilometre?
 a. 590 km b. 221 km c. 212 km **(d.)** 566 km $354 \text{ mi} \cdot \frac{1.609 \text{ km}}{1 \text{ mi}} = 569.6$

b 15. Convert 3180 m to yards and the nearest foot.
 a. 2935 yd. 1 ft. **(b.)** 3445 yd. 0 ft. c. 1060 yd. 0 ft. d. 815 yd. 1 ft. $3180 \text{ m} \cdot \frac{1 \text{ yd}}{0.9144 \text{ m}} = 3477.7 \text{ yd}$

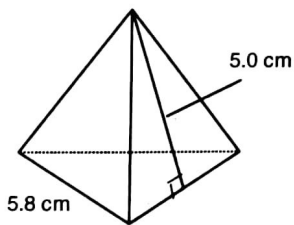
b 16. Convert 1732 yd. to the nearest tenth of a kilometre.
 a. 1558.8 km **(b.)** 1.6 km c. 15.6 km d. 155.9 km $1732 \text{ yd} \cdot \frac{0.9144 \text{ m}}{1 \text{ yd}} = \frac{1584.14 \text{ m}}{1000 \text{ m}} = 1.6 \text{ km}$

b 17. The Queen's Plate is a thoroughbred horse race for 3-year-old Canadian-bred horses. The race is $1 \frac{1}{4}$ mi. in length. What is this distance in kilometres?
 a. 0.78 km **(b.)** 2 km c. 1.7 km d. 1.28 km $1.25 \text{ mi} \cdot \frac{1.609 \text{ km}}{1 \text{ mi}} = 2.01 \text{ km}$

d 18. On a rugby field, the goal is 3 m high at the crossbar. What is this height to the nearest foot?
 a. 9 ft. b. 11 ft. c. 8 ft. **(d.)** 10 ft. $3 \text{ m} \cdot \frac{100 \text{ cm}}{1 \text{ m}} \cdot \frac{1 \text{ ft}}{30.48 \text{ cm}} = 9.8 \text{ ft.}$

b 19. A figure skating blade is 0.15 in. wide. What is this width to the nearest millimetre?
 a. 3 mm b. 4 mm c. 5 mm d. 6 mm

C 20. Determine the surface area of this regular tetrahedron to the nearest square centimetre.



$$SA = 4 \left(\frac{bh}{2} \right) = 2(5.8)(5) = 58$$

- a. 116 cm² b. 44 cm² **(c.)** 58 cm² d. 29 cm²

d 21. Determine the surface area of this right rectangular pyramid to the nearest square inch.

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

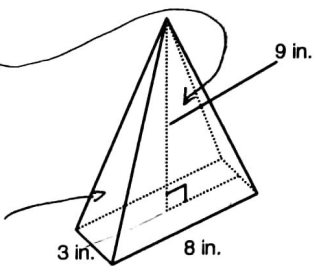
$$1.5^2 + 9^2 = c^2$$

$$9.1241 = c$$

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

$$4^2 + 9^2 = c^2$$

$$9.8489 = c$$



$$SA = (l \cdot w) + 2 \left(\frac{bh}{2} \right) + 2 \left(\frac{b_1 h_1}{2} \right)$$

$$= (3 \cdot 8) + (8 \cdot 9.1241) + (3 \cdot 9.8489)$$

$$= 126.54 \approx 127 \text{ in}^2$$

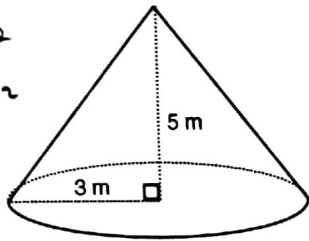
- a. 229 square inches c. 103 square inches
 b. 75 square inches **(d.)** 127 square inches

- d 22. Determine the surface area of this right cone to the nearest square metre.

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

$$3^2 + 5^2 = c^2$$

$$5.831 = c$$



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

$$= \pi (3)^2 + \pi (3)(5.831)$$

$$= 83.2$$

- a. 75 m² b. 55 m² c. 74 m² d. 83 m²

- d 23. The lateral area of a cone is 198.6 cm². The diameter of the cone is 10.2 cm. Determine the height of the cone to the nearest tenth of a centimetre.

