# NORTH SYDNEY GIRLS HIGH SCHOOL

## 2009 Year 10 Yearly Examination

# Mathematics

Name:_____ Class: _____

Teacher:_____

**Time Allowed:** 2 hours + 5 minutes reading time

**Directions to Candidates:**

- Approved calculators may be used
- Answer Part A, the multiple choice questions, on the answer sheet provided.
- Answer Part B in the spaces provided
- For Part C, ***each*** question is to be started on a ***new page.***
- Attempt every question.
- Show all necessary working. Do not use correction tape or fluid.
- Marks may be deducted for incomplete or poorly arranged work.

**At the end of the examination, staple this question paper to the front of your solutions and submit one bundle.**

| | A | M | D | G | WM | Total |
|---|---|---|---|---|---|---|
| Part A | | | | | | /20 |
| Part B | | | | | | /13 |
| Part C Qu1 | /7 | /6 | | | | /13 |
| Part C Qu2 | /6 | | /7 | | | /13 |
| Part C Qu3 | /13 | | | | | /13 |
| Part C Qu4 | | | /6 | /9 | | /15 |
| Part C Qu5 | | | | | /13 | /13 |
| TOTAL | /26 | /6 | /13 | /9 | /13 | /100 |

**Part A: Multiple Choice (1 mark each)**

**Answer on the sheet provided by completely colouring the circle representing your answer. Use pencil only.**

1. Which of the following is greatest in value:

(A) $3^{-1}$ (B) $\sqrt{0 \cdot 1}$ (C) 33% (D) $3 \cdot 1 \times 10^{-1}$

2. If $2x + 7$ is the largest of three consecutive numbers, the smallest is:

(A) $2x + 4$ (B) $2x + 5$ (C) $2x + 1$ (D) $2x$

3. $-\left(2b^2\right)^4 =$

(A) $16b^8$ (B) $-8b^6$ (C) $8b^8$ (D) $-16b^8$

4. The surface area of a rectangular prism 12 cm by 10 cm by 8 cm is

(A) 960 $cm^2$ (B) 200 $cm^2$ (C) 592 $cm^2$ (D) 296 $cm^2$

5. The expression $\frac{m}{c}+\frac{r}{c}$ is equivalent to:

(A) $m + r$ (B) $\frac{m+r}{2c}$ (C) $\frac{mc+rc}{c}$ (D) $\frac{m+r}{c}$

6. If $x + 1$ is an even number then:

(A) $x + 2$ is even (B) $x$ is even

(C) $\frac{x+1}{2}$ is an integer (D) $x + 2$ is a multiple of 3

7. If 1 kilometre is approximately $\frac{5}{8}$ mile, what fraction of a kilometre is half a mile?

(A) $\frac{4}{5}$ (B) $\frac{5}{16}$ (C) $\frac{1}{4}$ (D) $1\frac{1}{4}$

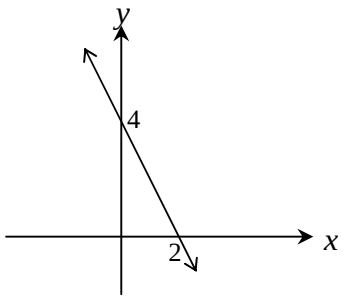
8. Which of the following is *not* linear?

(A) $y = 3$ (B) $y=\frac{1}{x}+2$ (C) $x + 2y - 3 = 0$ (D) $y=\frac{x}{2}+5$

9. Neema's coin collection appreciates at $3\frac{1}{4}\%$ per year. If it is worth \$3600 now, what will it be worth in 2 years time?

(A) \$3 369·80 (B) \$3 624 (C) \$3 837·80 (D) \$23 400

10. The equation of the line illustrated is:




(A) $y = -2x$
(B) $y = 4x - 2$
(C) $y = 4 - 2x$
(D) $y = 2x + 4$

11. Which line is parallel to $y = 2x - 3$?

(A) $4x - 2y + 5 = 0$ (B) $y = x - 3$

(C) $y + 2x - 3 = 0$ (D) $y = \frac{1}{2}x - 3$

12. Which of the following equations has the solutions 4 and $-3$?

(A) $x^2 + x - 12 = 0$ (B) $x^2 - 7x - 12 = 0$

(C) $x^2 - x - 12 = 0$ (D) $x^2 + 7x - 12 = 0$

13. Consider this solution of the equation $2g^2 + 8g + 1 = 0$. In which line does the first error occur?

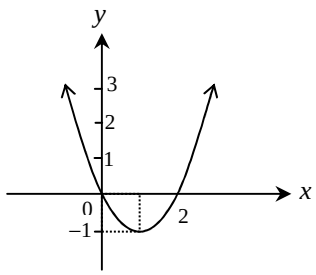
$g = -8 \pm \frac{\sqrt{8^2 - 4 \times 2 \times 1}}{2 \times 2}$ ….. Line 1

$g = -8 \pm \frac{\sqrt{56}}{4}$ ….. Line 2

$g = -8 \pm \frac{4\sqrt{14}}{4}$ ….. Line 3

$g = -8 \pm \sqrt{14}$ ….. Line 4

(A) Line 1 (B) Line 2 (C) Line 3 (D) Line 4

14. 


