

SOLUTIONS IB MATHEMATICAL STUDIES PAPER 1 NOVEMBER 2017

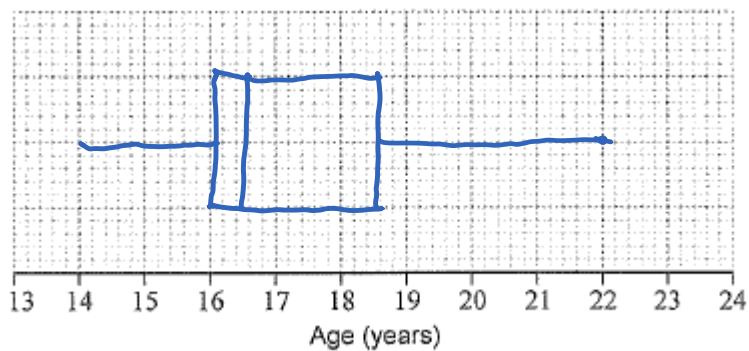
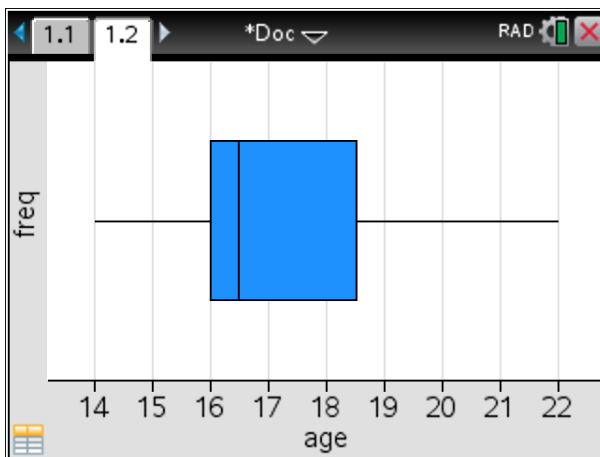
Question 1

1.1		*Doc		RAD
B	freq	C	D	E
=				=OneVar(
2	2		\bar{x}	17.5
3	7		Σx	350.
4	1		Σx^2	6236.
5	4		$s_x := s_{n-...}$	2.41704
6	1		$\sigma_x := \sigma_{n...}$	2.35584
E1 = "One-Variable Statistics"				

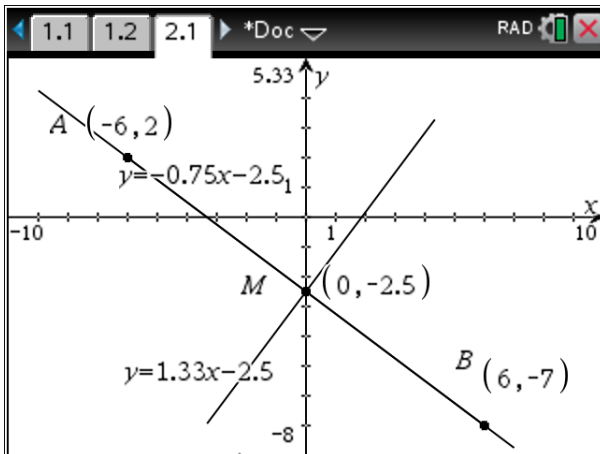
1.1		*Doc		RAD
B	freq	C	D	E
=				=OneVar(
7	1		n	20.
8	3		MinX	14.
9			Q_1X	16.
10			MedianX...	16.5
11			Q_3X	18.5
E1 = "One-Variable Statistics"				

- (a) (i) mean = 17.5
(ii) median = 16.5

(b)



Question 2



$$(a) M\left(\frac{-6+6}{2}, \frac{-7+2}{2}\right) = (0, -2.5)$$

$$(b) m = \frac{-7-2}{6-(-6)} = -\frac{9}{12} = -\frac{3}{4}$$

$$(c) m_{\perp} = \frac{4}{3}$$

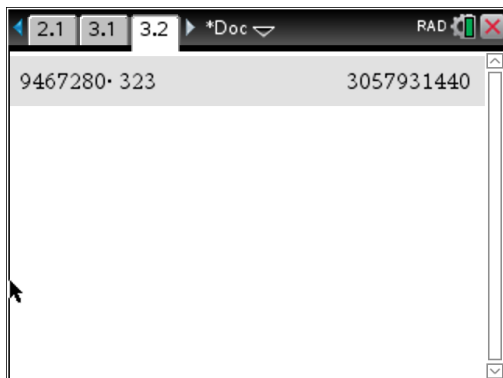
(d) We know the gradient and that the y -intercept is at M .

