Test 3 **Essential Maths 9H Units 5 & 6**

Graph paper is required Calculators are needed

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1. Use a calculator to work out the following. Give answers correct to 3 significant figures.

(a) $\frac{3.2}{1.9} + \frac{8.5}{6.2}$ (2 marks)

(b) $8.7^2 - \frac{23.7}{9.1}$ (2 marks)

(c) $(2.4 \times 10^7) \times (7.5 \times 10^{10})$ (1 mark)

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2. A right angled triangle has sides of length 5cm, 12cm and 13cm.

Work out the size of the smallest angle in the triangle, giving your answer correct to one decimal place. (3 marks)

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3. (a) Solve the inequality $3(2x + 1) < 7$ (1mark)

(b) Given that $3n > 1$ and that $n + 4 < 7.5$, list all the possible whole number values of n. (2 marks)

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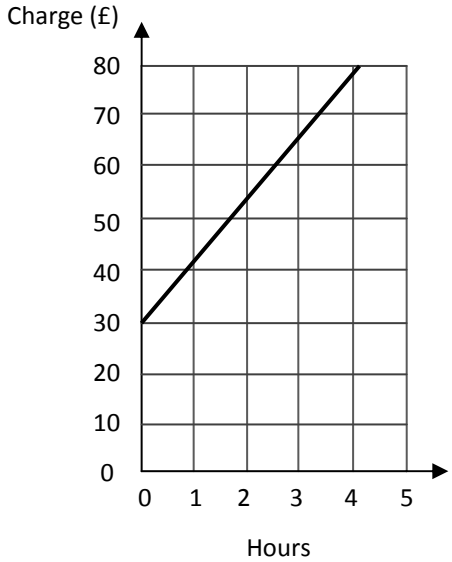
4. A plumber uses this graph to calculate his charge for a job.

He charges a fixed fee plus an amount for the time the job takes.

(a) How much is the fixed fee ? (1 mark)

(b) How much does he charge for a job which takes 3 hours ? (1 mark)



5. Make x the subject.

(a) $w + mx = t$ (1 mark)

(b) $\dfrac{a + hx}{e} = f$ (2 marks)

(c) $\dfrac{k}{x} = n + c$ (2 marks)

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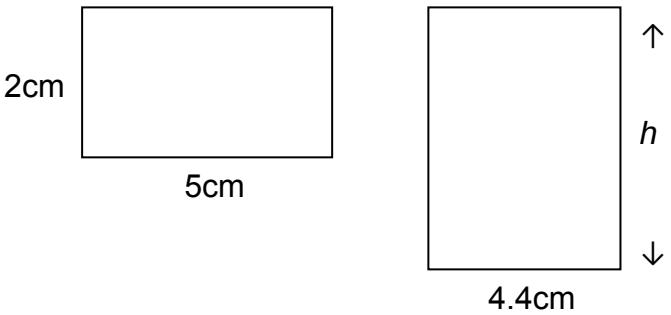
6. These two rectangles are similar. Calculate the height h.



(2 marks)

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7. Cards numbered 1 to 70 are placed in a bag and one card is picked at random.

Write down the probability of picking:

(a) the number 1 (1 mark)

(b) a multiple of 12 (1 mark)

(c) a cube number (2 marks)

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8. (a) On the same diagram *sketch* the graphs of $y = 2x + 1$ and $y = 7 - x$.

(2 marks)

(b) The two lines cross at point P.

The line $y = 2x + 1$ cuts the x-axis at point A

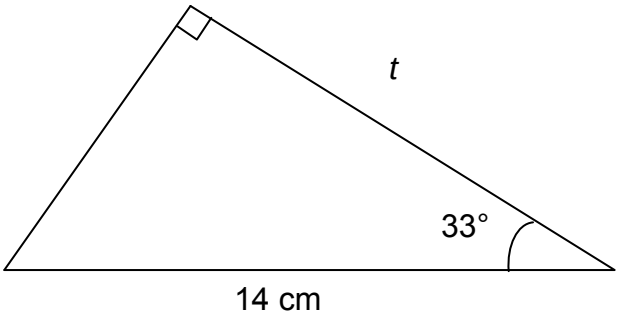
The line $y = 7 - x$ cuts the x-axis at point B

Find the area of triangle ABP. Give your answer in square units.

(3 marks)

9. Find the length of the side *t*.

Give your answer correct to one decimal place.



(2 marks)

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10. Max and Sophie have bikes with different size wheels.

The wheels on Max's bike have a diameter of 55cm.
Max rolls the bike forward so that the wheels turn round exactly once.

(a) How far has Max moved ? (1 mark)

The wheels on Sophie's bike have a diameter of 62cm.

Sophie rolls forward a distance of 1200cm.

(b) Calculate how many times the wheels go around *completely*. (2 marks)

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11. Use graph paper for this question.

(a) Draw the line $y = x + 3$ for values of x from −2 to +5 (1 mark)

(b) Draw the curve $y = x^2 - 3x$ for values of x from −2 to +5 (3 marks)

(c) Estimate the x-values at the two points where the line cuts the curve. (2 marks)

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12. (a) Find the time taken to travel 120 km at a speed of 15 km/h. (1 mark)

(b) A solid cube of side 2.5cm is made of metal with density 8.2 g/ cm^3.