The diagram shows the graph of the function $y = (x-1)^2 + d$. If $d$ is an integer, then $d$ is equal to:

(A) $-2$
(B) $-1$
(C) $2$
(D) $1$

15. Two dice are rolled and the sum of the uppermost faces is calculated.
What is the probability of obtaining a total of 2 or 3 is:

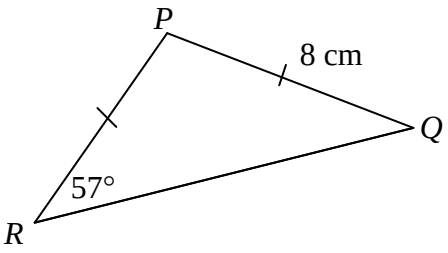
(A) $\frac{1}{12}$ (B) $\frac{1}{18}$ (C) $\frac{1}{6}$ (D) $\frac{1}{3}$

16.

| Age | Frequency |
|---|---|
| 14 | 5 |
| 15 | 4 |
| 16 | 1 |
| 17 | 6 |
| 18 | 4 |

The data in the table shows the ages of players in a cricket squad. If a new player aged 16 years joins the team, which of the following will change?

(A) range
(B) median
(C) mean
(D) mode

17. 


The area of $\Delta PQR$ in square centimetres is closest to:

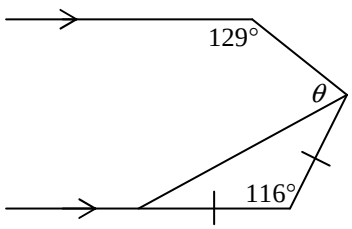
(A) 59
(B) 29
(C) 27
(D) 13

18. A car's fuel economy is stated as 13·5 L/100 km. If petrol costs 115·9 c/L, the fuel cost for a journey of 86 km is:

(A) \$7·38 (B) \$7·67 (C) \$13·46 (D) \$18·19

19. 0·000 38 in standard notation is:

(A) $3{\cdot}8 \times 10^{-5}$ (B) $38 \times 10^{-5}$ (C) $3{\cdot}8 \times 10^{-4}$ (D) $3{\cdot}8 \times 10^{4}$

20. 


The value of $\theta$ is:

(A) 33°
(B) 65°
(C) 83°
(D) 115°

**End of Part A**

**<u>Part B:</u> Write the answer only in the space provided. (1 mark each)**

(a) Write in expanded form: $(5a + 3)^2$

(b) Solve $(x-2)(2x+5)=0$

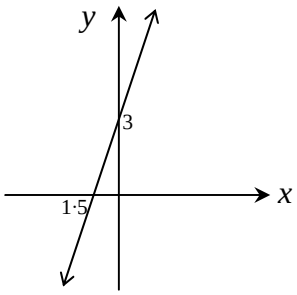
(c) Factorise: (i) $25x^2-9$

(ii) $2x^2+7x-15$

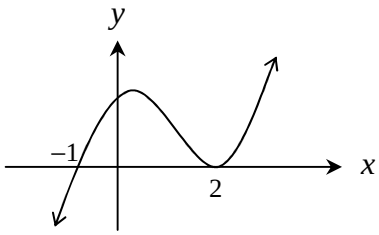
(d) Simplify $\sqrt{12}+\sqrt{27}$

(e) Write $\frac{2}{\sqrt{3}}$ with a rational denominator

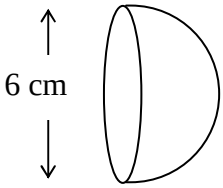
(f) Shade the region for which $y \geq 2x + 3$.




(g) Write down in factored form, an equation which can be represented by this graph.



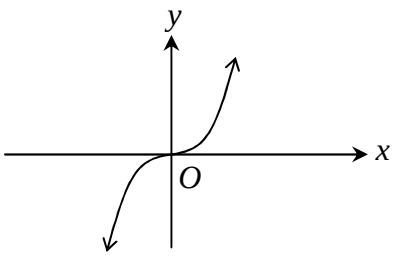

(h) Find the volume of this hemisphere, leaving your answer in terms of $\pi$.




(i) The probability of getting the measles as a teenager is 0·018. How many of 700 000 teenagers will *not* be expected to contract measles?

