Topic 2. Functions (MATH AI SL)

Straight-lines

1) There are 3 different forms of for the equation of a straight line:

   a) Convert $y = \frac{2}{3}x + 5$ to the general form, $ax + by + c = 0$.

   b) Convert $18x + 6y + 12 = 0$ to the gradient-intercept form: $y =$____$x +$___.

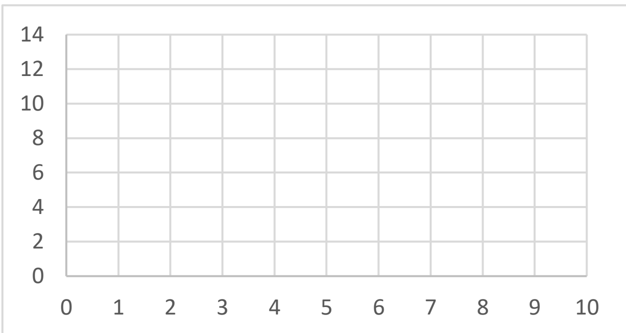
   c) The third form is called the ________-gradient form. It is useful when having coordinates such as $(4, 6)$ given the gradient is 8. Using your formula booklet, copy and fill in the formula with this information:

2) Lines are sometimes ________________. This means the _____________ are exactly the same.

3) Lines can also be ____________________ to each other. To test if they are precisely at ______ degrees, you can _____________ the gradients and you should get a value of _____. This could be useful in proof. The word ______________ can also be used to describe a line that is at ______ degrees to another.

4) It is important to note that linear functions can be ________- wise. This means that as the domain changes, so does the function. Sketch this example:

$$\begin{cases} y = x \quad where\ \{x|0 < x < 2, x \in \mathbb{R}\} \\ y = 2x - 2\ where\ \{x|\ 2 \le x < 7, x \in \mathbb{R}\} \\ y = 54 - 2x\ where\{x|\ 7 \le x < 9, x \in \mathbb{R}\} \end{cases}$$



Thinking question: Connection to topic 6 - how could one find the area under this function?

Other Functions

5) Functions can act as _______________. For example, $C(t)$ could be used to represent the change in cost over ________ for a company.

6) Inverse functions are found by switching the ___ and ___ coordinates. On a graph, this ends up being a reflection in the line ______. If a coordinate is defined as $f(2) = 5$, then the inverse would be written as f____ $=$ ____.

7) Finding the domain and range of inverse functions is easy. They simply ____________.

8) There are a few functions that should be used to ___________ various scenarios:

    a) $y = mx + c$ for data that is basically __________.

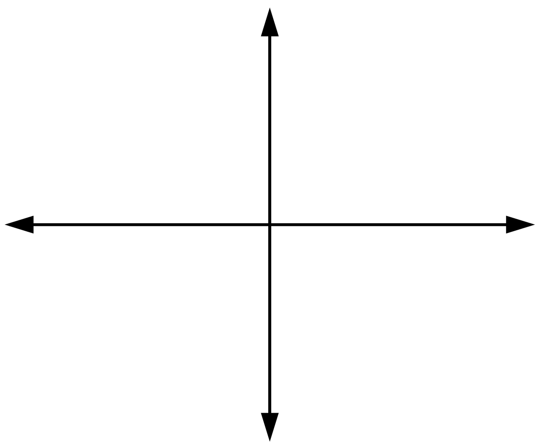
    b) $y =$______________ for data that essentially follows a quadratic pattern.

    c) $y = e^x$ is an _________________ model. This can be used for situations involving __________ and ________. They want you to be aware of several transformations this function can undergo. Sketch the following on the same axis to appreciate the differences using different colours. Note intercepts and asymptotes.

        i. $y = 2e^x + 1$

        ii. $y = 2e^{-x} + 1$

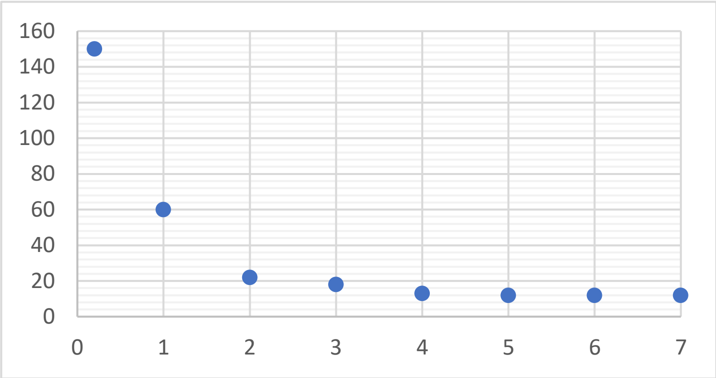
        iii. $y = 2e^{3x} + 1$



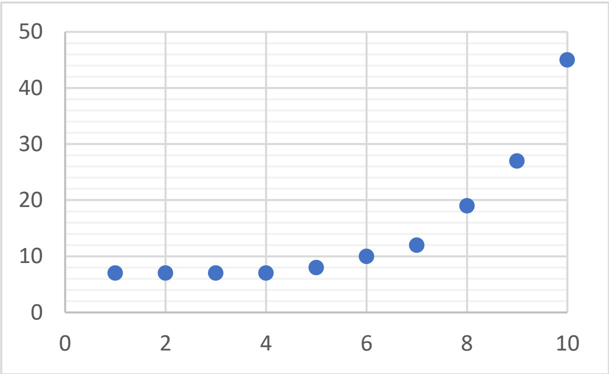
Thinking question: Link to topic 1 -what is the inverse function of an exponential function?

9) State which function should be used to ________ each of the following after drawing a sensible line of best fit. Using coordinates, see if you can find an approximation of the function (this is called the finding the PARAMETERS of the model). Also, state the domain.

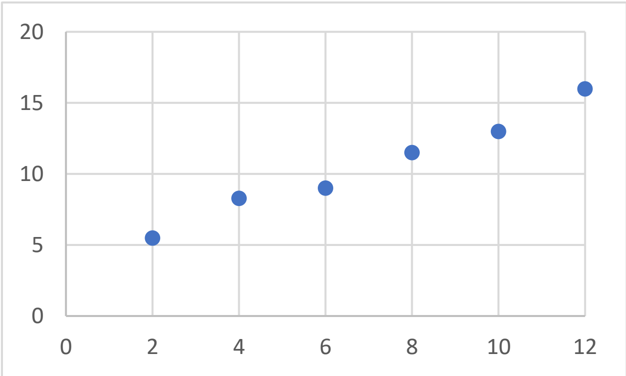
a)



b)



c)



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