

AW 11 Final Exam Review

Key

Investing Money: Simple and Compound Interest.

Formulas: Simple Interest $I = Prt$

I = interest paid
P = principal amount (the initial amount you borrow or deposit)
r = annual rate of interest (as a decimal)
t = number of years the amount is deposited or borrowed for.

- Can also be rearranged, eg.

$$P = \frac{I}{rt} \quad t = \frac{I}{pr} \quad r = \frac{I}{pt}$$

Example: David invests \$1500 in a GIC for 2 years. The interest rate is 2.5% per year. Calculate the interest.

Solution: $I = Prt$
 $= 1500 \times 0.025 \times 2$
 $= \$75$

Compound Interest: $A = P(1 + \frac{r}{n})^n$

A = amount of money accumulated after n years, including interest.
P = principal amount (the initial amount you borrow or deposit)
r = annual rate of interest (as a decimal)
t = number of years the amount is deposited or borrowed for.
n = number of times the interest is compounded per year

Example: David invests \$1500 in a GIC for 2 years. The interest rate is 2.5% compounded quarterly. Calculate the interest.

Solution: $A = P(1 + \frac{r}{n})^n$
 $= 1500(1 + \frac{.025}{4})^{4 \times 2}$
 $= \$1576.66$

Total interest = $A - P = 1576.66 - 1500 = \76.66

1. If \$2000 was deposited in an account with an annual simple interest rate of 4% for 5 years, how much interest was earned?

$$I = Prt$$

$$I = (2000)(0.04)(5)$$

$$I = \$400$$

ANS: \$400

2. Tiffany has invested \$1540 in a savings account which offers 2.4%/yr. After a period of time, she had earned \$50.25 in ^{simple} interest. How long was her money invested for?

$$I = Prt$$

$$50.25 = (1540)(0.024)(t)$$

$$t = \frac{50.25}{(1540)(0.024)}$$

$$t = 1.36 \text{ years.}$$

ANS: 1.36 years

3. Ava has invested in a savings account which offers 2%/yr. After 1 year, she has earned \$.75 in ^{simple interest} interest. How much money did she invest?

$$I = Prt$$

$$0.75 = P(0.02)(1)$$

$$P = \frac{0.75}{(0.02)(1)}$$

$$P = \$37.50$$

ANS: \$37.50

4. Tomas has 5 years to make \$200 in ^{simple} interest. If he has \$2000 to invest, what interest rate will Tomas need?

$$I = Prt$$

$$200 = 2000(r)(5)$$

$$r = \frac{200}{(2000)(5)} = 0.02 = 2\%$$

ANS: 2%

5. Catalina is looking to make \$1000 in interest. She is currently investing \$3450 in an account that pays an annual interest rate of 5%. She plans to invest for 5 years. Will she make \$1000 in interest? Show your work. ^{simple}

$$I = Prt$$

$$I = (3450)(0.05)(5)$$

$$I = 862.50$$

She will not make ~~\$1000~~ \$1000, she will make \$862.50.

ANS: NO

6. Kyle has decided to invest \$10 000 in his savings account, which offers 2% annual ^{simple} interest. He will be investing his money for 10 years. How much more interest could Kyle earn if the 2% interest was compounded annually? Show your work.

$$I = Prt$$

$$I = (10000)(0.02)(10)$$

$$I = \$2000$$

$$A = 10000(1 + 0.02)^{10}$$

$$A = 12189.94$$

$$I = 12189.94 - 10000$$

$$= \$2189.94$$

$$\begin{array}{r} 2189.94 \\ - 2000.00 \\ \hline 189.94 \end{array}$$

ANS: \$189.94

7. Derek owes \$756.88 on his credit card. He makes the minimum monthly payment of \$30.00. The card has an APR of 18.99% and is compounded daily. How much will Derek owe on his card in 30 days?

$$\begin{array}{r} 756.88 \\ - 30.00 \\ \hline 726.88 \end{array}$$

$$A = 726.88 \left(1 + \frac{0.1899}{365}\right)^{30}$$

$$726.88$$

$$A = 738.31$$

ANS: \$738.31

8. Hanna is lending Logan \$767.54 to buy a computer. Hanna charges simple interest at 7.2%/yr. At the end of 5 years, Logan will repay Hanna. How much will Logan owe?

$$I = Prt$$

$$I = (767.54)(0.072)(5)$$

$$I = 276.31$$

$$767.54 + 276.31 = 1043.85$$

\$1043.85

Managing Money

9. List three services offered by banks.

chequing/saving accounts / loans + mortgages / RRSPs

10. Kit is looking to set up a new chequing account. She has the choice between the following accounts. Which will cost her the least if she keeps a minimum balance of \$1500, and plans to make 30 transactions? Show your work.