- a. 12.4 cm b. 8.0 cm c. 8.8 cm d. 11.3 cm

$$LA \text{ of cone} = \pi r s$$

$$198.6 = \pi (5.1) s$$

$$12.3954 = s \rightarrow a^2 + b^2 = c^2$$

- a 24. A regular tetrahedron has edge length 20.0 m and a slant height of 17.3 m. Calculate the surface area of the tetrahedron to the nearest square metre.

- a. 692 m² b. 519 m² c. 1384 m² d. 173 m²

$$c^2 - b^2 = a^2$$

$$(17.3)^2 - (17.3)^2 = a^2$$

$$a = 11.3$$

- d 25. A right rectangular pyramid has base dimensions 8 ft. by 6 ft. and a height of 12 ft. Calculate the surface area of the pyramid to the nearest square foot.

- a. 216 square feet b. 159 square feet c. 271 square feet d. 223 square feet

$$s_1^2 = 12^2 + 3^2 \rightarrow s_1 = 12.3693$$

$$s_2^2 = 12^2 + 4^2 \rightarrow s_2 = 12.6491$$

$$SA = l \cdot w + bh + bh$$

$$= 8 \cdot 6 + 6 \cdot 12.6491 + 8 \cdot 12.3693$$

$$SA = 222.8$$

- a 26. A right pyramid has a square base with side length 12 m and a height of 7 m. Calculate the surface area of the pyramid to the nearest square metre.

- a. 365 m² b. 443 m² c. 664 m² d. 312 m²

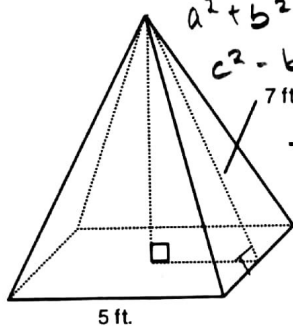
$$SA = \pi r^2 + \pi r s$$

$$400.2 = \pi (6)^2 + \pi (6) s$$

- b 27. The surface area of a right cone is 400.2 m². The radius of the cone is 6.0 m. Determine the height of the cone to the nearest metre.

- a. 13 m b. 14 m c. 16 m d. 15 m

- a 28. Calculate the volume of this right square pyramid to the nearest cubic foot.



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

$$c^2 - b^2 = a^2$$

$$7^2 - 2.5^2 = a^2$$

$$6.5383 = a$$

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

$$= \frac{1}{3} (5 \cdot 5) \cdot 6.5383$$

$$= 54.485$$

$$\frac{400.2 - 36\pi}{6\pi} = \frac{6\pi s}{6\pi}$$

$$s = 15.2313$$

$$a^2 + b^2 = c^2 \rightarrow c^2 - a^2 = b^2$$

$$(15.2313)^2 - 6^2 = b^2$$

$$b = 14$$

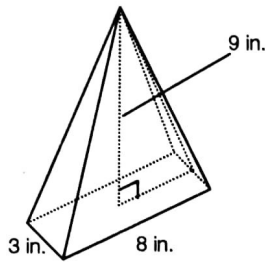
- a. 54 cubic feet b. 163 cubic feet c. 62 cubic feet d. 58 cubic feet

- b 29. Calculate the volume of this right rectangular pyramid to the nearest cubic inch.

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

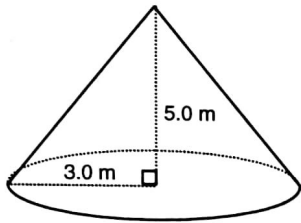
$$= \frac{1}{3} (3 \cdot 8) \cdot 9$$

$$= 72$$



- a. 64 cubic inches b. 72 cubic inches c. 216 cubic inches d. 78 cubic inches

a 30. Calculate the volume of this right cone to the nearest tenth of a cubic metre.



$$V = \frac{1}{3} (\pi r^2) \cdot h$$

$$= \frac{1}{3} (\pi 3^2) \cdot 5$$

$$= 47.1$$

- a. 47.1 m³ b. 49.3 m³ c. 141.4 m³ d. 55.0 m³

C 31. A right rectangular pyramid has base dimensions 9 ft. by 5 ft., and a height of 12 ft. Determine its volume to the nearest cubic foot.

