| IM1 Problem Set 40 | | |
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| **Task 1** | **Task 2** | **DC** |
| Put solutions to problems from the previous Problem Set on the board | Discuss all problems and come to a consensus. Record solutions in your notebooks and present solutions. | DC |

| Problem Set 40 | |
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| **40.1** | Use your knowledge of exponent rules to simplify the following expressions:<br>7. $8^0$<br>8. $-(9x)^0$<br>20. $7^{-2}$<br>21. $\frac{1}{x^{-5}}$<br>32. $\frac{3x^2y^{-3}}{12x^6y^3}$<br>33. $(2x^3y^{-3})^{-2}$ |
| **40.2** | A basketball whose volume is $4500\pi$ cm$^3$ is packaged in a box that is in the shape of a cube. The edge length of the box is equal to the diameter of the basketball. What is the surface area and the volume of the box?<br>  <br> |
| **40.3** | Mr. S has had two investments over the past 20 years. The value of his first investment is modeled by the equation $P(t) = 50{,}000 + 3000t$, where $t$ represents the time in years since 2000. The value of his second investment is modeled by $A(t) = 40{,}000(1.075)^t$, where $t$ represents the years since 2000.<br>a. Graph both equations on your calculator<br>b. What was the value of both investments in the year 2000?<br>c. What was the value of both investments in the year 2010?<br>d. What will be the value of both investments in the year 2030?<br>e. When will the value of both investments be the same?<br>f. Which investment is growing faster? Explain your answer. |
| **40.4** | A box contains 4 red and 2 blue chips. A chip is drawn at random and then replaced. A second chip is then drawn at random.<br>a. Show all the possible outcomes using a probability tree diagram.<br>b. Calculate the probability of getting:<br>i. at least one blue.<br>ii. one red and one blue.<br>iii. two of the same color. |

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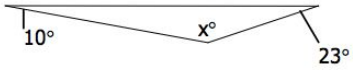
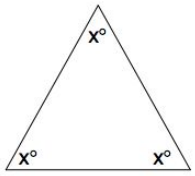
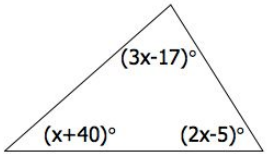
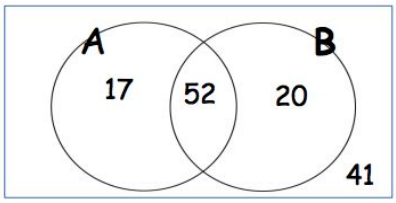
| **40.5** | Graph the following two exponential functions: let $y_1 = 8\left(\frac{1}{2}\right)^x$ and let $y_2 = 8\left(\frac{1}{2}\right)^x + 16$. Compare the two graphs and the 2 data tables and prepare a sketch of the graph in your notes and then label (i) the $y$-intercept, (ii) the asymptote and (iii) three additional data points. Do both graphs have $y = 8$ as a $y$-intercept? What is the effect of the +16 in the second equation? |
| **40.6** | Solve for $x$ in the following diagrams:<br>  <br>  <br>  |
| **40.7** | All members of a club were asked if they eat apples (A) and if they eat bananas (B.<br>a. How many people are in the club?<br>b. The information was represented on a Venn Diagram A member of the club is selected at random? What is the probability that<br>i. they eat both apples and bananas?<br>ii. they eat only apples and only bananas?<br>iii. they eat both apples or bananas?<br>  |
| **40.8** | A population of 800 beetles is growing each month at a rate of 5%. Hannah wants to write an equation that can be used to model the number of beetles, $B$, as a function of the number of months, $n$ ⇒ so she wants an equation for $B(n)$.<br>a. Mathla says that the equation includes the 5%, so she writes $B(n) = 500(0.05)^n$<br>b. Naimh sees the 5% and writes her equation as $B(n) = 500(5)^n$<br>c. Olivia also sees the 5%, so she writes her equation as $B(n) = 500(1.05)^n$<br>d. How can you determine which equation is correct? Which equation is correct and how did you determine the correct equation?<br>e. How many beetles will there be in 8 months?<br>f. When will there be 1600 beetles? |