	Account 1	Account 2	Account 3
Monthly fee	\$4.00	\$8.00	\$16.00
No fee with min. balance of ...	\$1000	\$2000	\$3000
Number of free transactions	10	25	no limit
Additional transaction fee	\$0.70	\$0.70	—

Answer:

$$\text{Acct 1: } 20 \times 0.70 = \$14.00$$

$$\text{Acct 2: } \$8.00 + 5(0.70) = \$11.50$$

$$\text{Acct 3: } \$16.00$$

Acct. 2 will cost the least.

11. When might you not want to use your debit card, and why? When withdrawing money overseas, or from another bank's ATM. High service charges.

12. List 2 purposes of a debit card. withdraw money, pay for goods + services directly.

13. What are the advantages of a credit card? pay for something on credit, earn rewards.

14. Bob received a credit card statement that has a new balance of \$1080.96 and a minimum payment of \$50.40. Bob makes only the minimum payment. He makes no other purchases. What will be the unpaid balance?

$$\begin{array}{r} 1080.96 \\ - 50.40 \\ \hline 1030.56 \end{array}$$

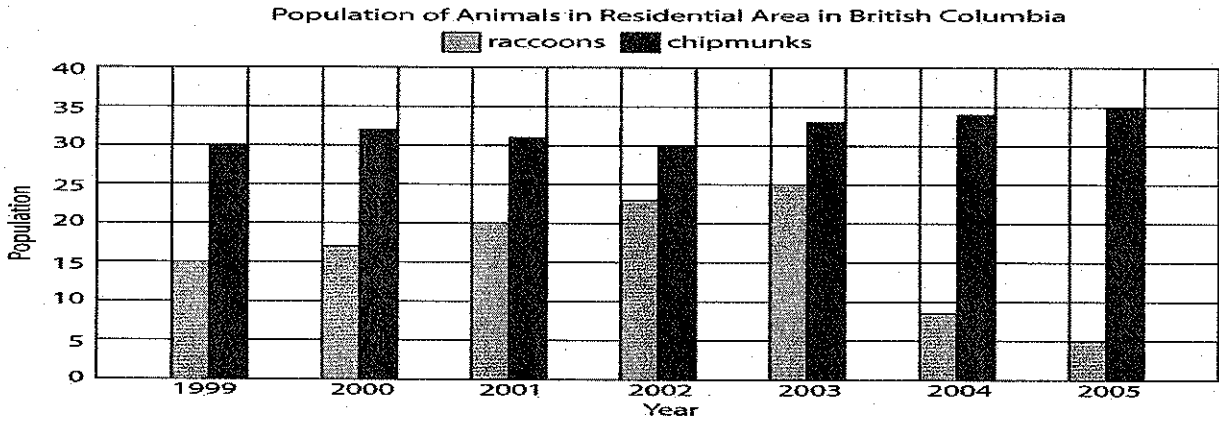
Answer: \$1030.56

15. List 3 services offered by online banking. viewing balances, transferring money, paying bills.

16. What is collateral? Something of value that is put up for loan money.

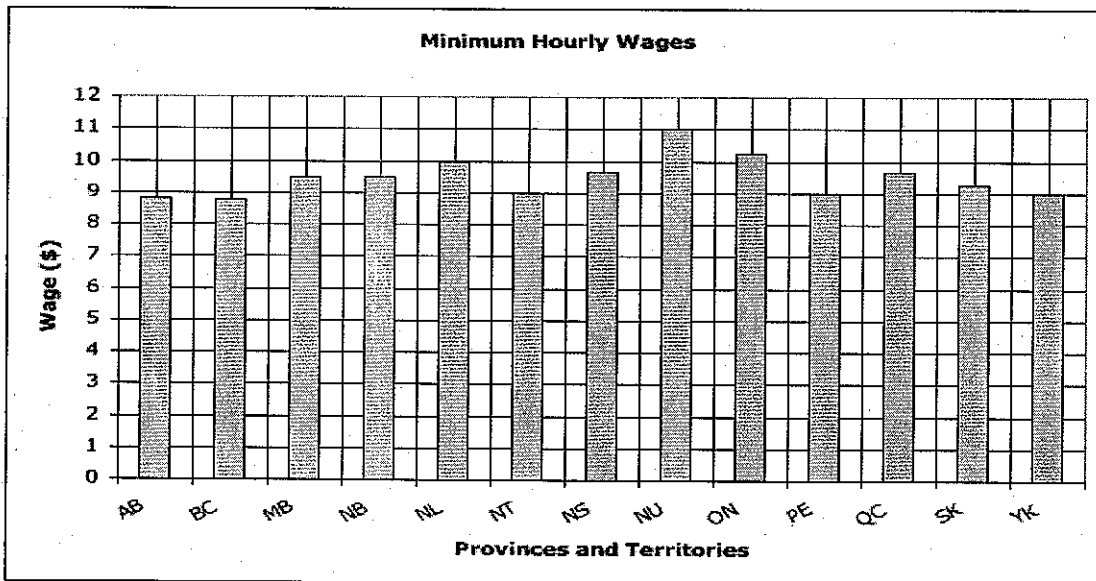
Working with Graphs:

17. The following graph shows the population of raccoons and chipmunks in a small residential area in British Columbia.



Describe the trend of the raccoon population. slowly grew from 1999-2003,
then drastically decreased until 2005.