(j) At a "25% off" sale, goods were sold for \$36. What was the price of the goods before the sale?

(k) The graph of $y = x^3$ is illustrated.
On the same axes, draw the graph of $y=(x+2)^3$.




(l) Solve the equation $3^{2-x}=9^x$.

**End of Part B**

**Part C:**
**Use the examination pad provided.**
**Start each question on a new page.**
**Show all working.**

**Question 1: (13 marks)** **Marks**

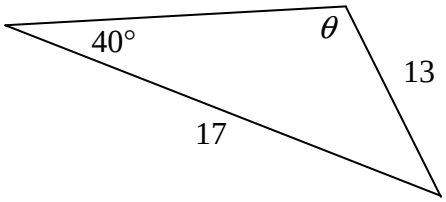
(a) Using $u = \sqrt{x} - 1$, solve **3**

$$\left(\sqrt{x} - 1\right)^2 - 8\left(\sqrt{x} - 1\right) + 12 = 0$$

(b) (i) If *k* is a positive integer, write down an expression in terms of *k* which will always generate odd numbers. **1**

(ii) Hence show that $n^2 - 1$ is a multiple of 8 for all odd values numbers *n*. **3**

(c) Find the value of $\theta$ correct to the nearest minute. **3**




(d) Sandra delivers mail to remote communities. She flies due east for 15 km and then turns on a bearing of 312° and flies a further 28 km. She then flies directly back to the starting point of the trip.

(i) Draw a diagram illustrating the trip. **1**

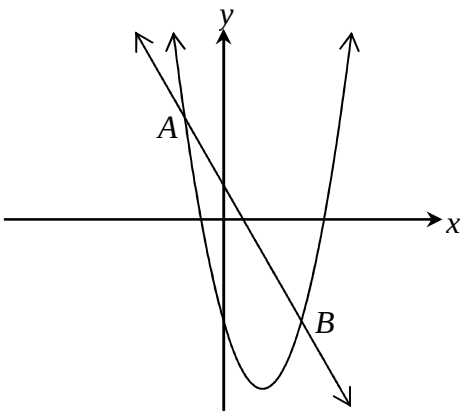
(ii) What was the distance Sandra flew on the final leg of the journey? Give your answer correct to 2 significant figures. **2**

**Question 2: (13 marks) Start a new page** **Marks**

(a) Draw a neat sketch of the following, showing the main features.
Include any intercepts and asymptotes.

$$y = 3 + \frac{2}{x+1}$$ **3**

(b) On the diagram below the graphs of $y = 2x^2 - 4x - 3$ and $y = 1 - 2x$ are drawn. **3**
Their points of intersection are labelled *A* and *B*.
Solve a pair of simultaneous equations to find the coordinates of *A* and *B*.




(c) A child has pulled off the labels from 6 cans on a pantry shelf.
Mum knew there were 2 cans of corn, 1 can of beans and 3 cans of soup.
She now takes 2 cans from the shelf and opens them.

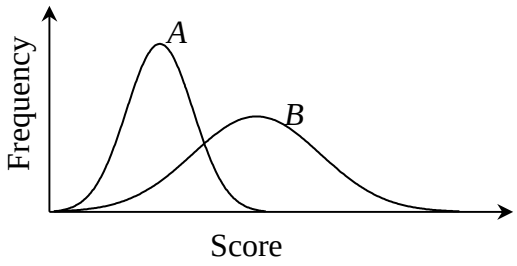
(i) Draw a diagram for the two can selection sequence. Label each branch of the diagram with the appropriate probability. **1**

(ii) What is the probability that Mum selects:

($\alpha$) a can of soup and a can of corn? **2**

($\beta$) exactly one can of soup? **2**

(d) The graph shows the frequency curves for two sets of test results, *A* and *B*. **2**
Write a statement comparing the means and standard deviations of both sets of results.



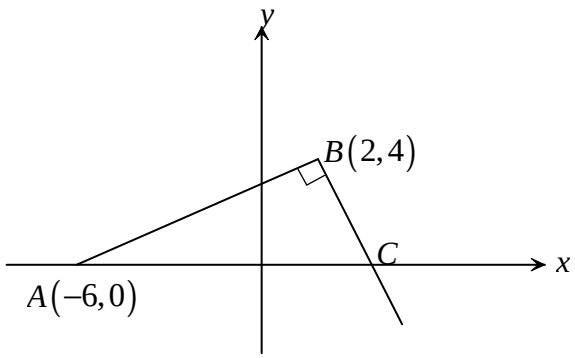
**Question 3: (13 marks) Start a new page** **Marks**

(a) Consider the formula $\frac{n+t}{3}=\frac{n-x}{y}$.

