

Revision Booklet 5

Topics

1. Time Speed & Distance
2. Density, Mass & Volume
3. Trial and Improvement
4. Angles in a Polygon
5. Surface Area & Volume
6. Transformations
7. Probability

Name _____

1. A train travels at 102 m.p.h for 1 hour and 6 minutes.
What distance will it travel in this time?

$$\text{Distance} = \text{Speed} \times \text{Time}$$

$$D = 102 \times 1.1$$

$$D = 112.2 \text{ miles}$$

$$1.(6 \div 60) 1.1 \text{ hrs}$$

2. If a cyclist travels a distance of 7 miles in 23 minutes,
what is the cyclist's speed?

$$\text{Speed} = \text{Distance} \div \text{Time}$$

$$S = 7 \div 0.3833$$

$$S = 18.26 \text{ mph}$$

$$23 \div 60 = 0.3833\dots$$

3. How long will it take a plane travelling at 50
metres/second to travel a distance of 135 km?

$$\text{Time} = \text{Distance} \div \text{Speed}$$

$$T = 135000 \div 50$$

$$T = 2700 \text{ seconds}$$

$$T = 45 \text{ minutes}$$

$$135 \times 1000 = 135000 \text{ metres}$$

$$2700 \div 60 = 45 \text{ minutes}$$

4. A block of gold has a mass of 1.4475 kg. Its dimensions
are: length = 10 cm, height = 2.5 cm and width = 3 cm.



Calculate the density of gold in grams/cm³.

$$\text{Density} = \text{Mass} \div \text{Volume}$$

$$D = 1447.5 \div 75$$

$$D = 19.3 \text{ grams per cm}^3$$

$$\text{Volume} = 2.5 \times 3 \times 10 = 75 \text{ cm}^3$$

Change kg → grams

$$1.4475 \times 1000 = 1447.5 \text{ grams}$$

5. Use trial and improvement to find the value of x if

$$x^2 - 2x = 5$$

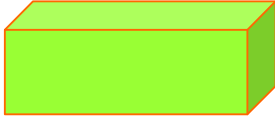
Try	Calculate	Comment
4	8	Too big
3	3	Too small
There is an answer between 3 and 4		
3.5	5.25	Too big
3.4	4.76	Too small
There is an answer between 3.4 and 3.5		
3.45	5.0024	Too big
3.44	4.9536	Too small
There is an answer between 3.44 and 3.45		
3.455	5.027025	Too big
The answer is 3.45 to 2 dp.		

6. Use trial and improvement to find the value of x if

$$\sqrt{x} + x = 9$$

Try	Calculate	Comment
6	8.45	Too small
7	9.65	Too big
6.5	9.05	Too big
6.4	8.93	Too small
6.45	8.99	Too small
6.46	9.00	Too big
The answer is 6.46 to 2 dp.		

8. Calculate the volume and surface area of a cuboid that has the following dimensions length = 10 cm, height = 2.5 cm and width = 3 cm.



$$\text{Volume} = \text{Area end} \times \text{length} \rightarrow V = 7.5 \times 10 \rightarrow \underline{V = 75 \text{ cm}^3}$$

$$\text{Surface area} = [(10 \times 2.5) + (2.5 \times 3) + (10 \times 3)] \times 2$$

$$\underline{\text{S.Area} = 125 \text{ cm}^2}$$

9. Calculate the surface area and volume of a cone with a height 4 cm, base radius 3 cm and slope length 5 cm.



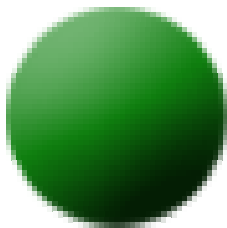
$$\text{S.Area} = \text{Area Base} + \text{Area Slope}$$

$$\text{S.Area} = \pi r^2 + \pi sr$$

$$\text{S.Area} = 75.36 \text{ cm}^2$$

$$\text{Vol} = \text{Area Base} \times \text{Height} \div 3 \rightarrow V = 37.68 \text{ cm}^3$$