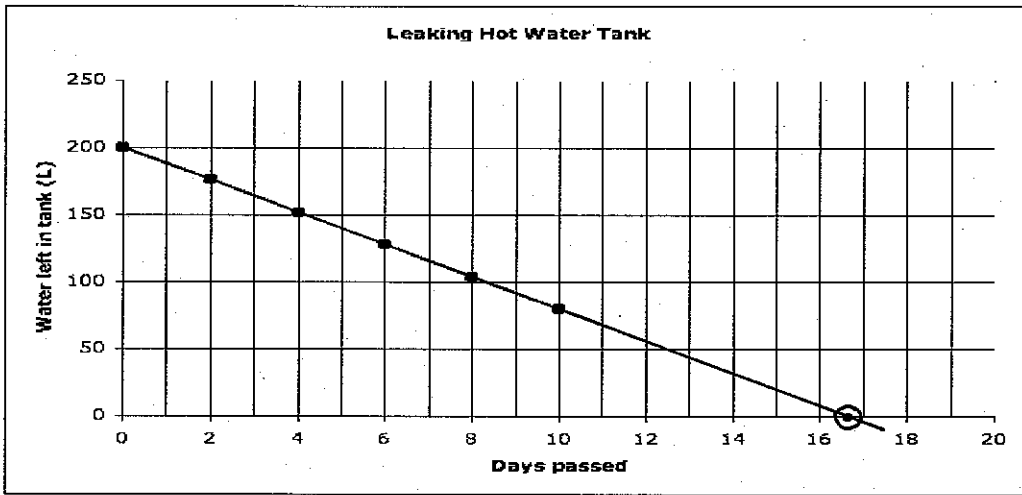
18. The following graph shows the minimum hourly wages in Canadian provinces and territories, as of May 1, 2011.



Which territory or province has the highest hourly minimum wage?

Nunavut

19. A hot water tank is dripping at a constant rate, and the amount of water in the tank is represented by this graph.

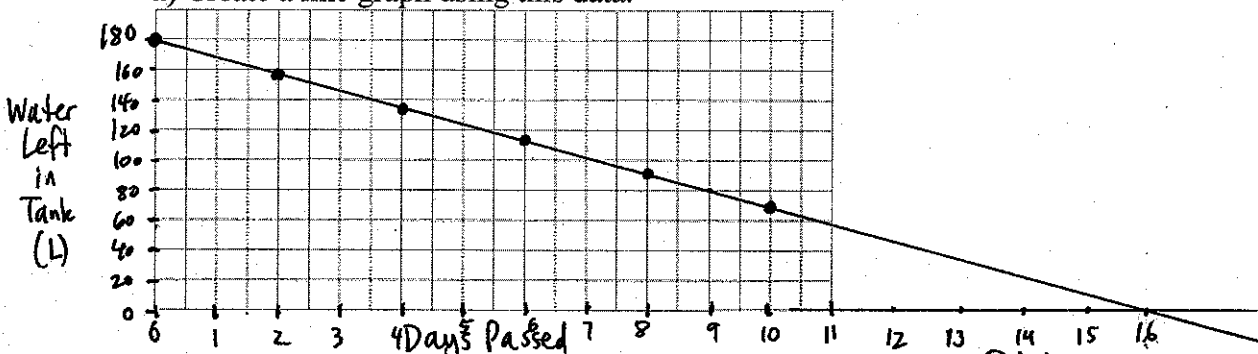


Extend the line to determine how many days must pass until the tank is empty. ANS 17 days.

20. Katie discovered that her water tank was leaking at a constant rate. She collected this data.

Days passed	Water left in tank (L)
0	180
2	158
4	136
6	114
8	92
10	70

a) Create a line graph using this data.

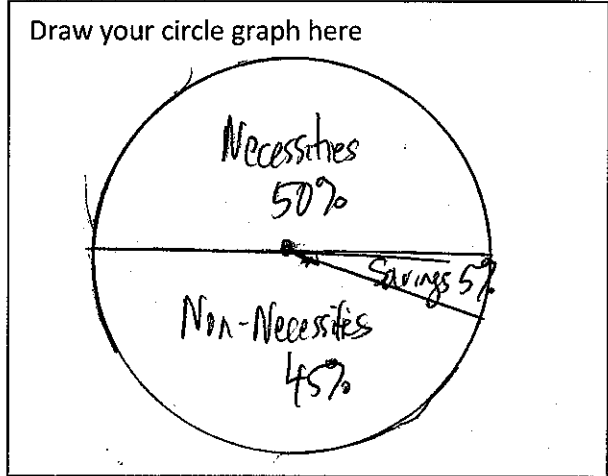


b) How much water will be in the tank after 9 d? Ans: 81 L

c) After how many days will the tank be empty? Ans: 16 days.

