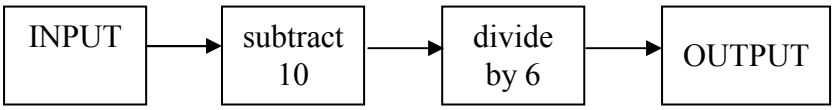
TRIAL PAPER 3
NO CALCULATORS

WRITE YOUR ANSWERS, **INCLUDING ROUGH WORKING**, ON THESE SHEETS

1. The diagram below represents a number machine.



a) When the input is 40, what is the output? ……

b) When the input is –8, what is the output? ……

c) If the input is x, write down the output in terms of x.

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2. The diagram shows a square with three of its vertices on the sides of an equilateral triangle ABC. Find the angles marked a and b.

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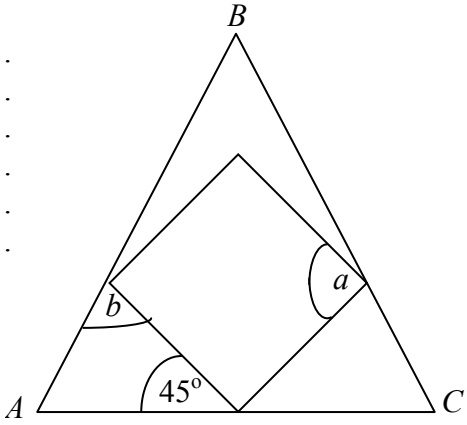
a = …… b = ……



3. a) Simplify $6a - 5 + 3a - 4$.

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b) Find the value of $2x + 6y$ when $x = 5$ and $y = -3$.

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4. a) Sarah went on holiday in America. She changed £700 into dollars when the exchange rate was £1 = $1.55. How many dollars did Sarah get?

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b) At the end of her holiday Sarah had $80 left. She changed them into pounds when the exchange rate was £1 = $1.60. How many pounds did Sarah get?

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5. a) Write down 18.6 correct to 2 significant figures.

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b) Write down 188.6 correct to 2 significant figures.

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c) Write down 0.00286 correct to 2 significant figures.

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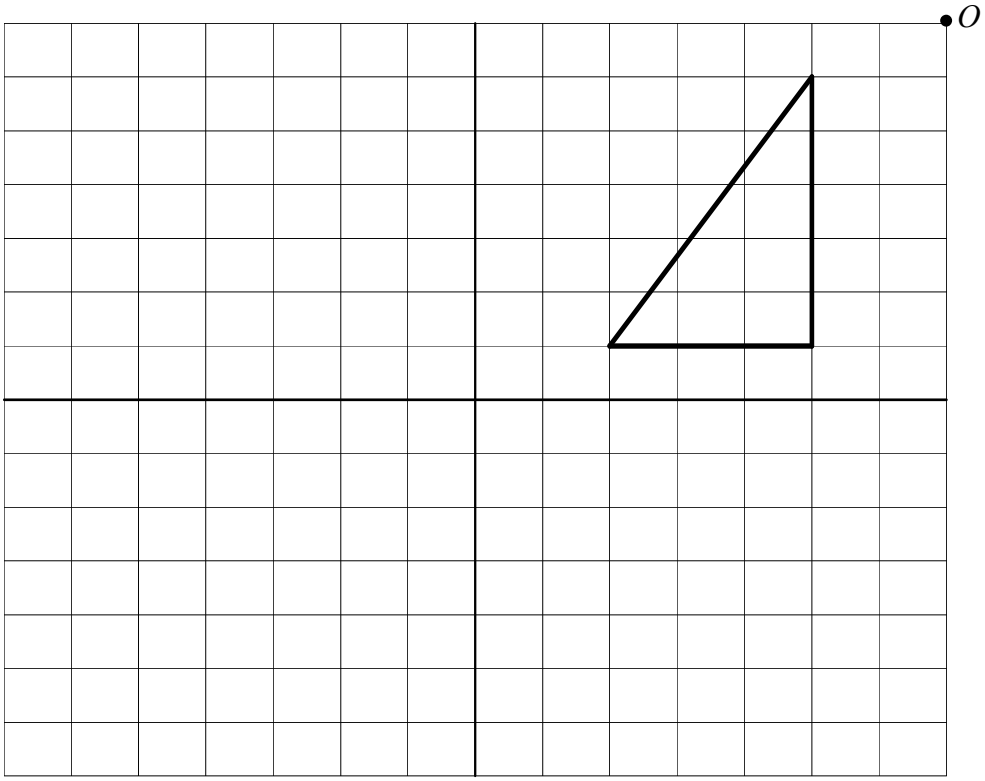
6. Draw on the grid below, an enlargement of the given shape, using a scale factor of 2 and centre O.