$$y = \frac{4}{3}x - \frac{5}{2}$$

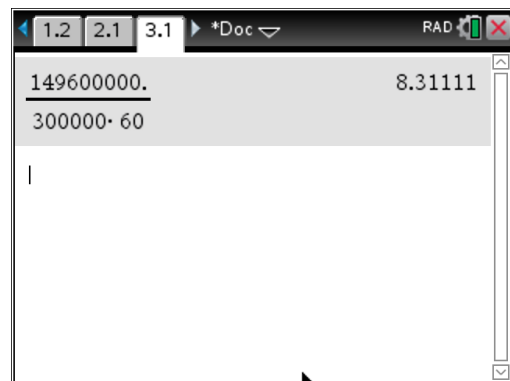
Question 3.

(a) 8.31 minutes

(b)



3.06×10^9 millions of km



Question 4

(a) If the car is less than 2 years old or the car has not been driven more than 20 000 km, then the car is under warranty.

(b)

p	q	r	$\neg r$	$q \vee \neg r$	$(q \vee \neg r) \Rightarrow p$
T	T	T	F	T	F
T	T	F	T	T	T
T	F	T	F	F	T
T	F	F	T	T	T
F	T	T	F	T	F
F	T	F	T	T	T
F	F	T	F	F	T
F	F	F	T	T	T

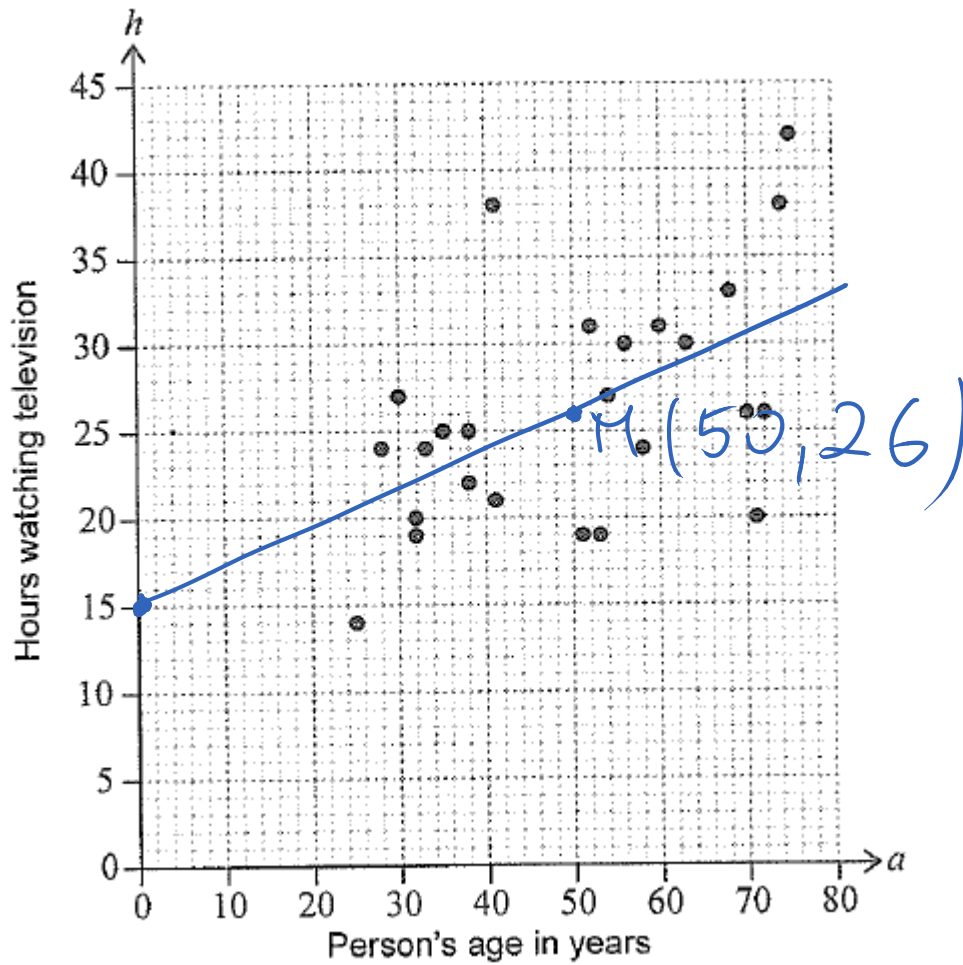
(c)inverse

Question 5

(a) 26 hours

$$0.22 \cdot 50 + 15 \quad 26.$$

(b)

(c) the correlation between h and a is positive.