- a. 237 cubic feet b. 192 cubic feet c. 180 cubic feet d. 184 cubic feet

$$V = \frac{1}{3} lwh = \frac{1}{3} (9)(5)(12) = 180$$

A 32. A right cone has a height of 8 cm and a volume of 250 cm³. Determine the radius of the base of the cone to the nearest centimetre.

- a. 5 cm b. 11 cm c. 3 cm d. 17 cm

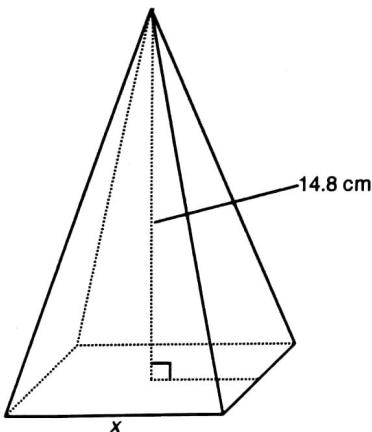
$$V = \frac{1}{3} (\pi r^2) h$$

$$250 = \frac{1}{3} \pi r^2 (8)$$

$$\frac{750}{8\pi} = r^2$$

$$r = \sqrt{\frac{750}{8\pi}} \approx 5.4627 \approx 5$$

C 33. This right square pyramid has a volume of 254.7 cm³. Calculate the side length of its base, x , to the nearest tenth of a centimetre.



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

$$254.7 = \frac{1}{3} (x^2) (14.8)$$

$$\frac{764.1}{14.8} = \frac{14.8 x^2}{14.8}$$

$$\sqrt{\frac{764.1}{14.8}} = \sqrt{x^2}$$

$$x = 7.2 \text{ cm}$$

- a. 5.9 cm b. 4.3 cm c. 7.2 cm d. 4.1 cm

a 34. The volume of this right cone is 14.7 mm³. Calculate its height, h , to the nearest tenth of a millimetre.

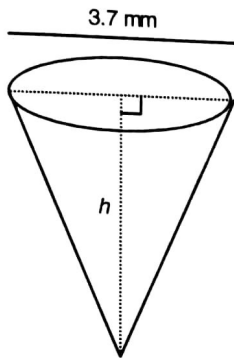
$$V = \frac{1}{3} \pi r^2 h$$

$$14.7 = \frac{1}{3} \pi (1.85)^2 h$$

$$44.1 = 3.4225 \pi h$$

$$\frac{44.1}{3.4225 \pi} = h$$

$$4.102 = h$$



- (a) 4.1 mm b. 2.8 mm c. 1.4 mm d. 1.0 mm

a 35. The radius of a volleyball is approximately 11 cm. Determine the surface area of a volleyball to the nearest square centimetre.

- (a) 1521 cm² b. 380 cm² c. 6082 cm² d. 5575 cm²

$$SA = 4\pi r^2 = 4\pi(11)^2 = 1520.5$$

a 36. The surface area of a tennis ball is approximately 23 square inches. What is the diameter of the tennis ball to the nearest inch?

- (a) 3 in. b. 4 in. c. 6 in. d. 1 in.

$$SA = 4\pi r^2 \Rightarrow \sqrt{\frac{23}{4\pi}} = r \Rightarrow r = 1.35 \Rightarrow d = 2.7$$

a 37. Mars approximates a sphere with radius 2100 mi. What is the approximate volume of Mars?

- a. 3.9×10^{10} mi.³ b. 5.5×10^7 mi.³ c. 6.8×10^{11} mi.³ d. 3.1×10^{11} mi.³

d 38. A hemisphere has radius 11.6 cm. What is the surface area of the hemisphere to the nearest tenth of a square centimetre?

- a. 3269.1 cm² b. 918.4 cm² c. 845.5 cm² (d) 1268.2 cm²

$$SA = \frac{1}{2}(4\pi r^2) + \pi r^2 = 3\pi(11.6)^2 = 1268.2$$

c 39. A ten-pin bowling ball has a radius of approximately $4\frac{1}{4}$ in. Determine the surface area of the ball to the nearest square inch.

