

## Int 2 – Revision

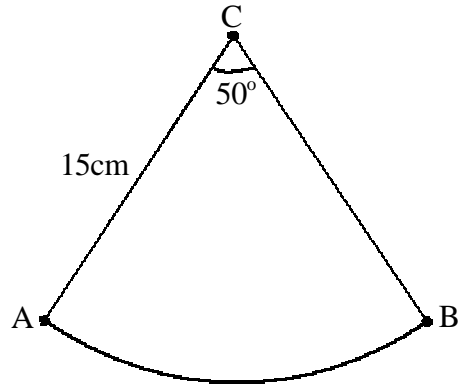
1. The price, in pence, of a carton of milk in six different supermarkets is shown below.

85      89      79      86      82      83

Use an appropriate formula to calculate the mean and standard deviation of these prices to 1 decimal place. **Show all your working.**

2. A pendulum travels along the arc of a circle centre C.  
It travels through an angle of  $50^\circ$  as it swings from A to B.  
The length of the pendulum is 15cm.

Calculate the arc length AB.



3. A tree is currently 15m tall. Each year the tree grows by a further 5% of its previous years height.  
How tall will the tree be at the end of a further 4 years growth?
4. A gas canister contains 5kg of gas. The canister is leaking so that at the end of every hour its contents are 12% less than at the beginning of the hour.  
How much gas will be left in the canister after 5 hours?
5. Work out the mean and five figure summary for each set of numbers. Draw a box plot for each set.
- 3,5,2,9,4,6,7,12,4,8,13
  - 5,2,7,3,8,6,3,7,8,2
  - 70,65,79,68,81,73,66,77
6. Multiply out and simplify
- $(2x + 3)(5x - 2)$
  - $(7x - 3)(5x - 2)$
  - $(x + 3)^2$
  - $(x + 2)(5x^2 + 3x - 6)$
  - $(3x - 4)^2 - (4x - 1)(x - 6)$
7. Factorise the following
- $x^2 + 7x$
  - $a^2 - 16b^2$
  - $x^2 + 10x + 24$
  - $x^2 + 5x - 14$
  - $2x^2 - 13x - 7$

8. Solve the following pairs of simultaneous equations (point of intersection)

a.  $x + y = 6$   
 $x - y = 4$

c.  $x + y = 6$   
 $x + 2y = 8$

b.  $x + 2y = 6$   
 $x - y = 3$

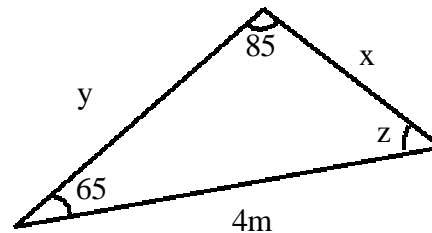
d.  $5a + 3b = 3$   
 $4a - 5b = 32$

9. Lewis buys 5 Kg of potatoes and 3 Kg of carrots for £2.36. Lorna buys 2 Kg of potatoes and 7 Kg of carrots for £3.09.

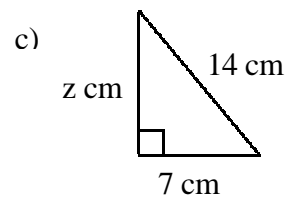
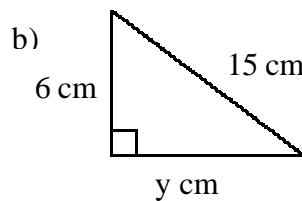
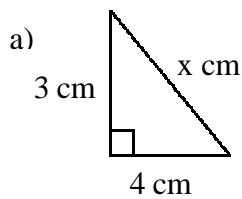
- How much do potatoes and carrots cost per Kg?
- How much would 13 Kg of potatoes and 11 Kg of carrots cost?

10. Calculate

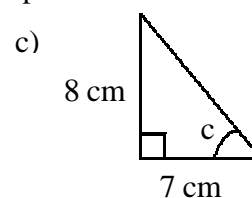
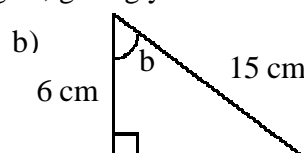
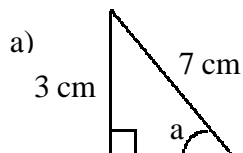
- All the **missing sides and angles** to 2 decimal places.
- The area of the triangle to 3 significant figures.