21. Maureen recorded her expenditures from the last month. Create a circle graph to display the data.

Expenditure	Amount
Necessities	\$2400
Non-necessities	\$2160
Savings	\$240



Expenditure	Fraction	Decimal	Degrees	Percent
Necessities	$\frac{2400}{4800}$	0.5	180	50%
Non-necessities	$\frac{2160}{4800}$	0.45	162	45%
Savings	$\frac{240}{4800}$	0.05	18	5%

22. What would be the best type of graph to show how many students in a class like certain types of ice cream? Justify your answer.

Ans: bar graph ... very easy to compare

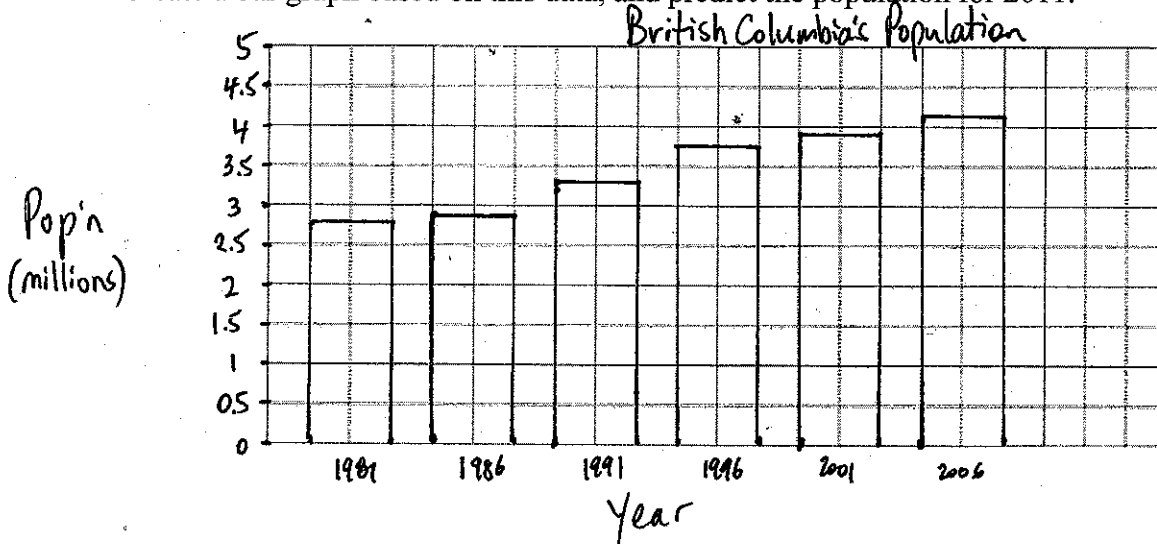
23. What would be the best type of graph to show the most common range of average temperatures from a month?

Ans: histogram ... need intervals for ranges.

24. Haddie collected data about the population of British Columbia over the past 30 years.

Year	Population
1981	2 744 467
1986	2 883 370
1991	3 282 061
1996	3 724 500
2001	3 907 738
2006	4 113 487

Create a bar graph based on this data, and predict the population for 2011.



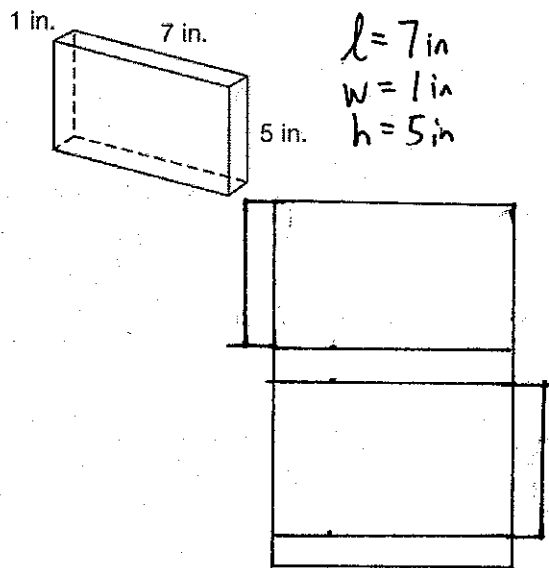
Prediction for 2011: 4.3 million

Surface Area: The total area of the surfaces of a three-dimensional object. Answer will be in square units, eg cm². Formulas are generally used to calculate surface area.

USE THE FORMULA SHEET TO ANSWER THE FOLLOWING QUESTIONS
Copy the formula carefully and then substitute values. Show all your work.

25.