- a. 57 square inches (c) 227 square inches
b. 908 square inches d. 322 square inches

$$SA = 4\pi r^2 = 4\pi(4.25)^2 = 227$$

c 40. A ten-pin bowling ball has a radius of approximately $4\frac{1}{4}$ in. Determine the volume of the ball to the nearest cubic inch.

- a. 5642 cubic inches (c) 322 cubic inches
b. 2572 cubic inches d. 227 cubic inches

$$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi(4.25)^3 = 322.6$$

b 41. The circumference of a beach ball is 55 cm. Determine its volume to the nearest cubic centimetre.

- a. 963 cm³ (b) 2810 cm³ c. 22 476 cm³ d. 307 cm³

$$C = 2\pi r \Rightarrow \frac{55}{2\pi} = r \Rightarrow V = \frac{4}{3}\pi\left(\frac{55}{2\pi}\right)^3 = 2809.5$$

a 42. A stadium has a roof that approximates a hemisphere with circumference 2500 ft. Determine the surface area of the roof to the nearest square foot.

- (a) 1 492 078 square feet including face b. 3 978 874 square feet not including circle face
c. 994 718 square feet d. 131 928 625 square feet

$$C = 2\pi r \Rightarrow \frac{2500}{2\pi} = r \Rightarrow SA = \frac{1}{2}(4\pi r^2) = 2\pi\left(\frac{2500}{2\pi}\right)^2 = 994 718.394$$

b 43. A flat basketball is inflated using a hand pump. The pump inflates the ball at a rate of 230 cm³ per pump, to a diameter of 23.5 cm. How many pumps are required to inflate the ball?

- a. 27 pumps (b) 30 pumps c. 29 pumps d. 28 pumps

$$V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi(11.75)^3 = 6795.19946$$

$$6795.19946 \div 230 \approx 30$$

100% Answer

$$358 \text{ in.} \cdot \frac{1 \text{ ft}}{12 \text{ in.}} \cdot \frac{1 \text{ yd}}{3 \text{ ft}} = 9.94 \text{ yd} \rightarrow 9 \text{ yd } 2 \text{ ft } 10 \text{ in.}$$

50. Convert 358 in. to yards, feet, and inches.

$$0.94 \text{ yd} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} = 2.82 \text{ ft}$$

51. Convert 3 miles to:

a) $3 \text{ mi.} \cdot \frac{1760 \text{ yd}}{1 \text{ mi}} = 5280 \text{ yd}$

- a) yards
- b) feet
- c) inches

b) $5280 \text{ yd} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} = 15840 \text{ ft}$

$$0.83 \text{ ft} \cdot \frac{12 \text{ in.}}{1 \text{ ft}} = 10 \text{ in.}$$

c) $15840 \text{ ft} \cdot \frac{12 \text{ in.}}{1 \text{ ft}} = 190080 \text{ in.}$

52. A right rectangular pyramid has base dimensions 11 cm by 7 cm and height 9 cm. Determine the volume of the pyramid to the nearest cubic centimetre. $V = \frac{1}{3} lwh = \frac{1}{3} (11)(7)(9)$

$$V = 231 \text{ cm}^3$$

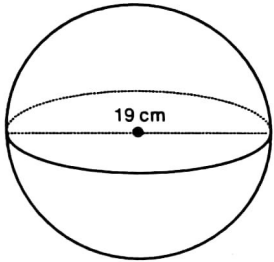
53. A right cone has a diameter of 17.1 cm and a height of 11.3 cm. Determine the volume of the cone to the nearest tenth of a cubic centimetre. $V = \frac{1}{3} \pi r^2 h = \frac{1}{3} \pi (8.55)^2 (11.3)$

$$V = 865.0 \text{ cm}^3$$

54. A right pyramid has a base that is a regular hexagon with side length 2.0 cm. The pyramid has a height of 5.3 cm and a base area of 10.4 cm². Calculate the volume of the pyramid to the nearest tenth of a cubic centimetre. $V = \frac{1}{3} (\text{area of base}) h = \frac{1}{3} (10.4)(5.3)$

$$= 18.4 \text{ cm}^3$$

55. Determine the surface area of this sphere to the nearest square centimetre. Determine its volume to the nearest cubic centimetre.