(i) Make $n$ the subject of the formula. **2**

(ii) State any restrictions which may apply to the variables. **2**

(b) The diagram above illustrates the points $A(-6,0)$ and $B(2,4)$.
The line $BC$ is perpendicular to the line $AB$ and the point $C$ lies on the $x$-axis.




(i) Find the gradient of $AB$. **1**

(ii) Write down the gradient of $BC$. **1**

(iii) Show that the equation of $BC$ is $2x+y-8=0$. **2**

(iv) Find the coordinates of $C$. **1**

(v) Find the area of triangle $ABC$. **2**

(vi) Find the equation of the circle with diameter $AC$. **2**

**Question 4: (15 marks) Start a new page** **Marks**

(a) In a trial, 200 patients chosen at random, were given a blood test for liver disease. Some were suffering from the disease and some were not. The results of the test are shown in the two-way table below. A positive test result indicates that a person has liver disease even if they do not.

| | Test Results | | |
|---|---|---|---|
| | Accurate | Not Accurate | Total |
| Patients with the disease | 13 | 3 | 16 |
| Patients without the disease | 144 | 40 **(A)** | 184 |
| Total | 157 | 43 | 200 |

(i) Explain the meaning of the value labelled **A**. **1**

(ii) What percentage of test results are accurate? **1**

(iii) How many patients had a negative test result? **1**

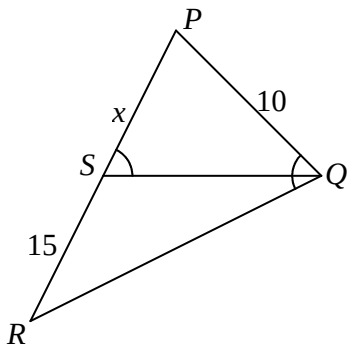
(iv) What is the probability that a patient with a positive test result, selected at random, actually has liver disease? **1**

(b) The following statistics were obtained from Year 10 Science and English tests. **2**

| Subject | Mean | Standard deviation |
|---|---|---|
| English | 60 | 6 |
| Science | 70 | 8 |

What mark in Science would be equivalent to a mark of 72 in English?

(c) In the diagram $\angle PQR = \angle PSQ$, $PQ$ = 10 units, $RS$ = 15 units and $PS = x$ units.




(i) Copy the diagram onto your examination pad.

(ii) Prove that $\Delta PQR$ is similar to $\Delta PSQ$. **3**

(iii) Explain why $\frac{x+15}{10} = \frac{10}{x}$. **1**

(iv) Hence find the value of $x$. **3**

(v) If the area of $\Delta PSQ$ is $k$ square units, find the area of $\Delta RSQ$ in terms of $k$. **2**

**Question 5: (13 marks) Start a new page** **Marks**

(a) (i) Simplify $\frac{1}{n}-\frac{1}{n+1}$. **1**

(ii) Hence, using the above result, evaluate the following sum **2**

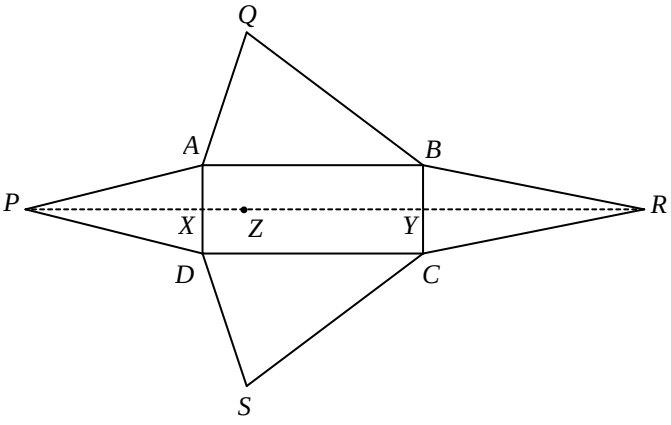
$$\frac{1}{1\times 2}+\frac{1}{2\times 3}+\frac{1}{3\times 4}+...+\frac{1}{100\times 101}$$

(b) Evelyn has been investing her money for 5 years. Initially her investment was earning interest at 9% per annum compounded monthly. From the start of the global financial crisis 18 months ago, her investment began to lose value at 15% per annum each month.

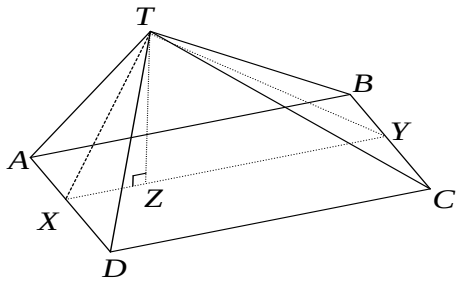
(i) If Evelyn initially invested \$*P*, what was the value of her portfolio immediately before the global financial crisis? Give your answer in unsimplified form in terms of *P*. **1**

(ii) Evelyn's investment portfolio is now worth \$10 000. What was the amount of her original investment? **2**

(c) The figure shows the net of a pyramid with a rectangular base.
In this figure, *PXZYR* is a straight line, *PX* = 15 cm, *RY* = 20 cm, *AB* = 25 cm and *BC* = 10 cm. Further, *AP* = *PD* and *BR* = *RC*.




