

Complete the square.

$$\left(\frac{b}{2}\right)^2$$

$$4x + 9 = x^2 - 4x + \underline{4}$$

$$\begin{array}{r} x - 2 \\ x - 2 \end{array}$$

$$9 + 4 = (x - 2)^2$$

Vertex
(2, -13)

$$0 = x^2 - 4x - 9$$

$$-13 = (x - 2)^2 - 13$$

$$0 = (x - 2)^2 - 13$$

$$f(x-h)$$

$$\left(\frac{-8}{2}\right)^2$$

$$16 \quad \cancel{8x} - 3 = x^2 - \cancel{8x} + 16$$

$$\pm\sqrt{13} = x - 4$$

$$4 \pm \sqrt{13} = x \quad \text{zeros}$$

$$13 = (x-4)^2 - 13$$

$$0 = (x-4)^2 - 13$$

$$(4, -13) \text{ vertex}$$

$$(x-2)(x-2)$$

$$f(x) = 4(x-2)^2(4x^2 - 11x - 3)$$

$\begin{matrix} (4x & +1) \\ (x & -3) \end{matrix} = 0$

Find all zeros & multiplicity

$$x=2$$

$$x=3$$

$$x = \frac{-1}{4}$$

$$M_{of} 2$$

$$M_{of} 1$$

$$M_{of} 1$$

x	4	9	7	11	-8
y	1	21	3	4	-5

$R = 0.644$

- Pearson product moment correlation coefficient

$y = 0.833x + 0.968$

- Estimate x value for $f(x) = 17$ $x = 19.2$

2nd "0" --> DiagnosticOn --> Enter --> "Done"
 STAT --> Edit --> Type data into L1(x) and L2 (y)
 STAT --> Calc --> LinReg(ax+b) ---> R = Correlation

$$(2x-3)^5 = 32x^5 - 240x^4 + 720x^3 - 1080x^2 + 810x - 243$$

Find the simplified expression

	1					
	1	2	1			
	1	3	3	1		
	1	4	6	4	1	
	1	5	10	10	5	1

1	(2x) ⁵	(-3) ⁰	=	2 ⁵ x ⁵ = 32x ⁵
5	(2x) ⁴	(-3) ¹	=	5(16x ⁴)(-3) = -240x ⁴
10	(2x) ³	(-3) ²	=	10(8x ³)(9) = 720x ³
10	(2x) ²	(-3) ³	=	10(4x ²)(-27) = -1080x ²
5	(2x) ¹	(-3) ⁴	=	5(2x)(+81) = 810x
1	(2x) ⁰	(-3) ⁵	=	-243

Find the term in x³

720x³

$x \in \mathbb{R}$

$x \in \mathbb{Z}$

Divide $3x^3 - 4x^2 + 3$ by $x - 2$

Synthetically

$$3x^2 + 2x + 4 + \frac{11}{x-2}$$

$$3x^3 - 4x^2 + 0x + 3$$

$$\begin{array}{r|rrrrr} 2 & 3 & -4 & 0 & 3 & \\ & \downarrow & 6 & 4 & 8 & \\ \hline & 3 & 2 & 4 & 11 & \end{array}$$

Probability

- Venn Diagram (triple)
- Algebraic

1. [Maximum mark: 6]

Consider the events A and B , where $P(A) = \frac{2}{5}$, $P(B') = \frac{1}{4}$ and $P(A \cup B) = \frac{7}{8}$.

(a) Write down $P(B) = \frac{3}{4}$

(b) Find $P(A \cap B)$. $\frac{x}{8} = \frac{2}{5} + \frac{3}{4} - ?$ $? = \frac{11}{40} = P(A \cap B)$

(c) Find $P(A|B)$.

$$\frac{11}{40} = \frac{3}{4} \cdot P(A|B)$$

$$\frac{11}{30} = P(A|B)$$

Probability of an event A

$$P(A) = \frac{n(A)}{n(U)}$$

Complementary events

$$P(A) + P(A') = 1$$

Combined events

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

~~Mutually exclusive events~~

~~$$P(A \cup B) = P(A) + P(B)$$~~

Conditional probability

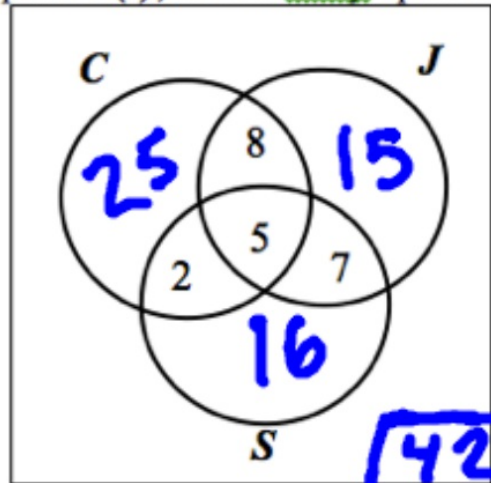
$$P(A \cap B) = P(A)P(B|A) = P(B)P(A|B)$$

Independent events

$$P(A \cap B) = P(A)P(B)$$

1. [Maximum mark: 5]

The Venn diagram below shows information about 120 students in a school. Of these, 40 study Chinese (C), 35 study Japanese (J), and 30 study Spanish (S).



$$\begin{array}{r} 120 \\ - 25 \\ - 8 \\ - 15 \\ \dots \end{array}$$

A student is chosen at random from the group. Find the probability that the student

(a) studies exactly two of these languages;

$$17/120$$

[1 mark]

(b) studies only Japanese;

$$15/120$$

[2 marks]

(c) does not study any of these languages.

$$42/120$$

[2 marks]