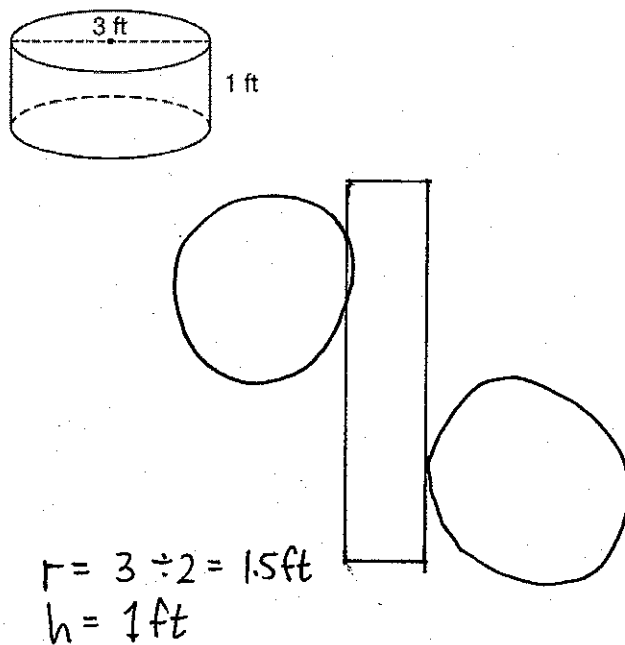
a) Draw a net for the following rectangular prism AND record the dimensions on the net.



b) Determine the surface area

$$\begin{aligned}
 SA &= 2lw + 2lh + 2wh \\
 &= 2(7)(1) + 2(7)(5) + 2(1)(5) \\
 &= 14 + 70 + 10 \\
 &= \underline{\underline{94 \text{ in}^2}}
 \end{aligned}$$

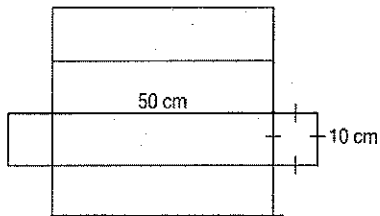
26. Draw a net for the following cylinder AND record the dimensions on the net.



b) Determine the surface area to one decimal place.

$$\begin{aligned}
 SA &= 2\pi r^2 + 2\pi rh \\
 SA &= 2\pi (1.5)^2 + 2\pi (1.5)(1) \\
 &= 14.137 + 9.425 \\
 &= 23.6 \text{ ft}^2
 \end{aligned}$$

27. What is the surface area of the rectangular prism for this net?



$$l = 50 \text{ cm}$$

$$w = 10 \text{ cm}$$

$$h = 10 \text{ cm}$$

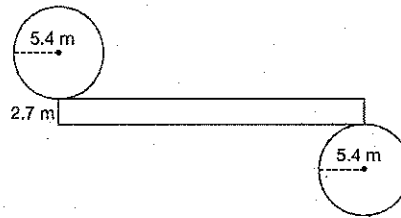
$$SA = 2lw + 2lh + 2wh$$

$$= 2(50)(10) + 2(50)(10) + 2(10)(10)$$

$$= 1000 + 1000 + 200$$

$$= 2200 \text{ cm}^2$$

28. What is the surface area of the cylinder for this net, to one decimal place?



$$r = 5.4 \text{ m}$$

$$h = 2.7 \text{ m}$$

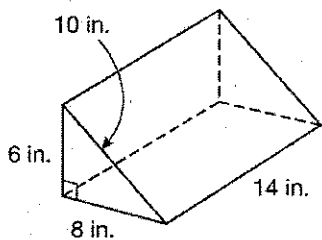
$$SA = 2\pi r^2 + 2\pi rh$$

$$= 2\pi(5.4)^2 + 2\pi(5.4)(2.7)$$

$$= 183.22 + 91.61$$

$$= 274.8 \text{ m}^2$$

29. Determine the surface area of the following prism.



$$b = 8 \text{ in}, h = 6 \text{ in}$$

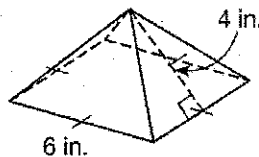
$$SA = 2\left(\frac{b \times h}{2}\right) + \text{area of 3 rectangles.}$$

$$= 2\left(\frac{8 \times 6}{2}\right) + (10)(14) + (8)(14) + (6)(14)$$

$$= 48 + 140 + 112 + 84$$

$$= 384 \text{ in}^2$$

30. Determine the surface area of the pyramid below.



$$SA = b^2 + 4\left(\frac{b \times s}{2}\right)$$

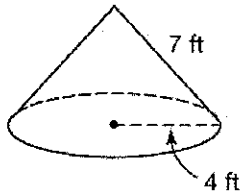
$s = \text{slant height}$

$$SA = 6^2 + 4\left(\frac{6 \times 4}{2}\right)$$

$$= 36 + 48$$

$$= 84 \text{ in}^2$$

31. Determine the surface area of the cone below, to two decimal places.



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

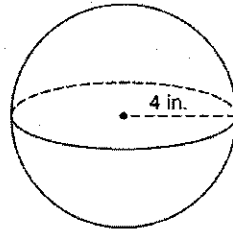
$$r = 4 \text{ ft}, s = 7 \text{ ft}$$

$$SA = \pi (4)^2 + \pi (4)(7)$$

$$= 50.265 + 87.965$$

$$= 138.23 \text{ ft}^2$$

32. Determine the surface area of the following sphere, to the nearest tenth of a square inch.

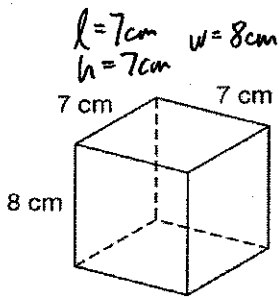


$$SA = 4\pi r^2$$

$$SA = 4\pi (4)^2$$

$$SA = 201.1 \text{ in}^2$$

33. Gloria makes toy for her children, including wooden blocks which she paints. Which of these two designs will be less expensive to paint?