When the net is folded, points *P*, *Q*, *R* and *S* all meet at *T*, which lies vertically above the point *Z* in the horizontal base, as shown below.




(i) Show that $\Delta TXY$ is right-angled. **1**

(ii) By considering the value of $\sin \angle TXY$ or otherwise, show that *T* is 12 cm above the base. **2**

(iii) Find the volume of the pyramid. **2**

(iv) Find the angle that the face *DCT* makes with the base. **2**

**End of Paper**

Name:_____ Class: _____

**<u>Part A:</u> Multiple choice answer sheet.**

**Completely colour the circle representing your answer. Use pencil only.**

1. Ⓐ Ⓑ Ⓒ Ⓓ
2. Ⓐ Ⓑ Ⓒ Ⓓ
3. Ⓐ Ⓑ Ⓒ Ⓓ
4. Ⓐ Ⓑ Ⓒ Ⓓ
5. Ⓐ Ⓑ Ⓒ Ⓓ
6. Ⓐ Ⓑ Ⓒ Ⓓ
7. Ⓐ Ⓑ Ⓒ Ⓓ
8. Ⓐ Ⓑ Ⓒ Ⓓ
9. Ⓐ Ⓑ Ⓒ Ⓓ
10 Ⓐ Ⓑ Ⓒ Ⓓ
11. Ⓐ Ⓑ Ⓒ Ⓓ
12. Ⓐ Ⓑ Ⓒ Ⓓ
13. Ⓐ Ⓑ Ⓒ Ⓓ
14. Ⓐ Ⓑ Ⓒ Ⓓ
15. Ⓐ Ⓑ Ⓒ Ⓓ
16. Ⓐ Ⓑ Ⓒ Ⓓ
17. Ⓐ Ⓑ Ⓒ Ⓓ
18. Ⓐ Ⓑ Ⓒ Ⓓ
19. Ⓐ Ⓑ Ⓒ Ⓓ
20. Ⓐ Ⓑ Ⓒ Ⓓ

## 2009 Year 10 Yearly Examination

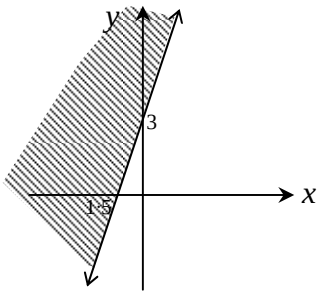
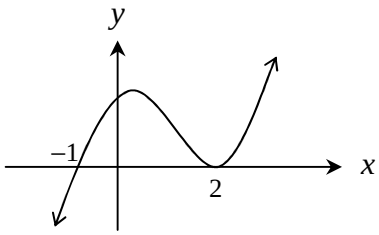
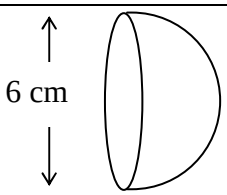
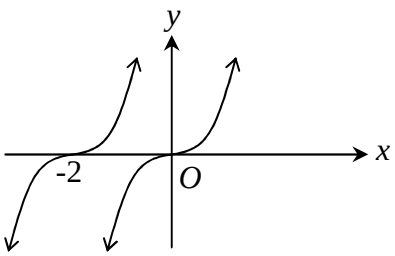
# Mathematics

Name: Solutions

**Part A:**

1. (A) B C D
2. A (B) C D
3. A B C (D)
4. A B (C) D
5. A B C (D)
6. A B (C) D
7. (A) B C D
8. A (B) C D
9. A B (C) D
10. A B (C) D
11. (A) B C D
12. A B (C) D
13. (A) B C D
14. A (B) C D
15. (A) B C D
16. A (B) C D
17. A (B) C D
18. A B (C) D
19. A B (C) D
20. A B (C) D