10. Calculate the surface area and volume of a sphere with a diameter of 20 cm

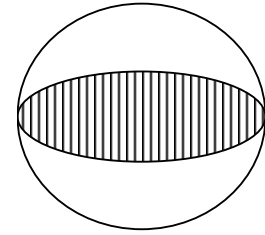


$$\text{S. Area} = 4\pi r^2 \rightarrow \text{S. Area} = 4 \times 3.14 \times 10^2$$

$$\underline{\text{S. Area} = 125.6 \text{ cm}^2}$$

$$\text{Volume} = (4 \div 3) \pi r^3 \rightarrow \underline{V = 4186.67 \text{ cm}^3}$$

11. A hemisphere is the name for half of a sphere. What is the total surface area of a hemisphere with a radius of 10 cm?

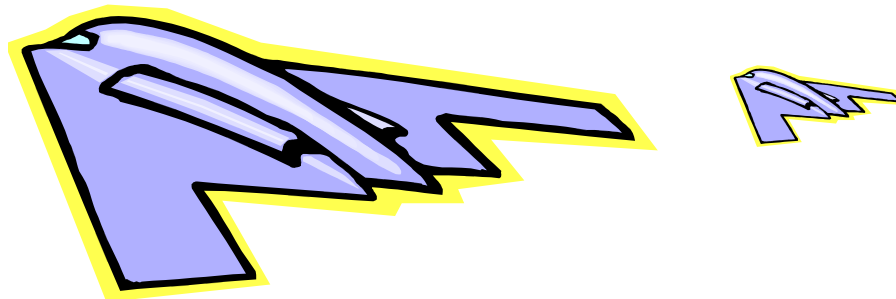


Surface Area = $\frac{1}{2}$ (sphere's area) + Circle Area

$$S. \text{ Area} = (0.5 \times 4 \times \pi \times 10^2) + (\pi \times 10^2)$$

$$S. \text{ Area} = 628 + 314 \rightarrow s. \text{ Area} = \underline{942 \text{ cm}^2}$$

- 12.



The linear scale of a model plane is $\frac{1}{4}$ of the real plane. If 2.5 litres of paint is required to paint the model, how much paint is needed to paint the real plane?

The amount of paint is really the surface areas so:

Model : Real

Linear Ratio 1 : 4

Area Ratio = Linear Ratio Squared

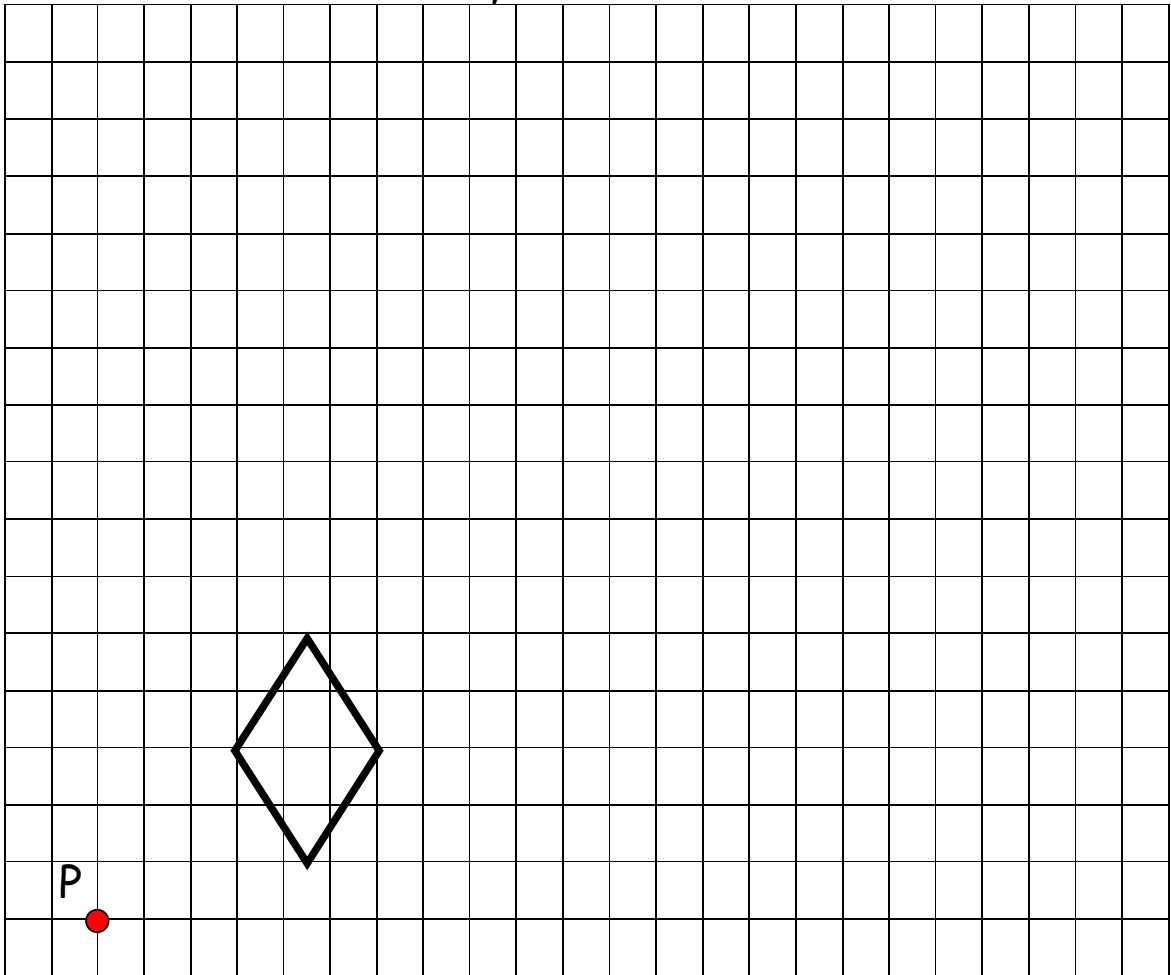
Area Ratio $1^2 : 4^2$

Area Ratio 1 : 16

The real plane needs 16 times more paint

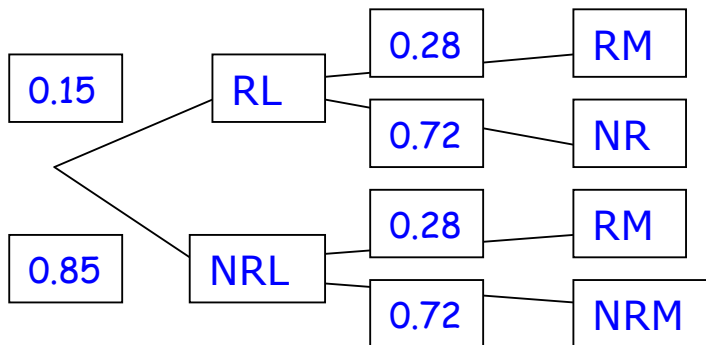
$$\rightarrow 16 \times 2.5 = 40 \text{ litres}$$