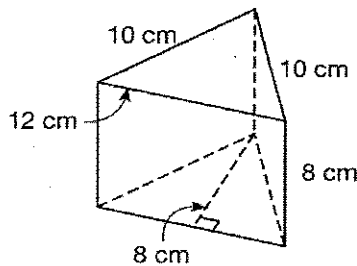


$$SA = 2lw + 2lh + 2wh$$

$$= 2(7)(8) + 2(7)(7) + 2(8)(7)$$

$$= 112 + 98 + 112$$

$$= 322 \text{ cm}^2$$



$b = 12 \text{ cm}$
 $h = 8 \text{ cm}$

$$SA = 2\left(\frac{b \times h}{2}\right) + \text{area of 3 rectangles}$$

$$= 2\left(\frac{12 \times 8}{2}\right) + (10)(8) + (10)(8) + (12)(8)$$

$$= 96 + 80 + 80 + 96$$

$$= 352 \text{ cm}^2$$

The rectangular prism will be less expensive to paint.

Volume and Capacity: **Volume** is the amount of 3-dimensional space an object occupies. Answers will be in cubic units eg. *Metric:* cubic centimeters (cm^3), cubic meters (m^3) or *Imperial:* cubic inch, cubic foot.

Capacity is the amount that something can hold and is measured in litres, gallons, pints, For example: "The bucket has a capacity of 9 litres"

Example: Calculate the volume of the rectangular prism with length of 12 cm, width 2 cm and height 2 cm.

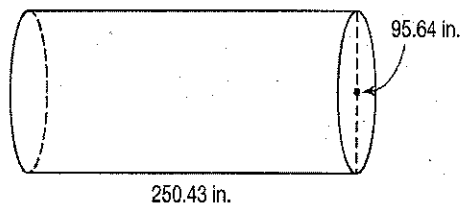
Solution: Volume of 3d object is Area of base x Height

The base is a rectangle – area of rectangle is $l \times w$, so

Area of rectangular prism is $l \times w \times h$

$$12 \times 2 \times 2 = 48\text{cm}^3$$

34. What is the volume of this cylinder, to the nearest cubic inch?



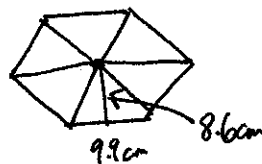
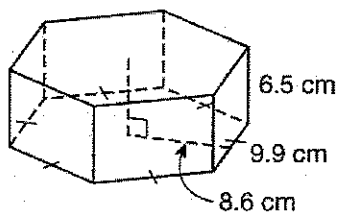
$$V_{\text{cylinder}} = \pi r^2 h$$

$$r = 95.64 \div 2 = 47.82 \text{ in}$$

$$V = \pi (47.82)^2 (250.43)$$

$$= \underline{\underline{1799100 \text{ in}^3}}$$

35. What is the volume of this prism, to the nearest cubic centimeter? To the nearest cubic millimetre?



$$A_{\text{tri}} = \frac{b \times h}{2} = \frac{9.9 \times 8.6}{2}$$

$$= 42.57$$

6 triangles so

$$A_{\text{base}} = 6(42.57) = 255.42\text{cm}^2$$

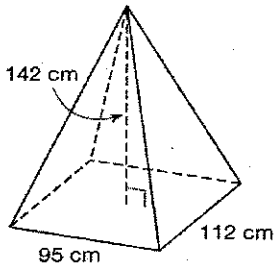
$$V_{\text{prism}} = (A_{\text{base}})(h)$$

$$= (255.42)(6.5)$$

$$= \underline{\underline{1660 \text{ cm}^3}}$$

$$1660\text{cm}^3 \times 1000 = \underline{\underline{1660000 \text{ mm}^3}}$$

36. What is the volume of this pyramid, to the nearest cubic centimeter? In cubic metres to 6 decimal places?



$$V_{\text{pyramid}} = \frac{(A_{\text{base}})(h)}{3}$$

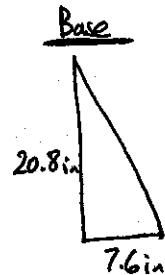
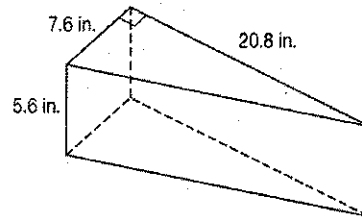
base is a rectangle