**<u>Part B:</u> Write the answer only in the space provided. (1 mark each)**

| | | |
|---|---|---|
| (a) | Write in expanded form: $(5a + 3)^2$ | $25a^2 + 30a + 9$ |
| (b) | Solve $(x-2)(2x+5)=0$ | $x = 2, -2\cdot 5$ |
| (c) | Factorise: (i) $25x^2 - 9$ | $(5x-3)(5x+3)$ |
| | (ii) $2x^2 + 7x - 15$ | $(2x-3)(x+5)$ |
| (d) | Simplify $\sqrt{12} + \sqrt{27}$ | $5\sqrt{3}$ |
| (e) | Write $\frac{2}{\sqrt{3}}$ with a rational denominator | $\frac{2\sqrt{3}}{3}$ |
| (f) | Shade the region for which $y \geq 2x + 3$. |   |
| (g) | Write down in factored form, an equation which can be represented by this graph.   | $y = (x+1)(x-2)^2$ |
| (h) | Find the volume of this hemisphere, leaving your answer in terms of $\pi$.   | $18\pi\,\text{cm}^3$ |
| (i) | The probability of getting the measles as a teenager is 0·018. How many of 700 000 teenagers will *not* be expected to contract measles? | 687 400 |
| (j) | At a "25% off" sale, goods were sold for \$36. What was the price of the goods before the sale? | \$48 |
| (k) | The graph of $y = x^3$ is illustrated. On the same axes, draw the graph of $y = (x+2)^3$.   | |
| (l) | Solve the equation $3^{2-x} = 9^x$. | $x = \frac{2}{3}$ |

**End of Part B**

**Part C:**

**Question 1:**

(a) $\left(\sqrt{x}-1\right)^2-8\left(\sqrt{x}-1\right)+12=0$ using $u=\sqrt{x}-1$

$$u^2-8u+12=0$$
$$(u-2)(u-6)=0$$
$$u=2,6$$

$\therefore \sqrt{x}-1=2$ or $\sqrt{x}-1=6$

$\sqrt{x}=3$ $\sqrt{x}=7$

$\therefore$ $x=9$ or 49

(b) (i) $n=2k+1$ or $n=2k-1$

(ii) $n^2-1=(2k+1)^2-1$ if $n$ is odd

$$=4k^2+4k+1-1$$
$$=4k^2+4k$$
$$=4k(k+1)$$

Now either $k$ or $k+1$ will be even

$\therefore$ let $k(k+1)=2m$ for some integer $m$

$\therefore n^2-1=4k(k+1)$

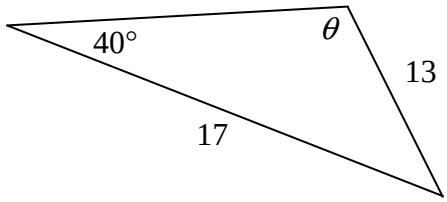
$$=4(2m)$$
$$=8m$$

Which is a multiple of 8.

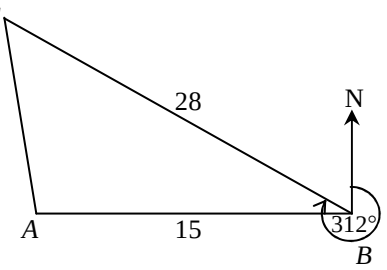
(c) $\dfrac{\sin\theta}{17}=\dfrac{\sin 40^\circ}{13}$ by the sin rule

$$\sin\theta=\frac{17\sin 40^\circ}{13}$$
$$=0\cdot 8405...$$
$\theta=57\cdot 200...^\circ$ or $122\cdot 7998...^\circ$

$=57^\circ 12'$ or $122^\circ 48'$ to the nearest minute




(d) (i)



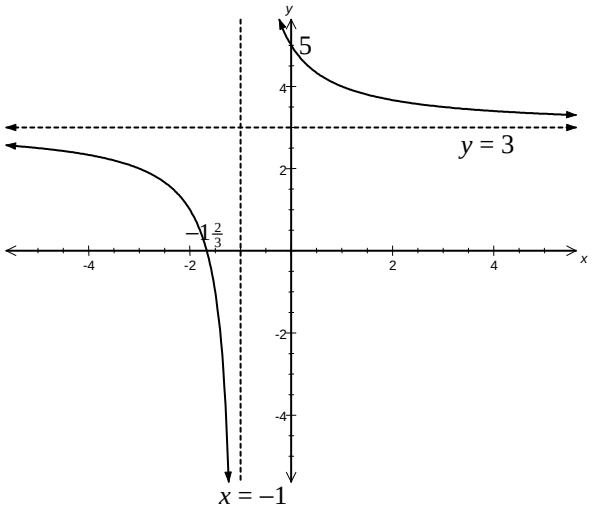

(ii) $\angle ABC=312^\circ-270^\circ=42^\circ$

$$AC^2=15^2+28^2-2\times 15\times 28\times\cos 42^\circ$$
$$=384\cdot 758...$$
$$AC=\sqrt{384\cdot 758...}$$
$$=19\cdot 615...$$

$\therefore$ she flew 20 km (to 2 sig fig)