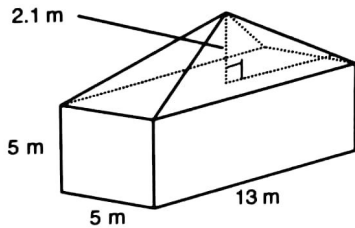
$$\begin{aligned} SA &= 4\pi r^2 \\ &= 4\pi (9.5)^2 \\ &= 1134 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} V &= \frac{4}{3} \pi r^3 \\ &= \frac{4}{3} \pi (9.5)^3 \\ &= 3591 \text{ cm}^3 \end{aligned}$$

56. A hemisphere has radius 12 m. Determine the volume of the hemisphere to the nearest tenth of a cubic metre.

$$V = \frac{1}{2} \left(\frac{4}{3} \pi r^3 \right) = \frac{1}{2} \left(\frac{4}{3} \pi (12)^3 \right) = 3619.1 \text{ m}^3$$

57. Determine the volume of this composite object, which is a right square prism and a right rectangular pyramid, to the nearest tenth of a cubic metre.



$$V_{\text{rect prism}} + V_{\text{rect pyramid}}$$

$$\begin{aligned} V &= lwh + \frac{1}{3} lwh \\ &= (13 \cdot 5 \cdot 5) + \frac{1}{3} (5 \cdot 13) 2.1 \\ &= 370.5 \text{ m}^3 \end{aligned}$$

Problem

58. Sheila plans to place crown moulding along the top of each wall in her family room. A total of 554 in. of moulding is required. The moulding costs \$1.59/ft. and is sold in 8-ft. lengths. What is the cost of the crown moulding, before taxes?

$$554 \text{ in.} \cdot \frac{1 \text{ ft}}{12 \text{ in.}} = 46.16 \text{ ft}$$

59. There are 8 furlongs in a mile.

a) How many yards are in a furlong? $1760 \text{ yd} / 1 \text{ mi}$ so $\frac{1760 \text{ yd}}{8} = 220 \text{ yd/furlong}$

b) Use a proportion to convert 4180 yd. to furlongs.

x is furlongs in 4180 yd

$$\frac{x}{4180} = \frac{1}{220}$$

$$x = 4180 \left(\frac{1}{220} \right) \boxed{x = 19} \text{ so } 4180 \text{ yd} = 19 \text{ furlongs}$$

$$46.16 \text{ ft} \div 8 = 5.77$$

so need to buy

6 strips

$$1.59 (6 \cdot 8) = \$76.32$$

60. A fathom is a unit of length used to measure the depth of water. A fathom is equal to 6 ft. $1 \text{ mile} = 880 \text{ fathoms}$
- a) How many fathoms are in a mile? $1 \text{ mi} = \frac{1760 \text{ yd}}{1 \text{ mi}} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} = 5280 \text{ ft}$ $5280 \div 6 = 880 \text{ fathoms}$
- b) Challenger Deep in the Pacific Ocean is the deepest point in Earth's oceans. It is 35 797 ft. below sea level. What is this depth to the nearest fathom? Is this depth greater than or less than 7 mi.? Explain.

$\frac{35797}{6} = 5966.2$
 6 fathoms
 $7 \text{ mi} = 880 \text{ fathom} = 6160$
 Less than 7 mi

61. Jaymee is 4 ft. 5 in. tall. $4 \text{ ft} \cdot \frac{12 \text{ in}}{1 \text{ ft}} = 48 \text{ in}$ $48 + 5 = 53 \text{ in}$ $53 \text{ in} \cdot \frac{2.54 \text{ cm}}{1 \text{ in}} = 134.62 \text{ cm}$
- a) What is Jaymee's height in centimetres? Write a proportion to determine your answer.
- b) Use mental math and estimation to justify that the answer is reasonable.