$$A_{\text{base}} = l \times w = 95 \times 112 = 10640 \text{ cm}^2$$

$$V = \frac{(10640)(142)}{3} = 503627 \text{ cm}^3$$

$$503627 \text{ cm}^3 \times 0.000001 = 0.503627 \text{ m}^3$$

37. What is the volume of this prism, to the nearest cubic inch?

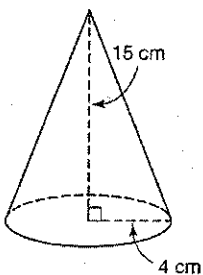


base is a triangle

$$A_{\text{base}} = \frac{b \times h}{2} = \frac{7.6 \times 20.8}{2} = 79.04 \text{ in}^2$$

$$V = A_{\text{base}} \times h = 79.04 \times 5.6 = 443 \text{ in}^3$$

38. What is the volume of this cone, to two decimal places?

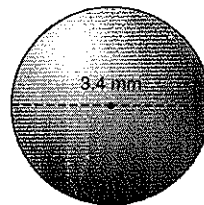


$$V_{\text{cone}} = \frac{\pi r^2 h}{3}$$

$$V = \frac{\pi (4)^2 (15)}{3}$$

$$= 251.33 \text{ cm}^3$$

39. David works in a skateboard shop. Stainless steel balls are inside each wheel bearing. What is the volume of each ball bearing, to the nearest cubic millimeter?



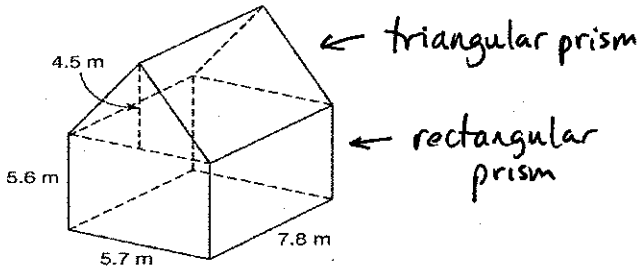
$$r = 3.4 \div 2 = 1.7 \text{ mm}$$

$$V_{\text{sphere}} = \frac{4}{3} \pi r^3$$

$$= \frac{4}{3} \pi (1.7)^3$$

$$= 21 \text{ mm}^3$$

40. What is the volume of the given object, to the nearest cubic metre?



$$V_{\text{tri}} = \frac{b \times h}{2} \times \text{height of prism}$$

$$= \frac{5.7 \times 4.5}{2} \times 7.8$$

$$= 100.035$$

$$V_{\text{rec prism}} = lwh$$

$$= (5.7)(7.8)(5.6)$$

$$= 248.976 \text{ m}^3$$

$$V = V_1 + V_2 = 248.976 + 100.035$$

$$= \underline{\underline{349 \text{ m}^3}}$$

41. Andy, a water boy, has 250 cone drinking cups for football players at a big game. Each cup has a diameter of 84 mm at the top and a height of 102 mm. Calculate the volume of carbonated water needed to completely fill the 250 cups. Round up to the nearest liter.

$$d = 84 \text{ mm}, r = 42 \text{ mm}$$

$$h = 102 \text{ mm}$$

$$\text{change to cm: } 1 \text{ cm} = 10 \text{ mm}$$

$$r = 4.2 \text{ cm}, h = 10.2 \text{ cm}$$

$$V_{\text{cone}} = \frac{\pi r^2 h}{3} = \frac{\pi (4.2)^2 (10.2)}{3}$$

$$= 188.420161 \times 250$$

$$= 47105 \text{ cm}^3$$

$$1 \text{ cm}^3 = 1 \text{ mL}$$

so

$$47105 \text{ mL}$$

$$1 \text{ L} = 1000 \text{ mL}$$

$$47105 \div 1000$$

$$= 47 \text{ L}$$

42. The storage area in a building has a volume of 7843.64 m^3 . The boxes for the storage area are rectangular prisms. Each has the dimensions 18.095 m by 1.675 m by 3.423 m . What is the maximum number of boxes that can fit into the storage area