**Question 2:**

(a)




$$y = 3 + \frac{2}{x+1}$$

(b) $y = 2x^2 - 4x - 3$ ……①

$y = 1 - 2x$ ……②

Sub ① into ②: $2x^2 - 4x - 3 = 1 - 2x$

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

$$x^2 - x - 2 = 0$$

$$(x-2)(x+1) = 0$$

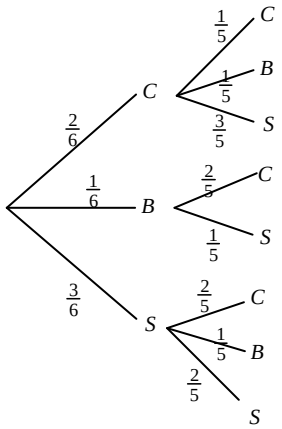
$$x = 2, -1$$

Sub into ②: $x = 2$: $y = 1 - 2(2) = -3$

$x = -1$: $y = 1 - 2(-1) = 3$

$\therefore A = (-1, 3)$ and $B = (2, -3)$

(c) (i)




(ii) ($\alpha$) $P(CS) = \frac{2}{6} \times \frac{3}{5} + \frac{3}{6} \times \frac{2}{5}$

$$= \frac{2}{5}$$

($\beta$) $P(\text{exactly 1 } S)$

$$= \frac{2}{6} \times \frac{3}{5} + \frac{1}{6} \times \frac{3}{5} + \frac{3}{6} \times \frac{2}{5} + \frac{3}{6} \times \frac{1}{5}$$

$$= \frac{3}{5}$$

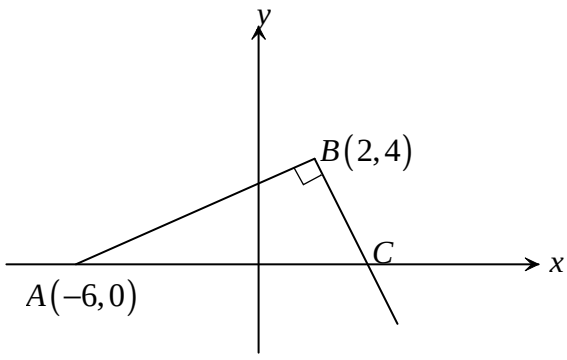
(d) *A* has a lower mean than *B* and *B* has a greater standard deviation than *A*.

**Question 3:**

(a) (i)
$$\frac{n+t}{3}=\frac{n-x}{y}$$
$$y(n+t)=3(n-x)$$
$$yn+yt=3n-3x$$
$$yn-3n=-3x-yt$$
$$n(y-3)=-3x-yt$$
$$n=\frac{-3x-yt}{y-3}$$
$$n=\frac{3x+yt}{3-y}$$

(ii) $y \neq 0;\ y \neq 3$

(b) (i)
$$m_{AB}=\frac{4-0}{2-(-6)}$$
$$=\frac{1}{2}$$




(ii) $m_{BC}=-2$

(iii) $y-4=-2(x-2)$
$$y=-2x+8$$
$$\therefore\ 2x+y-8=0$$

(iv) At $C$, $y=0$: $2x-8=0$
$$x=4$$
$$\therefore C=(4,0)$$

(v) $AC = 10$ and is the base; $B$ is 4 above the $x$-axis
$$A=\frac{1}{2}(10)(4)$$
$$=20$$
$\therefore$ Area $\Delta ABC$ is 20 unit$^2$

(vi) $AC = 10\ \therefore\ r = 5$
$$M_{AC}=(-1,0)$$
$\therefore$ equation of the circle is $(x+1)^2+y^2=25$

**Question 4: (15 marks) Start a new page** **Marks**

(a) (i) **A** is the number of patients for whom the test indicated that they had liver disease when they really did not.

(ii) $\%\text{ accurate } = \frac{157}{200} \times 100\%$

$= 78{\cdot}5\%$

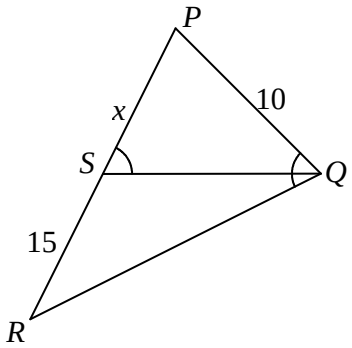
(iii) Patients with a negative test result = 3 + 144 = 147

(iv) Patients with a positive test result = 13 + 40 = 53

$$P(\text{positive test result with the disease}) = \frac{13}{53}$$

(b) In English, $72 = 60 + 2 \times 6$
That is, the English mark is 2 standard deviations above the mean
$\therefore$ The equivalent mark in Science is $70 + 2 \times 8 = 86$

(c) (i)




(ii) In $\Delta PQR$ and $\Delta PSQ$
1. $\angle PQR = \angle PSQ$ (given)
2. $\angle P$ is common
$\therefore \Delta PQR \,|||\, \Delta PSQ$ (equiangular)

