

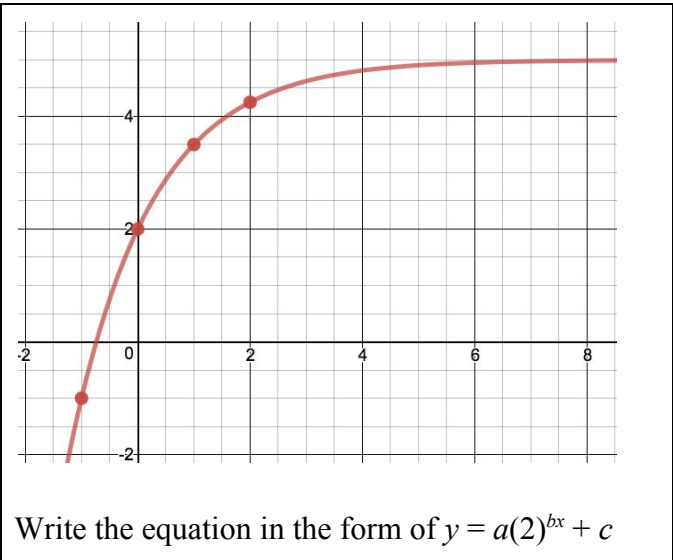
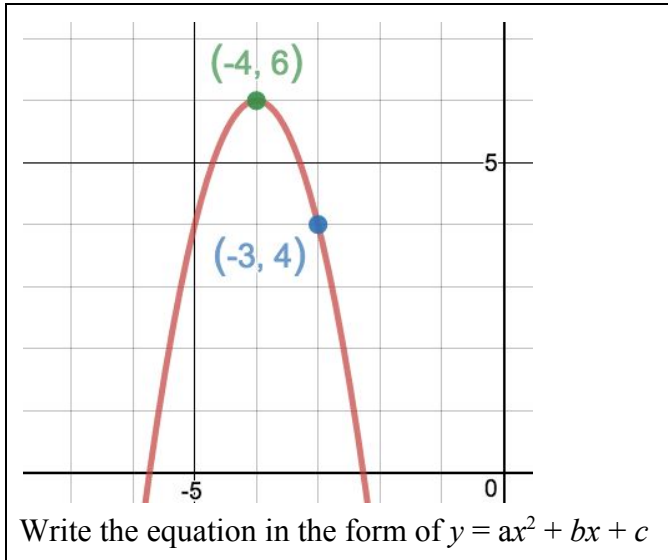
Math SL PROBLEM SET 49

Section A (Skills/Concepts Consolidation)

1. **(V4.2 - N) (CA)** Find the angle between the two vectors \mathbf{c} and \mathbf{d} , if \mathbf{c} is parametrically defined as $x(t) = 2 - 5t$ and $y(t) = -3 + 3t$ and \mathbf{d} is defined as $\frac{2-3x}{5} = \frac{5y+8}{3}$. At what point do the lines intersect? **(Cirrito 12.6.1, p432)**

2. **(F2.2, F2.4, F2.6 - R) (CI)** Determine the equations of the following graphs:

(Cirrito 2.4, p39 & Cirrito 5.3.3, p131)



3. **(T3.5 - E) (CI)** Solve $2\sin(2x) = 3\cos(x)$ on the domain of $-90^\circ < x < 360^\circ$. (NOTE: you may need a calculator to work out some of the inverse trig “stuff”) **(Cirrito 10.4, p351)**
4. **(C6.2 - N) (CI)** For the following **derivatives** of polynomial functions, determine the equation of the original function. Additionally, in each case it is known that $y(1) = -2$. Hence, also determine the value of “C” in your antiderivatives. **(Cirrito 19.1.2, p604)**

i. $\frac{dy}{dx} = 2x + 5$

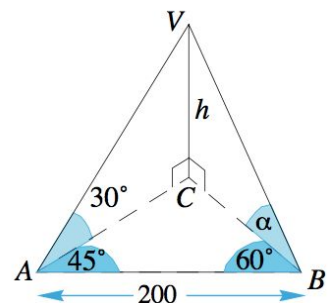
ii. $\frac{dy}{dx} = 6x^2 + 4x - 7$

iii. $\frac{dy}{dx} = 4x^3 - 3x$

5. **(T3.6 - E) (CA)** For the triangle prism shown in the diagram, find:

(Cirrito 9.3, p283)

- The value of h .
- The value of α .
- The angle that the plane ABV makes with the base ABC.



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6. **(T3.6 - E) (CA)** For the $\triangle TAM$, side $AT = 12$ cm and side $TM = 10.5$ cm and $\angle TAM = 21^\circ$. Determine the measure of side MA and hence the area of the triangle. **(Cirrito 9.5.2, p297)**

Section B (Skills/Concepts Practice)

7. **(SP5.6 - R) (CI)** Jonas and Hannah are both “good” math students. Mr. S. has calculated that Hannah has a probability of 0.7 of getting a 6 in Math and that Jonas has a probability of 0.6 of getting a 6 in Math. Find the probability that:

(Cirrito 15.3, p512)

- neither get a 6 in Math
- if only one gets a 6, then it is Hannah.

Now, the situation changes. Given that Jonas gets a 6, then the probability that Hannah gets a 6 is 0.6; however, if Jonas does not get a 6, then the probability that Hannah gets a 6 is now 0.85.

- Are the events independent or dependent? Explain.
- Draw a tree diagram to help make sense of this new information.
- How probable is it that neither get a 6 in Math.
- How probable is it that if only one gets a 6, then it is Hannah.

8. **(SP5.7 - N) (CA)** The discrete random variable X has a distribution defined by $P(X = x) = \frac{3k}{5}x$ for $x \in \{1, 2, 3, 4, 5\}$. **(Cirrito 16.1, p527)**

- Prepare a frequency table to help organize the information and to solve this problem.
- Find the value of k .
- Find $P(1 < x \leq 3)$
- Prepare a histogram and a frequency polygon for X .
- Find $E(X)$ and $\text{Var}(X)$.

9. **(C6.3 - N) (CI)** Draw a sketch of a function, $g(x)$, that has all of the following characteristics:

- $\lim_{x \rightarrow \infty} g(x) = -2$
- $\lim_{x \rightarrow -3} g(x) = 4$
- $\frac{d}{dx} g(x) > 0$ on the domain of $-\infty < x < -2$ as well as $4 < x < 8$.
- the global (absolute) maximum is $g(8) = 12$
- $\frac{d}{dx} g(x) = 0$ at $x = -5, -2, 4, 8$