11. Calculate the lengths of the missing sides of the following triangles, giving your answer to 1dp.

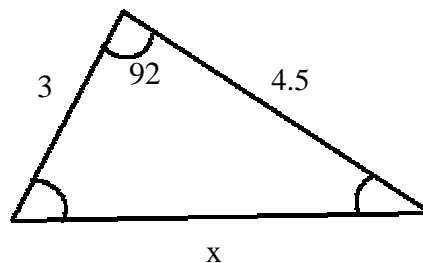


12. Calculate the marked angles, giving your answer to 2dp.



13. Calculate

- The missing side to 2 decimal places.
- The area of the triangle to 3 significant figures.



14. Sketch the curves of

a.  $y = 2\sin x$   
b.  $y = 5\cos x$

c.  $y = 4\sin 2x$   
d.  $y = 6\cos 3x$

15. Solve the following equations  $0 \leq x \leq 360$

a.  $\sin x = 0.2$   
b.  $\sin x = \frac{1}{3}$   
c.  $\cos x = \frac{1}{4}$   
d.  $7\cos x = 3$

e.  $7\cos x - 4 = 0$   
f.  $5\sin x + 3 = 0$   
g.  $4\tan x + 9 = 0$

16. Express the following as a fraction with a rational denominator

a.  $\frac{5}{\sqrt{7}}$

b.  $\frac{2}{\sqrt{3}}$

17. Simplify

a.  $\sqrt{32}$   
b.  $\sqrt{75}$   
c.  $\sqrt{3} \times \sqrt{27}$

d.  $\sqrt{\frac{27}{3}}$   
e.  $\sqrt{32} - \sqrt{2} + \sqrt{50}$

18. A parabola has an equation  $y = (x+3)^2 - 5$

Write down a) its axis of symmetry and b) the coordinates of its turning point.

19. Express in its simplest form

a.  $\frac{b^{\frac{1}{7}} \times b^{\frac{20}{7}}}{b^2}$   
b.  $\frac{p^{\frac{2}{3}} \times p^{\frac{13}{3}}}{p^3}$

c.  $\frac{c^{-2} \times c^7}{c^3}$   
d.  $a^{\frac{1}{2}} \left( a - a^{-\frac{1}{2}} \right)$

20. Express as a fraction in its simplest form

a.  $\frac{5}{a} + \frac{7}{a}$   
b.  $\frac{7}{b} - \frac{3}{b}$   
c.  $\frac{2}{a} + \frac{7}{b}$

d.  $\frac{5}{a} + \frac{7}{(a+2)}$   
e.  $\frac{5}{c} - \frac{2}{(c+2)}$

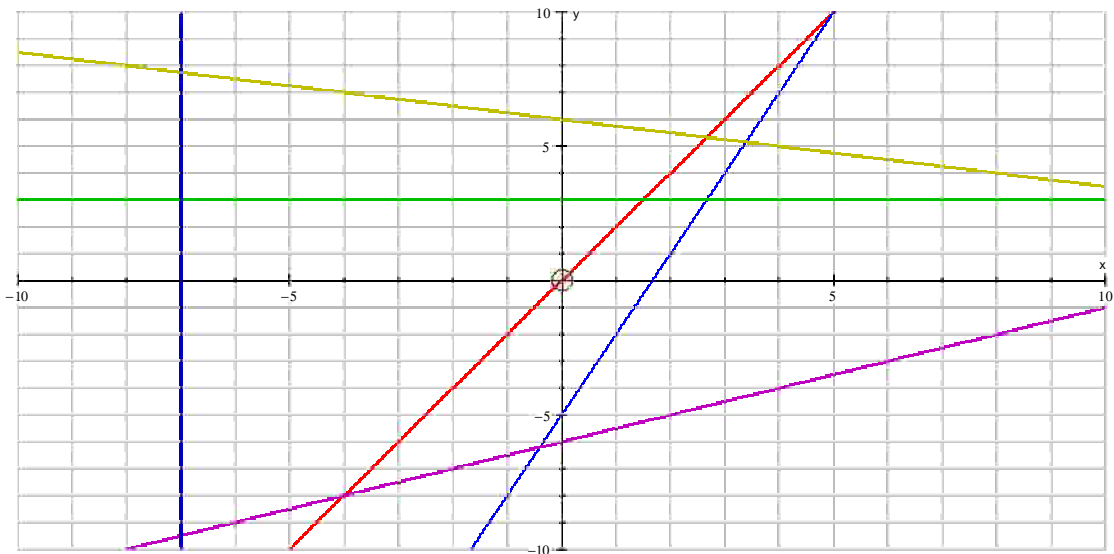
21. Construct a frequency table with the data given and add a cumulative frequency column. **Calculate** the position (eg 5<sup>th</sup> place) and value of the