Work out the weight of the cube. (2 marks)

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13. Make *t* the subject of each formula.

(a) $e = a - gt$ (2 marks)

(b) $b = \sqrt{\left(\frac{t}{m}\right)}$ (2 marks)

14. A bag contains balls which are either red, blue or yellow.

The probability of selecting a red ball is 0.15.

The probability of selecting a blue ball is 0.4.

(a) Find the probability of selecting a yellow ball. (1 mark)

(b) Find the probability of selecting a ball which is not blue. (1 mark)

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15. (a) Draw a *sketch* graph of $y = 2^x$. You do *not* need to draw the graph accurately. (2 marks)

(b) Use trial and improvement to find the solution to the equation $2^x = 103$,

Give your answer correct to one decimal place. (2 marks)

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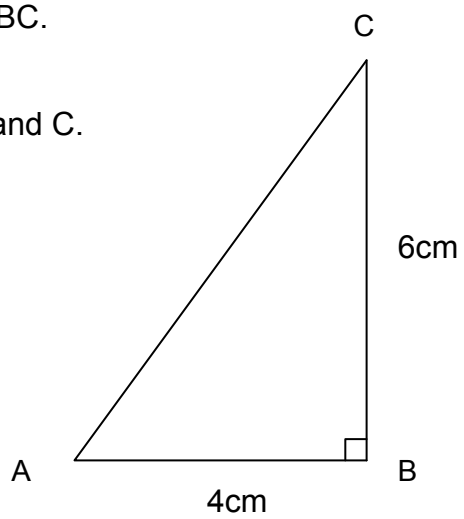
16. (a) Draw an accurate full size copy of triangle ABC. (1 mark)

(b) Draw the locus of points equidistant from B and C. (1 mark)

(c) Draw the locus of points equidistant from lines AC and AB. (2 marks)



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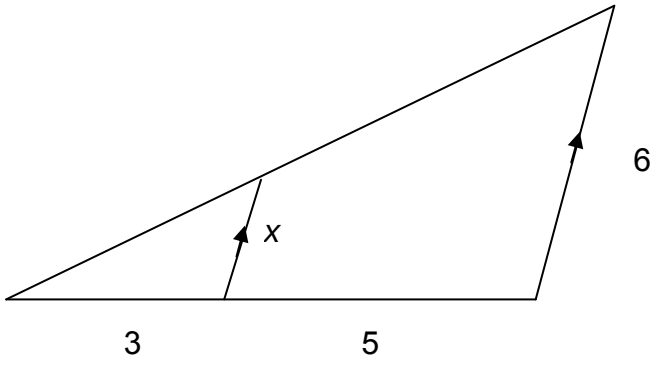
17. Use similar triangles to find *x*.

(3 marks)



18. A bag contains balls which are numbered 2, 3, 4 or 5 and the rest are blank.

The table shows the probabilities of drawing a ball from the bag.

p(2) = 0.1
p(3) = 0.25
p(4) = 0.2
p(5) = 0.05

Find the probability of drawing a ball

(a) numbered 2 or 5 (1mark)

(b) numbered 3, 4 or 5 (1 mark)

(c) which is blank (1 mark)

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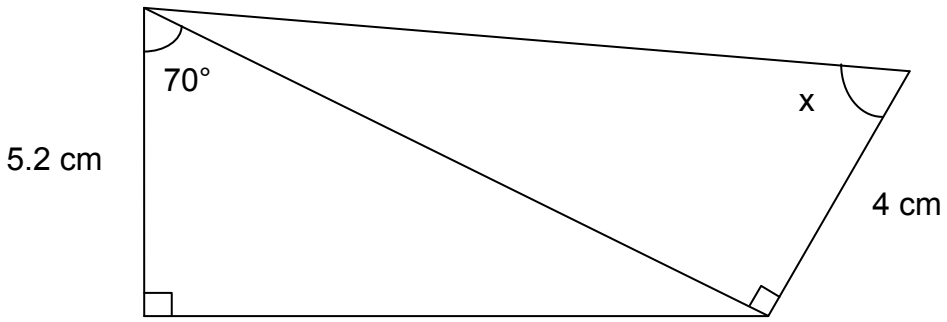
19. The diagram shows the frame of a bicycle.

Find angle *x,* correct to one decimal place.



(3 marks)

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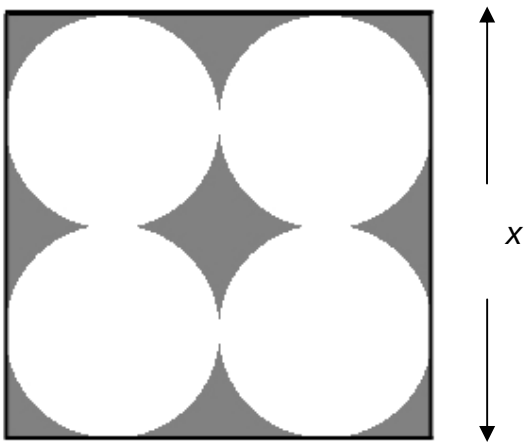
20. The area of the shaded region is this diagram is 100cm

Find the length marked *x*.



(4 marks)