62. In track and field, the 440-yd. race was replaced with the 400-m race when Canada changed from the imperial system to the SI system. Which race is longer and by how much? Use the exact conversion: 1 yd. = 91.44 cm
- $440 \text{ yd} = \frac{0.9144 \text{ m}}{1 \text{ yd}} = 402.336 \text{ m}$ $402.336 - 400 = 2.336 \text{ m}$ 440 yd is longer by 2.336 m or 233.6 cm

63. A hardware store sells nylon rope for \$0.89/yd. A lumber yard sells the same rope for \$0.94/m.
- a) Which store sells the rope for a lower price? Explain your answer. $\$0.89 / 0.9144 \text{ m} = 0.97 \text{ /m}$ or $\$0.94 / \text{m}$ Cheaper
- b) How much money would Jim save if he purchased 550 ft. of the less expensive rope, before taxes?
- $550 \text{ ft} \cdot \frac{30.48 \text{ cm}}{1 \text{ ft}} = \frac{1 \text{ m}}{100 \text{ cm}} = 167.64 \text{ m}$ $167.64 \text{ m} \cdot 0.99 = 165.96$
 $167.64 \cdot 0.94 = 157.58$
 saved \$8.38

64. A right pyramid with a base that is a regular hexagon has a slant height of 5.0 m. The base area is 10.4 m² and the side length of the base is 2.0 m. Calculate the surface area of the pyramid to the nearest tenth of a square metre. $SA = 10.4 + 6 \cdot \frac{bh}{2} = 10.4 + 3(2 \cdot 5) = 40.4 \text{ m}^2$

65. A right rectangular pyramid has base dimensions 6 cm by 4 cm and a height of 8 cm. Determine its lateral area to the nearest square centimetre.
- $LA = b_1 h_1 + b_2 h_2 = 4(8,544) + 6(8,2462) = 84 \text{ cm}^2$
- $a^2 + b^2 = c^2$ $c = 8.544$ $2^2 + 8^2 = c^2$
 $4 + 64 = c^2$ $3^2 + 8^2 = c^2$

66. A right square pyramid has base perimeter 62.4 m and height 6.4 m. Calculate the volume of the pyramid to the nearest cubic metre. $side = 62.4 \div 4 = 15.6 \text{ m}$ $V = \frac{1}{3}(l \cdot w) \cdot h = \frac{1}{3}(15.6 \cdot 15.6)(6.4) = 519 \text{ m}^3$

67. A right rectangular pyramid has base dimensions 23.2 cm by 17.0 cm and volume 1552.4 cm³. Calculate the height of the pyramid to the nearest tenth of a centimetre. $V = \frac{1}{3} lwh$ $1552.4 = \frac{1}{3}(23.2)(17)h$ $h = 11.8 \text{ cm}$

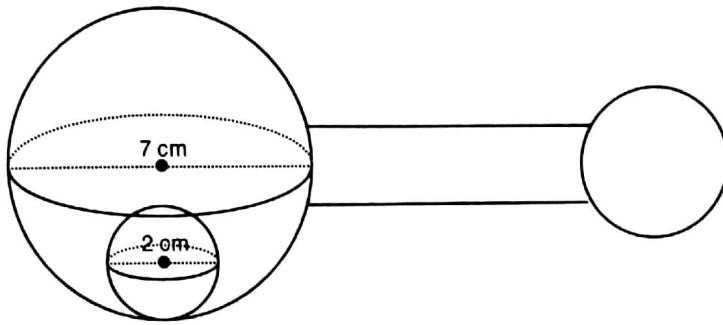
68. Francis has three empty containers: a right rectangular prism, a right square pyramid, and a right cone. Each container has height 2.0 cm. The prism has base dimensions 1.5 cm by 2.5 cm. The pyramid has base side length 3.4 cm. The cone has base diameter 3.8 cm. Determine the volume of each container to the nearest tenth of a cubic centimetre. Which container has the least volume? Which container has the greatest volume? Explain your answer.
- $V = lwh = 1.5 \cdot 2.5 \cdot 2 = 7.5 \text{ cm}^3$ $V = \frac{1}{3} lwh = \frac{1}{3}(3.4 \cdot 3.4 \cdot 2) = 7.7 \text{ cm}^3$ $V = \frac{1}{3} \pi r^2 h = \frac{1}{3} \pi (1.9)^2 (2) = 7.6 \text{ cm}^3$

69. A candle approximates a sphere with circumference 21 cm. The surface of the candle is to be covered with glitter.
- $C = 2\pi r$ $\frac{21}{2\pi} = r$ $r = 3 \text{ cm}$