- Median
- Lower quartile
- Upper quartile
- Calculate the mean score.
- What is the modal score?
- What is the probability of scoring 3 goals or more (simplest form)

Goals	Frequency
g	f
0	
1	
2	
3	
4	
5	
Total	

**Data**  
 2 0 1 0 3 2  
 2 0 3 1 0 5  
 1 0 4 1 2 0  
 0 1 0 2 1 3  
 0 1 0 2 2 2  
 0 1 0 2 1 3

22. Write down the equations of the following lines



23. A car was originally bought for £7800, it is now worth £5200. Work out the depreciation as a percentage of the original value (give your answer to 2 decimal places).

24. David bought a house last year. It has increased in value by 17% of the purchase price and is now valued at £134,000. How much did David pay for the house? (give your answer to the nearest pound).

25. A CD is sold in the shops for £8.99. This price includes VAT at 17.5%. How much does the CD cost before the VAT is added?

26. Use the quadratic formula to solve the following equations giving your answer to 3 decimal places. (**check your answer by substitution!**)

a.  $3x^2 + 2x - 4 = 0$

b.  $2x^2 - 7x - 2 = 0$

c.  $5x^2 - 8x + 2 = 0$

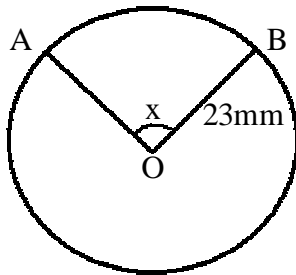
27. Use the quadratic formula to find where the following equations cut the x axis giving your answer to 3 decimal places. (**check your answer by substitution!**)

a.  $y = 3x^2 + x - 7$

b.  $y = x^2 + 5x - 3$

c.  $y = 2x^2 - 5x + 1$

28.



Calculate the angle  $x$  and hence the **arc length AB**, if the sector area AOB is  $230\text{mm}^2$ . Give your answer to 5 significant figures. ( use the pi button **not 3.14**)

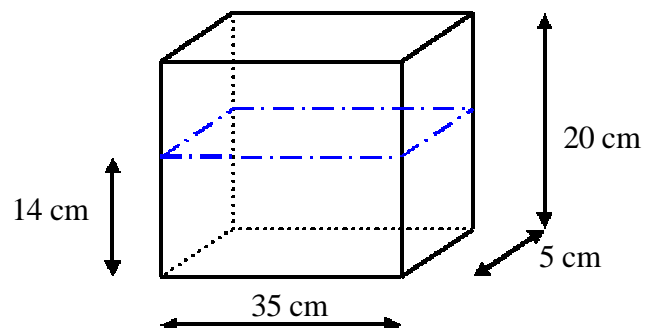
29. A weather balloon is assumed to be spherical and have a diameter of 25cm.

- Calculate the volume of the balloon.
- The balloon develops a puncture and loses 30% of its remaining volume every minute. Calculate its volume after 3 minutes.
- If the balloon remains spherical, calculate its new radius after 3 minutes.

30. A rectangular tank contains water to a height of 14 cm. Two identical steel hemispheres are dropped in to the tank raising the water level to a height of 15 cm.