(iii) $\frac{PQ}{PS} = \frac{QR}{SQ} = \frac{PR}{PQ}$ (corresponding sides of similar triangles)

$\therefore \frac{10}{x} = \frac{x+15}{10}$

i.e. $\frac{x+15}{10} = \frac{10}{x}$ as required

(iv) $100 = x^2 + 15x$

$x^2 + 15x - 100 = 0$

$(x+20)(x-5) = 0$

$x = -20$ or $5$

But $x > 0$ $\therefore x = 5$

(v) Area of $\Delta PSQ = k$ square units
Ratio of sides of $\Delta PQR$ : sides of $\Delta PSQ = 10 : 5$
$= 2 : 1$
$\therefore$ Ratio of area of $\Delta PQR$ : area of $\Delta PSQ = 4 : 1$
$\therefore$ area of $\Delta PQR = 4k$
By subtraction, area of $\Delta PSQ = 3k$ square units

**Question 5:**

(a) (i)
$$\frac{1}{n}-\frac{1}{n+1}=\frac{n+1-n}{n(n+1)}$$
$$=\frac{1}{n(n+1)}$$

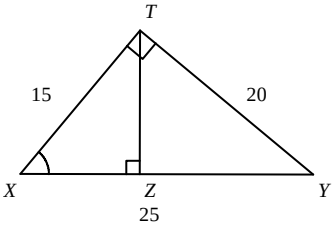
(ii)
$$\frac{1}{1\times 2}+\frac{1}{2\times 3}+\frac{1}{3\times 4}+\ldots+\frac{1}{100\times 101}$$
$$=\left(\frac{1}{1}-\frac{1}{2}\right)+\left(\frac{1}{2}-\frac{1}{3}\right)+\left(\frac{1}{3}-\frac{1}{4}\right)+\ldots+\left(\frac{1}{99}-\frac{1}{100}\right)+\left(\frac{1}{100}-\frac{1}{101}\right)$$
$$=1-\frac{1}{2}+\frac{1}{2}-\frac{1}{3}+\frac{1}{3}-\frac{1}{4}+\ldots+\frac{1}{99}-\frac{1}{100}+\frac{1}{100}-\frac{1}{101}$$
$$=1-\frac{1}{101}$$
$$=\frac{100}{101}$$

(b) (i) Months investing before the crisis = 60 – 18 = 42
9% pa = 0·75% per month
Value before crisis = $P(1+0\cdot 75\%)^{42}$
$$=P(1\cdot 0075)^{42}$$

(ii) 15% pa = 1·25% per month
Value after crisis = $P(1\cdot 0075)^{42}(1-1\cdot 25\%)^{18}$
$$\therefore P(1.0075)^{42}(0\cdot 9875)^{18}=10\,000$$
$$P=\frac{10\,000}{(1.0075)^{42}(0\cdot 9875)^{18}}$$
$$=9163\cdot 045...$$
Evelyn's original investment was approximately \$9 163.

(c) (i) $PX = 15$, $XY = AB = 25$, $YR = 20$
$$15^2+20^2=625$$
$$=25^2$$
$\therefore \Delta TXY$ is right-angled by the converse of Pythagoras theorem

(ii)

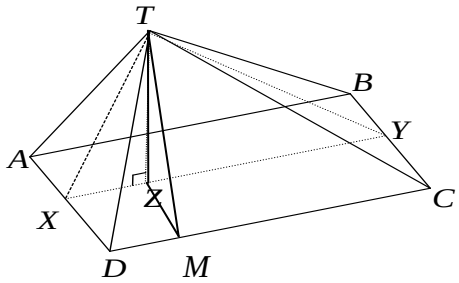



$$\sin\angle TXY=\frac{20}{25}=\frac{4}{5} \text{ in } \Delta XYT$$

In $\Delta XZT$: $\sin \angle TXZ = \dfrac{TZ}{15}$

$$TZ = 15\sin \angle TXZ$$
$$= 15 \times \frac{4}{5}$$
$$= 12$$

$\therefore$ $T$ is 12 cm above the base.




(iii) $V = \dfrac{1}{3}Ah$

$$V = \frac{1}{3} \times 12 \times 10 \times 25$$
$$= 1000$$

$\therefore$ the volume of the pyramid is 1000 $cm^3$

(iv) The angle that the face $DCT$ makes with the base is $\angle TMZ$

$\Delta TMZ$ is right-angled at $Z$ and $ZM = XD = 5$ also $TZ = 12$

$\therefore \tan \angle TMZ = \dfrac{12}{5}$

$\therefore$ $\angle TMZ = 67°23'$ correct to the nearest minute

**End of Solutions**