7. Estimate the value of $\frac{47 \times 73}{387}$. Show clearly how you obtain your answer.

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8. David purchased a bike in 1997 for a price of £150. He later sells the bike and makes a loss of 35% of the original price. How much did David sell the bike for?

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9. Solve the equation $4x - 6 = 6 - 4x$.

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10. The points A and B are marked in the space below.

a) C is the point that is 75 miles from A on a bearing of 040^{o}. Using the scale of 1 cm to represent 10 miles, draw the line from A to the point C.

b) Find the bearing of the point A from the point B.

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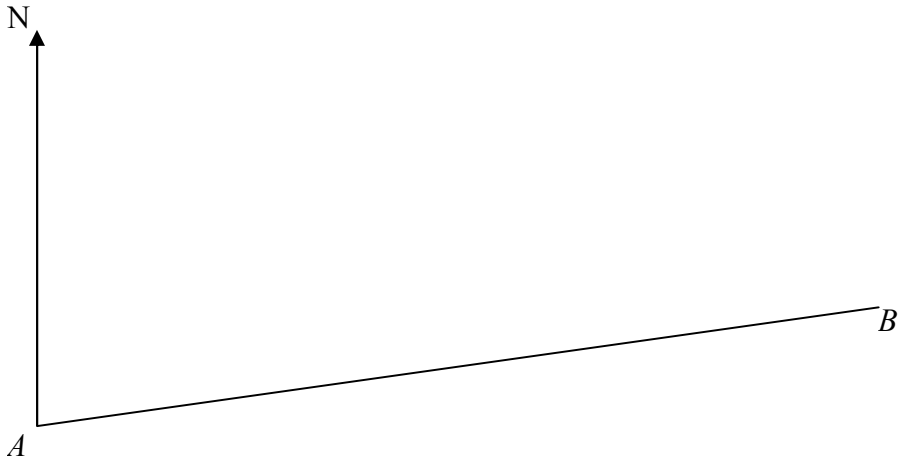

11. A motorist travels 105 miles in $1\frac{1}{2}$ hours. What is the average speed, in m.p.h., of the motorist?

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12. Jane buys milk in 4 litre containers. She uses $2\frac{1}{3}$ litres of milk every day. What is the least number of containers of milk she would need to buy in ten days?

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13. Bob, Sarah and Jenny invest £1900, £1200 and £900 respectively in a business venture which makes them a profit of £800. They share the profit in proportion to how much they each invested. Calculate how much each of them gets.

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14. a) Simplify $(3x^4)^3$.

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b) Expand $(x-4)^2$.

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15. In a certain isosceles triangle, the lengths of each of the two longer sides is 6 cm more than the length of the shorter side. Let x cm denote the length of the shorter side.

a) Write down, in terms of x, the length of each of the longer sides.

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b) Write down, in terms of x, the perimeter of the triangle. Simplify your answer as far as possible.

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c) The perimeter of the triangle is 57 cm. Write down an equation in x. Solve this equation to find the value of x.

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16. A fair 4-sided dice has faces numbered 1 to 4. Catherine throws the dice twice.

a) Find the probability that she throws a 3 both times.

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b) Find the probability that she throws the same number both times.

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17. A random sample of people in a certain county revealed the following information.

	Left handed	Right handed
Male	65	300
Female	85	350

The county has a population of 16 000. Use this information to estimate how many right-handed females there are in the county.

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18. Solve the simultaneous equations by an algebraic (not graphical) method.

$6x + 2y = -3$

$4x - 3y = 11$

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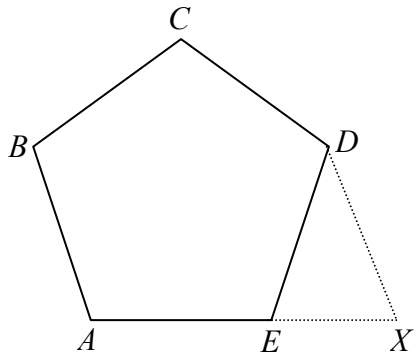
19. *ABCDE* is a regular pentagon.
The lengths *DE* and *DX* are equal.



Calculate the value of $E\hat{D}X$.

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20. a) Write each of the following numbers in standard form.

i) 0.0000556 ……

ii) 823 336 ……

b) Find, in standard form, the value of

i) $(5 \times 10^8) \times (4.1 \times 10^3)$

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ii) $(6 \times 10^{12}) \times (2.1 \times 10^{-3})$

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iii) $\dfrac{3 \times 10^{-4}}{5 \times 10^6}$.