Calculate

- The combined volume of the 2 hemispheres.
- The volume of a single hemisphere.
- The radius of the hemispheres (to 3 significant figures).



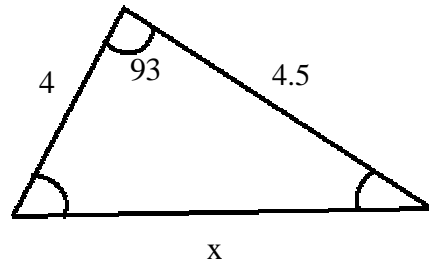
31. Using the following data

15,32,24,16,27,20,39,35,32,19,26,27,36,41,22,28,37,32,28,46

- Construct an ordered stem and leaf diagram for the data.
- Hence, or otherwise, find the lower quartile, median, upper quartile and interquartile range.

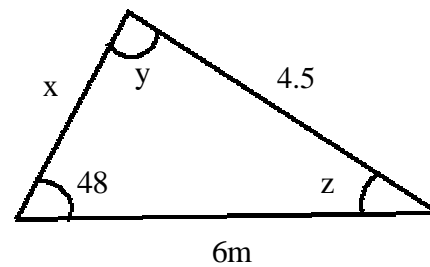
32. Calculate

- The missing side to 2 decimal places.
- The area of the triangle to 3 significant figures.



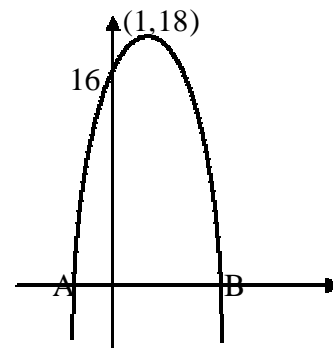
33. Calculate

- All the **missing sides and angles** to 2 decimal places.
- The area of the triangle to 3 significant figures.



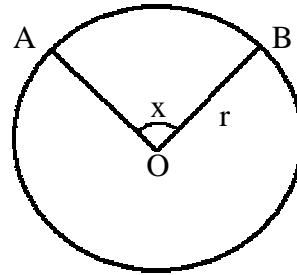
34. The following equation (parabola) is of the form  $y = k(x - a)^2 + b$ , where (a,b) is the turning point.

- Given the maximum turning point at (1,18) find the equation of the parabola clearly showing the value of k.
- What is the equation of the axis of symmetry?
- The parabola cuts the x axis at A and B. If A is (-2,0) find B and state its coordinates.



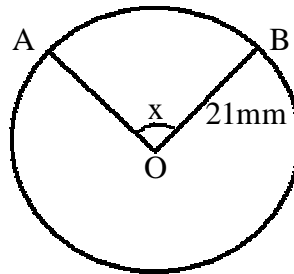
35. Calculate i) the **arc length AB** and ii) **sector area AOB** for the following.  
Give your answer to 1 decimal place. ( use the pi button **not 3.14**)

	Angle <b>x</b>	Radius <b>r</b>	Diameter <b>d</b>
Circle a	45°	12 cm	
Circle b	72°		124 mm
Circle c	136°	11 m	
Circle d	245°		46 cm
Circle e	143.5°	12.5 m	



36. If arc length AB is 40mm, calculate to 3 decimal places

- the angle **x**
- the **sector area AOB**



37. Change the subject of the following as shown

- $y = 2x + 5$  [ $x$ ]
- $a = 7b - 4$  [ $b$ ]
- $m = 4(n + 3)$  [ $n$ ]
- $p = q(p + 8)$  [ $q$ ]
- $d = p + 5p$  [ $p$ ]
- $h = \frac{j}{4}$  [ $j$ ]
- $a = \frac{9}{b}$  [ $b$ ]

- $a = \frac{3}{6b}$  [ $b$ ]
- $y^2 = x$  [ $y$ ]
- $m^2 + 3 = n$  [ $m$ ]
- $m^2 = n^2 + 2a$  [ $n$ ]
- $h^2 = a^2 + b^2$  [ $a$ ]
- $v = \frac{1}{3}pr^2h$  [ $h$ ]
- $v = \frac{1}{3}pr^2h$  [ $r$ ]