$$V_{\text{rec prism}} = lwh$$

$$= (18.095)(1.675)(3.423)$$

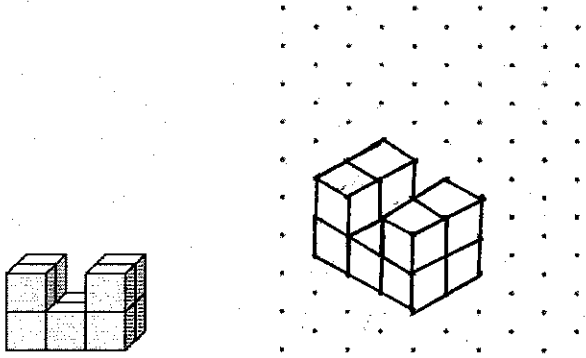
$$= 103.748 \text{ m}^3$$

$$7843.64 \div 103.748 = 75.6 \text{ boxes.}$$

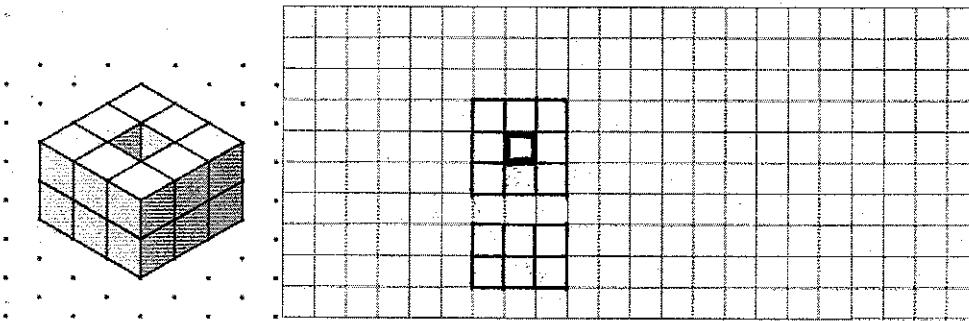
75 boxes max can fit.

Drawing 3D Objects and Shapes

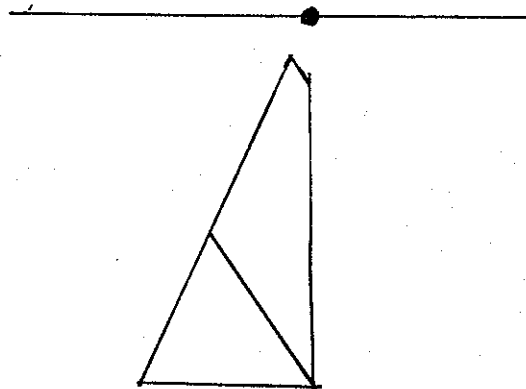
43. Make an isometric drawing of this structure.



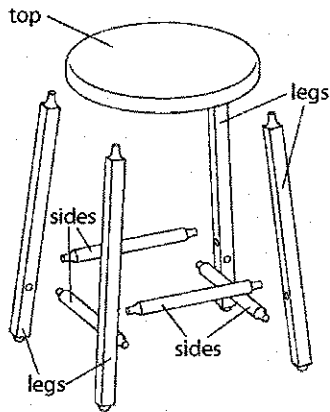
44. From this isometric drawing, draw the top, front and right-side views.



45. Draw a one-point perspective drawing of a triangular prism. Include the horizon line and vanishing point.



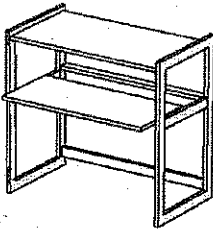
46. The following picture is an exploded view of a stool.



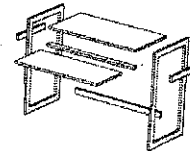
Draw a freehand sketch of the stool when assembled.



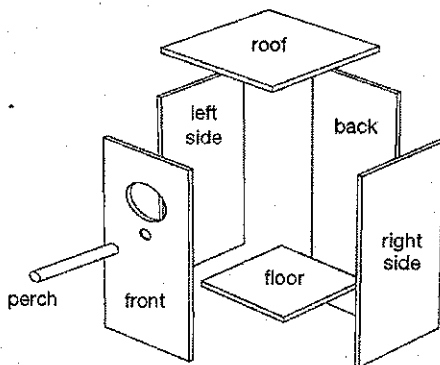
47. Draw an exploded view of this computer desk.



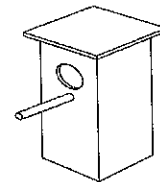
Drawing:



48. Jon wants to build a birdhouse with these pieces. Draw a picture of the assembled birdhouse.



Drawing:



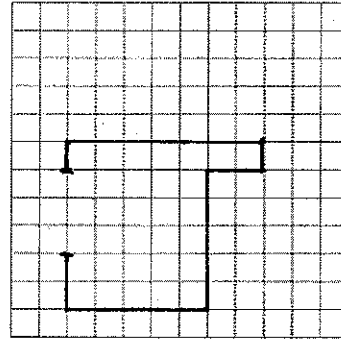
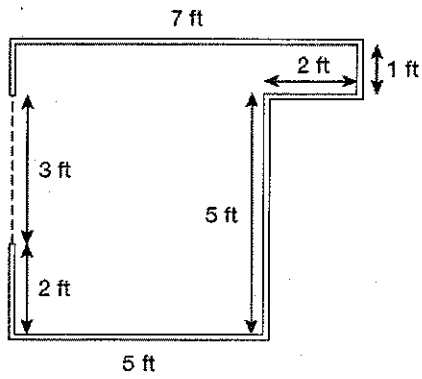
49. Geoff wants to build a model of a building that is 100 m tall, 85 m wide, and 90 m long. What could be the measurements of Geoff's scale model?

Answer: _____

Scale $\frac{1}{1000}$

10cm tall x 8.5cm wide x 9cm long

50. Draw a scale diagram of this living room floor plan on grid paper, and show the scale.



1 square = 1 sq. ft.