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| **S3 National 5 Homework Exercise 13** | | | | | | | | | C:\Users\Ian\Pictures\CHS.jpg | | | |
|  | | | | | | | | |
| **Similarity** | | | | | | | | |
|  | | | | | | | | | | | | |
| Issued by: | | |  | Return by: | | | |  | | | | |
|  | | | | | | | | | | | | |
| **1.** | Explain why all circles and squares are similar, but not all rectangles. | | | | | | | | | | | |
|  |  | | | | | | | | | | | |
| **2.** | Find the missing side in each diagram (triangles are similar in each case). | | | | | | | | | | | |
|  |  | | | | | | | | | | | |
|  |  | 9cm  6cm  15cm  *a* | | | |  | 35°  *b*  35°  21mm  7mm  35mm | | | | | |
|  |  | *c*  20cm  8cm  24cm | | | |  | 12m  9m  10.5m  16m  *d* | | | | | |
|  | | | | | | | | | | | | |
| **3.** | A  B  D  C  E  3.5m  10.5m | | | | | | | • AB and DE are parallel | | | | |
|  |  | | | | |
|  | • AB = 3.5m and DE = 10.5m | | | | |
|  |  | | | | |
|  | • BD = 20m | | | | |
|  |  | | | | |
|  | Find the length of BC. | | | | |
|  |  | | | | |
|  |  | | | | |
|  | **HINT:** find the ratio of BC:CD | | | | |
|  |  | | | | |
|  | | | | | | | | | | | | |
| **4.** | A Spider-Man poster is available in three sizes, all of which are mathematically similar. | | | |  | | | | |  |  | |
|  |  | | | |
|  | a) | The small poster has an area of 900cm2 | | |
|  |  | | | |
|  |  | Find the area of the medium poster. | | |
|  |  |  | | |
|  | b) | The large poster has an **area** of 14400cm2. Find its width. | | |
|  |  | | | | Small (20cm wide) | | | | |  | Medium (30cm wide) | |
|  | | | | | | | | | | | | |
| **5.** | Cups of Bovril are mathematically similar. Small, medium and large cups are available. | | | | | | | | | | | 254241277a6255615320m |
|  |  | | | | | | | | | | |
|  | The **medium** cup has a base 6cm across, and holds 300ml of liquid. | | | | | | | | | | |
|  |  | | | | | | | | | | |
|  | a) | To the nearest ml, find the volume of the **small** cup, given that its base is 5cm across. | | | | | | | | | |
|  |  |  | | | | | | | | | |
|  | b) | If the **large** cup holds 500ml of liquid, find the width of its base (to the nearest mm). | | | | | | | | | |
|  |  |  | | | | | | | | | |

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|  | **Award 1 Mark for each ●** | | | | | | | | | | | | |
|  |  | | | | | | | | | | | | | |
| **1.** | Accept any three appropriate comments, e.g.:  ● In squares all sides are equal so stay in the same ratio whatever the scale  ● Circles are perfectly symmetrical in all directions  ● Rectangles can have sides in different proportions to other rectangles. | | | | | | | | | | | | | |
|  |  |  |  |  | | | |  |  | | |  |  | |
| **2.** | a) | ● | b) | ● | | | | c) | ● | | | d) | ● | |
|  |  | ● a = 10cm |  | ● b = 4.2mm | | | |  | ● c = 15cm | | |  | ● d = 14m | |
|  |  |  |  |  | | | |  |  | | |  |  | |
| **3.** | ● | | | | | OR | ● | | | | | | | |
|  | ● Divides BD in ratio 1:3 | | | | | ● 10.5x = 70 – 3.5x | | | | | | | |
|  | ● BC = 5m | | | | | ● BC = 5m | | | | | | | |
|  |  | | | | | | | | | | | | | |
| **4.** | a) | ● SF = 1.5 | | | b) | ● 14400 = 900 x (SF)2 | | | | OR | ● 14400 =2025 x (SF)2 | | | |
|  |  | ● Area = 900 x (1.5)2 | | |  | ● SF = | | | | OR | ● SF = | | | |
|  |  | ● 2025cm2 | | |  | ● SF = 4 | | | | OR | ● SF =  (or equivalent) | | | |
|  |  |  | | |  | ● 20 x 4 = 80cm | | | | OR | ● 30 x  = 80cm | | | |
|  |  |  | | |  |  | | | |  |  | | | |
| **5.** | a) | ● Volume = 300 x (SF)3 | | | | | | b) | ● 500 = 300 x (SF)3 | | | | | |
|  |  | ● Volume = 300 x | | | | | |  | ● SF = | | | | | |
|  |  | ● V = 173.61111111 | | | | | |  | ● x = 6 x | | | | | |
|  |  | ● V = 174ml | | | | | |  | ● x = 7.1137866069… | | | | | |
|  |  |  | | | | | |  | ● x = 7.1cm | | | | | |
|  | | | | | | | | | | | | | | |
| **Total = 30 marks** | | | | | | | | | | | | | | |
|  |  |  | | | | | |  |  | | | | | |