13. Using point P as the centre of enlargement, enlarge the rhombus by a scale factor of 3.



14. The probability of rain is 15% in London and 28% in Manchester. Using a tree diagram, calculate the probabilities of

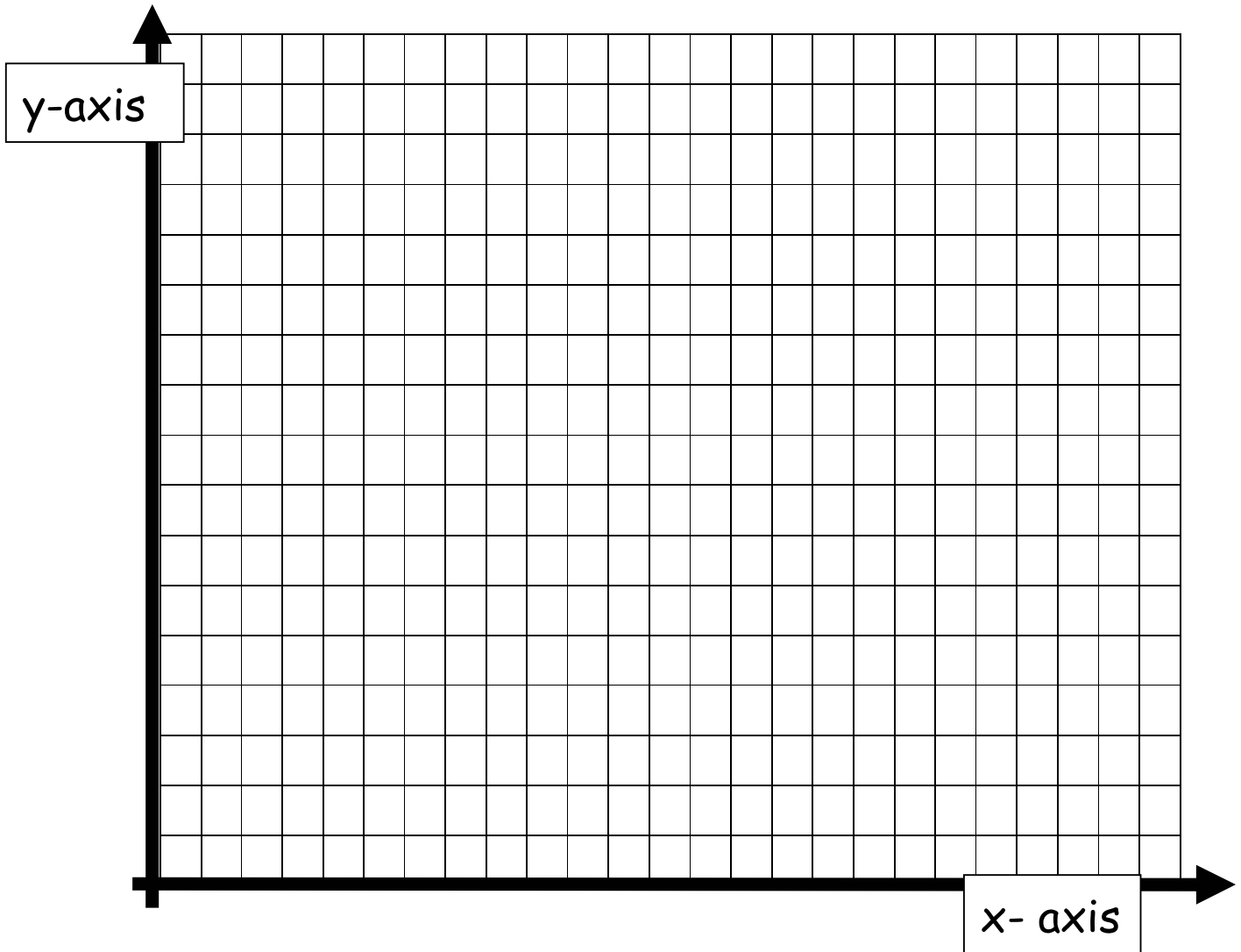
- a. Rain in London and Manchester
- b. Rain in London or Manchester



a) $0.15 \times 0.28 = 0.042$

b) $1 - (0.85 \times 0.72) = 0.388$

Question b) is ambiguous. I've taken it that it can be raining in either or both cities. If it rain in London or Manchester but not at the same time the answer is 0.304



15. On the grid above, draw triangle ABC with $A(4, 5)$ $B(4, 10)$ and $C(7, 5)$.

- Rotate this triangle 180° about the point $(11, 5)$ and label this triangle $A'B'C'$.
- Reflect $A'B'C'$ in the line $y = 8$ and label this reflected triangle $A''B''C''$.
- Reflect $A''B''C''$ in the line $x = 11$ and label this reflected triangle $A'''B'''C'''$.
- What translation maps $A'''B'''C'''$ onto ABC ?