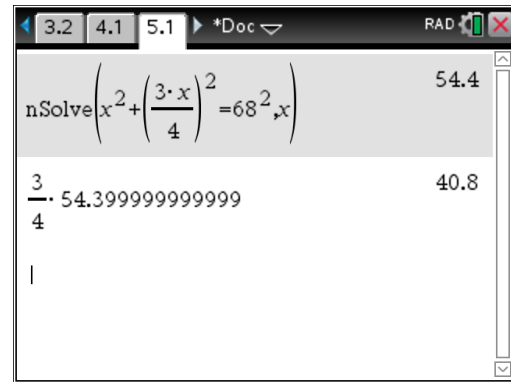
(d) It is extrapolation, predicting for age which is outside the range of data.

Question 6

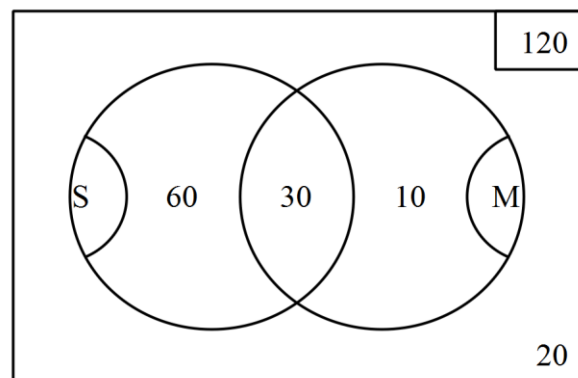
(a) $x^2 + y^2 = 68^2$

(b) $\frac{y}{x} = \frac{3}{4} \Rightarrow y = \frac{3x}{4}$

(c) $x = 54.4\text{cm}, y = 40.8\text{cm}$

**Question 7**

(a)



(b) $P(\text{both} | S) = \frac{30}{90} = \frac{1}{3}$

(c) $P(S) \times P(M) = \frac{3}{4} \times \frac{1}{3} = \frac{1}{4}$

$$P(S \cap M) = \frac{30}{120} = \frac{1}{4}$$

S and M are independent.

Question 8

(a) $\frac{350}{0.1559} = 2245.03$

(b) $\frac{2245.03}{0.98} = 2290.85$

(c) $\frac{585}{4228.38} = 0.14$ (2 d.p.)