- a) Determine the radius of the candle to the nearest centimetre.
- b) Determine the surface area of the candle to the nearest square centimetre. $SA = 4\pi r^2 = 4\pi \left(\frac{21}{2\pi}\right)^2 = 140 \text{ cm}^2$

70. A sphere has a diameter of 24 in. A hemisphere has a radius of 18 in. Franco says the surface area of the sphere is greater than the surface area of the hemisphere. Do you agree? Justify your answer.
- $SA_{\text{sphere}} = 4\pi r^2 = 4\pi(12)^2 = 1809.557$ $SA_{\text{hemisphere}} = 2\pi r^2 + \pi r^2 = 3\pi r^2 = 3\pi(18)^2 = 3053.623$

71. A baby's rattle contains a plastic ball inside a spherical case. The diameter of the plastic ball is 2 cm and the diameter of the case is 7 cm. **Next page**
- Franco is WRONG!
 SA of hemisphere is greater!



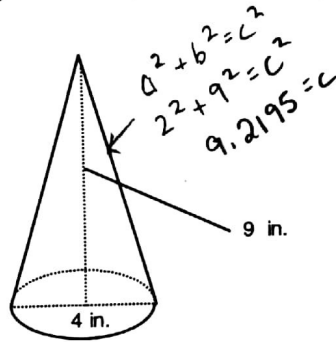
$$a) V = \frac{4}{3} \pi r^3 = \frac{4}{3} \pi (3.5)^3 = 180 \text{ cm}^3$$

$$b) V = \frac{4}{3} \pi r^3 = \frac{4}{3} \pi (1)^3 = 4 \text{ cm}^3$$

$$c) 180 \text{ cm}^3 - 4 \text{ cm}^3 = 176 \text{ cm}^3$$

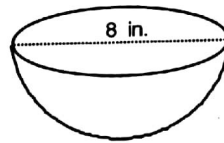
- Calculate the volume of the spherical case, to the nearest cubic centimetre.
- Calculate the volume of the plastic ball, to the nearest cubic centimetre.
- Calculate the volume of air in the rattle, to the nearest cubic centimetre.

72. A pail of ice cream is cylindrical, with diameter 10 in. and height 12 in. A scoop makes a sphere of ice cream with diameter 2 in. How many full scoops of ice cream can be made from this pail? $V = \pi r^2 h$ $V = 942.4778$
- ② scoop = $V = \frac{4}{3} \pi (1)^3 = 4.1888$ $\textcircled{1} = \pi (5)^2 (12) = 942.4778$ $\textcircled{3} 942.4778 \div 4.1888 = 225 \text{ scoops}$
73. The base of this cone is to be glued to the circular face of the hemisphere. Calculate the surface area of the composite object formed, to the nearest square inch. $SA = \pi r s + \frac{1}{2}(4\pi r^2) + \pi r_1^2 - \pi r^2$

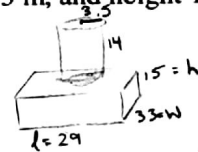


$$= \pi(2)(9.2195) + 2\pi(4)^2 + \pi(4)^2 - \pi(2)^2$$

$$SA = 196 \text{ in}^2$$



74. A sculpture comprises a right rectangular prism with base dimensions 29 m by 33 m, and height 15 m. A right cylinder with base diameter 7 m and height 14 m sits on top of the prism.
- Determine the volume of the sculpture to the nearest cubic metre.
 - Determine the surface area of the sculpture to the nearest square metre.



$$a) V = V_{\text{rect prism}} + V_{\text{cyl}}$$

$$= lwh + \pi r^2 h$$

$$= 29 \cdot 33 \cdot 15 + \pi (3.5)^2 (14)$$

$$= 14894 \text{ m}^3$$

$$b) SA = 2lw + 2wh + 2lh - \pi r^2 + 2\pi r^2 + 2\pi r h - \pi r^2$$

$$SA = 2(29 \cdot 33) + 2(33 \cdot 15) + 2(29 \cdot 15) + 2\pi(3.5)(14)$$

$$SA = 4081.876 \text{ m}^2$$

$$SA = 4082 \text{ m}^2$$