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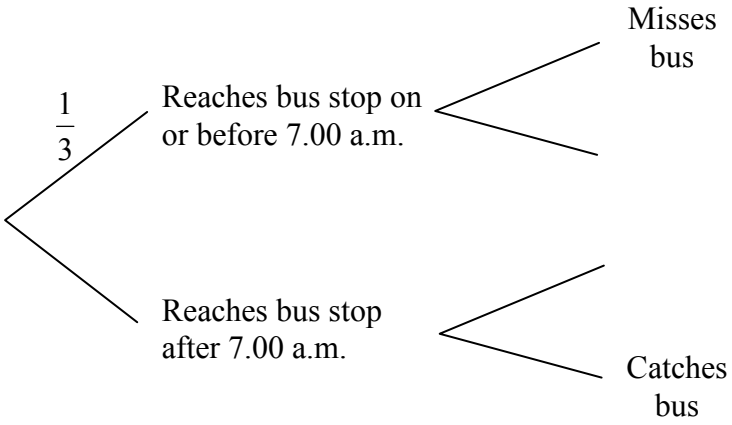
21. A certain bus is due to pass a particular bus stop at 7.00 a.m.

The probability that John reaches the bus stop on or before 7.00 a.m. is $\frac{1}{3}$. If John reaches the bus stop on or before 7.00 a.m. then the probability that he has missed the bus is $\frac{1}{5}$. When he reaches the bus stop after 7.00 a.m., the probability that he catches the bus is $\frac{1}{10}$.

a) Complete the following tree diagram.



b) Calculate the probability that John catches the bus.

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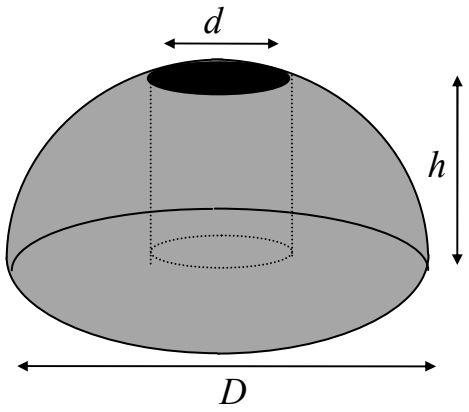
22. A pressure washer is a section from a hemisphere of diameter D cm with a cylindrical hole of diameter d cm in it. It is h cm high.



Which of these could be the formula for its curved surface area? Give a reason for your answer.

i) $A = \pi h(D + d)$, ii) $A = 0.25\pi h(D^2 + d^2)$,

iii) $A = 0.25\pi Ddh$, iv) $A = 0.5\pi(D + d + h)$.

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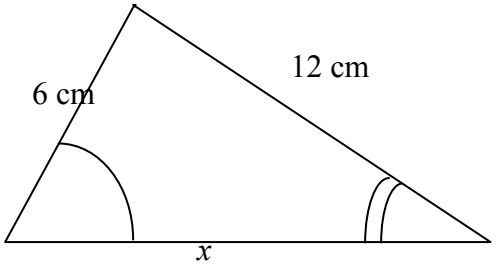

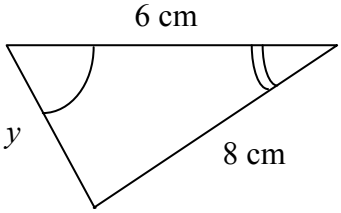

The 2 triangles drawn are similar.

i) Calculate the length of x.

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ii) Calculate the length of y.

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Answers.

1. a) 5 b) –3 c) $\frac{x-10}{6}$.
2. $a = 90^o$, $b = 75^o$.
3. a) $9a - 9$ b) –8.
4. a) \$1085 b) £50.
5. a) 19 b) 190 c) 0.0029.
7. Approximately 8.75.
8. £97.50.
9. $x = \frac{3}{2}$ (or 1.5).
11. 70 m.p.h.
12. 6 containers.
13. Bob = £380, Sarah = £240, Jenny = £180.
14. a) $27x^{12}$ b) $x^2 - 8x + 16$.
15. a) $x + 6$ b) $3x + 12$ c) $3x + 12 = 57$; $x = 15$.
16. a) $\frac{1}{16}$ b) $\frac{1}{4}$.
17. 7000.
18. $x = 0.5$, $y = -3$.
19. 36^o.
20. a) i) 5.56×10^{-5} ii) 8.23336×10^5
    b) i) 2.05×10^{12} ii) 1.26×10^{10}, iii) 6×10^{-11}.
21. b) $\frac{1}{3}$.
22. Formula i) could be the surface area.
23. i) $x = 9$ cm ii) $y = 4$ cm.