Question 9

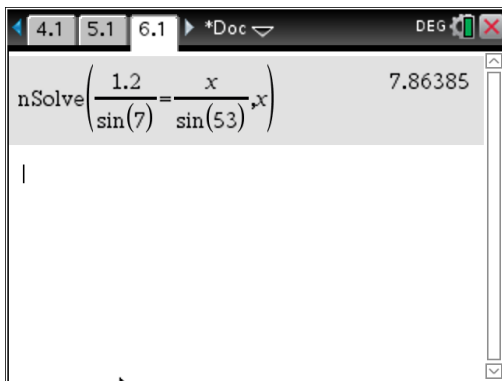
(a) $\frac{560}{.7} = 800$

(b) $560 \times \left(1 + \frac{.75}{100 \times 12}\right)^6 = 562.10$

$800 - 562.10 = 237.90$ USD

Question 10

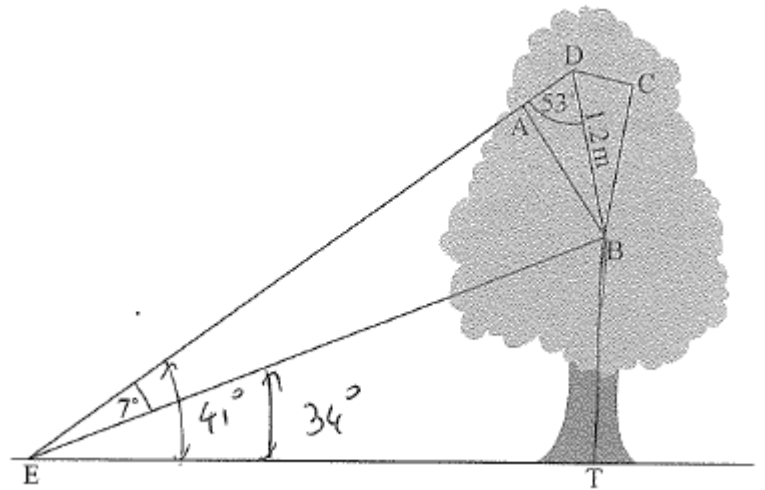
(a) $\frac{1.2}{\sin(7^\circ)} = \frac{EB}{\sin(53^\circ)}$



$EB = 7.86$ m

(b) 34°

(c) $h = EB \sin(34^\circ) = 4.40$ m

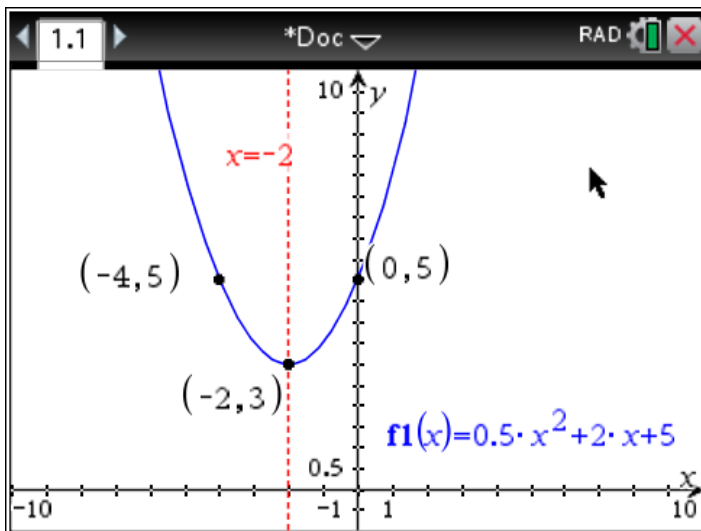


Question 11

- (a) $x = -2$
 (b) $c = 5$
 (c) $a = 0.5, b = 2$

	A	x	B	y	C	D	E
=							=QuadRe
1		-4		5		Title	Quadrat...
2		0		5		RegEqn	$a \cdot x^2 + b \dots$
3		-2		3		a	0.5
4						b	2.
5						c	5.
C5							

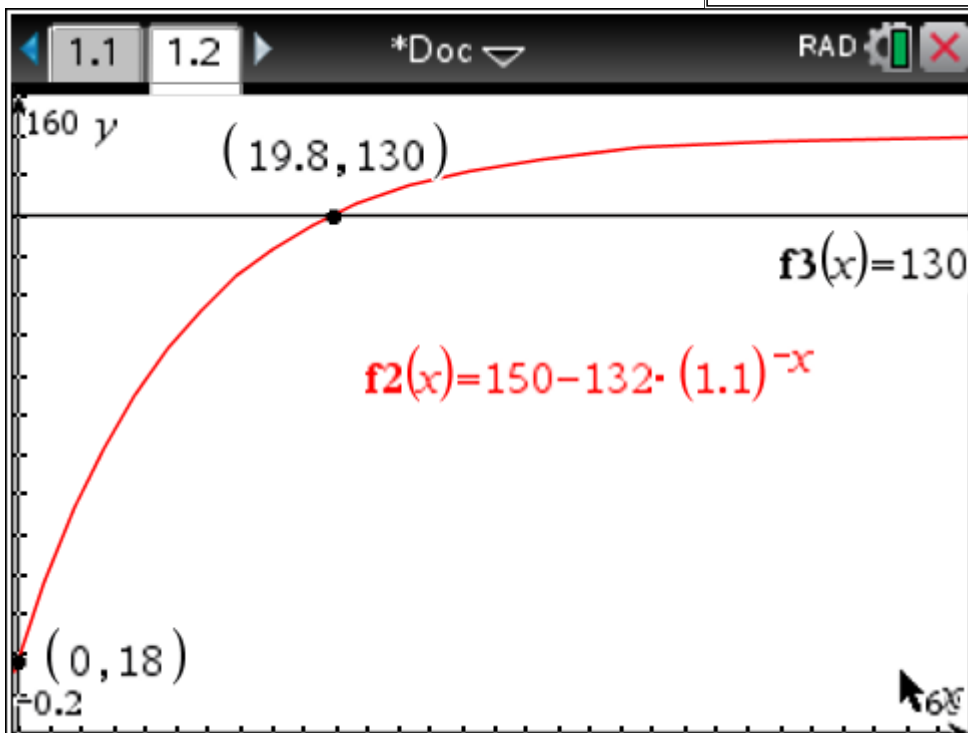
Check:



Question 12

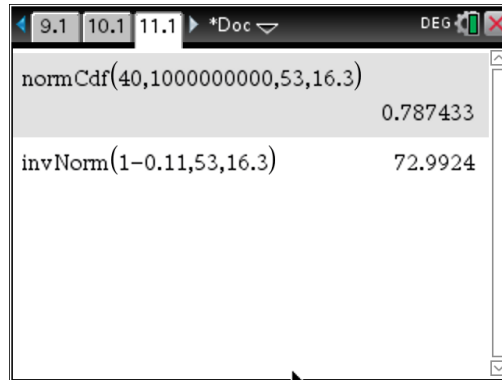
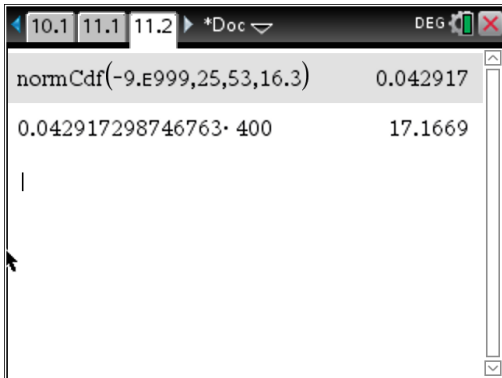
- (a) The oven's temperature is 150 degrees
 (b) $a = 132$
 (c) 34.8 minutes

Equation	Result
$\text{nSolve}(150 - a \cdot (1.1)^{-0} = 18, a)$	132.
$\text{nSolve}(150 - 132 \cdot (1.1)^{-t} = 130, t)$	19.7992
$19.799245504591 + 15$	34.7992

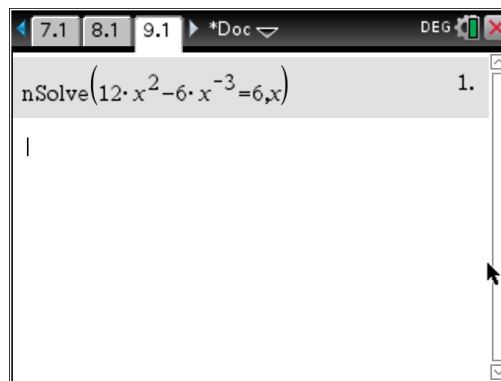
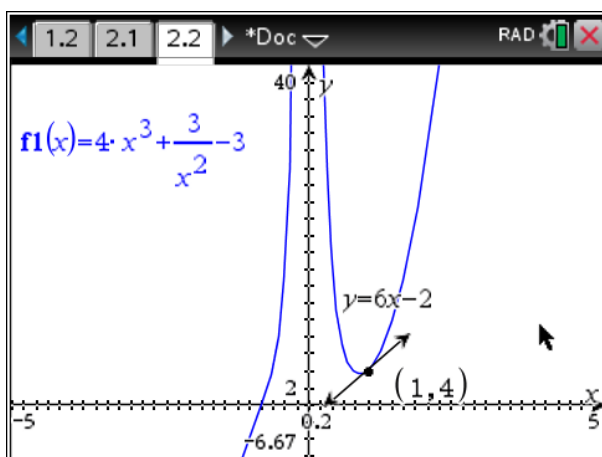


Question 13

- (a) 0.787
 (b) 73.0
 (c) 17 applicants

**Question 14**

- (a) $f'(x) = 12x^2 - 6x^{-3}$
 (b)
 $x = 1, y = 4$
 (1,4)

**Check:**

Question 15

- (a) 522 kg
- (b) $(882 - 45 \times 8) \times (8 - 6.8) = 626.40$
- (c) $W = (882 - 45p)(p - 6.80)$
- (d) $p = 13.2$

