NAME MASTER

SYDNEY GRAMMAR SCHOOL

2016 Annual Examination

FORM III

MATHEMATICS

Thursday 27th October 2016

General Instructions

- Writing time — 2 hours
- Write using black pen.
- Board-approved calculators and templates may be used.

Total — 104 Marks

- All questions may be attempted.
- All necessary working should be shown.
- Start each question on a new page.

Collection

- Write your name, class and Master on each page of your answers.
- Staple your answers in a single bundle.
- Write your name, class and Master on this question paper and hand it in with your answers.

3A: LRP	3B: LYL	3C: WJM	3D: SJE
3E: DWH/BR	3F: RCF	3G: SDP	3H: FMW/DNW
3I: PKH	3J: REJ		

Checklist

- Writing paper required.
- Candidature — 180 boys

Examiner

SDP

QUESTION ONE (13 marks) Start a new page.

(a) Simplify $7p - 4p$.

(b) Solve $x + 4 = 13$.

(c) Simplify $b^8 \div b^3$.

(d) Factorise:

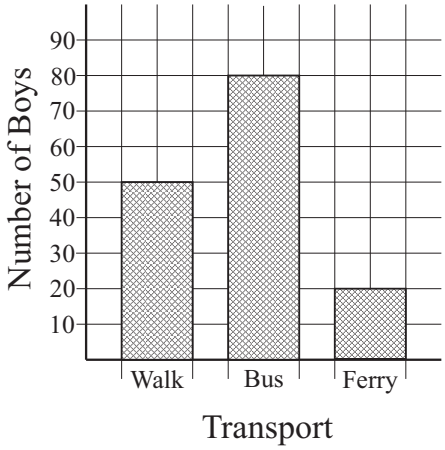
(i) $8x + 6$

(ii) $a^2 + 2a$

(e) Convert $2\,\text{m}^2$ to square centimetres.

(f) Solve $(x - 2)(x + 3) = 0$.

(g)



The column graph above shows the methods of transport used by boys to travel to school. How many boys walk to school?

(h) Write down the name of a parallelogram with four equal sides.

(i) Simplify $2\sqrt{5} - 3\sqrt{5}$.

(j) Given $\sin\theta = \dfrac{1}{2}$ and θ is acute, find θ.

(k) Find the midpoint M of $P(2, 7)$ and $Q(4, 13)$.

(l) Find the mode of the following data: $0, 4, 3, 5, 4, 2, 1, 0, 4, 3, 7$.

Examination continues next page ...

QUESTION TWO (13 marks) Start a new page.

(a) Simplify $\sqrt{50}$.

(b) Sam has \$80 in his wallet and spends 15% of this on chocolate. How much money does he spend on chocolate?

(c) Solve the pair of simultaneous equations by substitution:

$$2x + y = 30$$
$$y = 3x$$

(d) Find the area of a rhombus with diagonals measuring 3 cm and 6 cm.

(e) Factorise $x^2 + 3x + 2$.

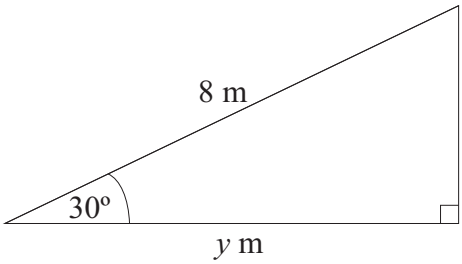
(f) The following test results were recorded:

46 67 34 94 35 63 53

(i) Find the mean.

(ii) Find the median.

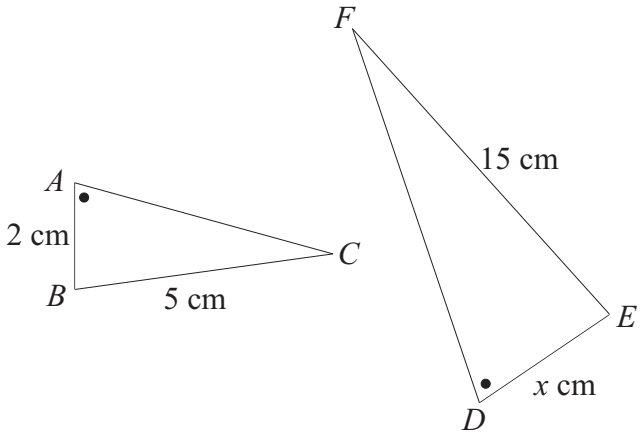
(g)



Find the value of y in the diagram above. Give your answer correct to two decimal places.

(h) Express 7 out of 23 as a percentage. Give your answer correct to one decimal place.

(i)



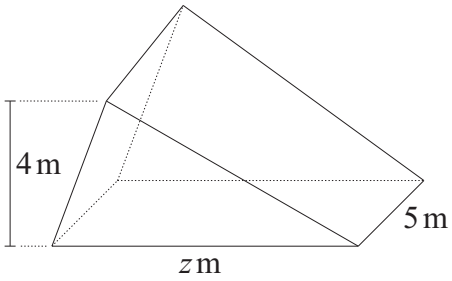
In the diagram above, $AB = 2$ cm, $BC = 5$ cm and $EF = 15$ cm.
Given that $\triangle ABC \,|||\, \triangle DEF$, find the value of x. Clearly state your reasoning.

Examination continues overleaf ...

QUESTION THREE (13 marks) Start a new page.

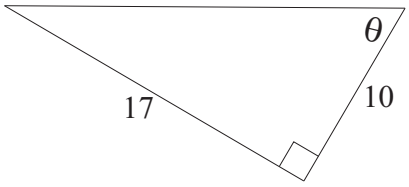
(a) Solve $-3(x+2) \leq 33$.

(b)



In the diagram above, the depth of the prism is 5 m, the perpendicular height of the triangular cross section is 4 m and the volume of the prism is $60\,\text{m}^3$. Find the length z.

(c)



In the diagram above, find the value of θ. Give your answer correct to the nearest degree.

(d) Simplify:

(i) $5a^6b^4 \times 3ab^{-1}$

(ii) $\left(\dfrac{2}{3}\right)^{-2}$

(e) Solve $x^2 + 5x - 14 = 0$.

(f) Find the distance between the points $A(4, 7)$ and $B(12, 13)$.

(g) Solve the following simultaneous equations by elimination:

$$5x + y = 30$$
$$2x - y = 19$$

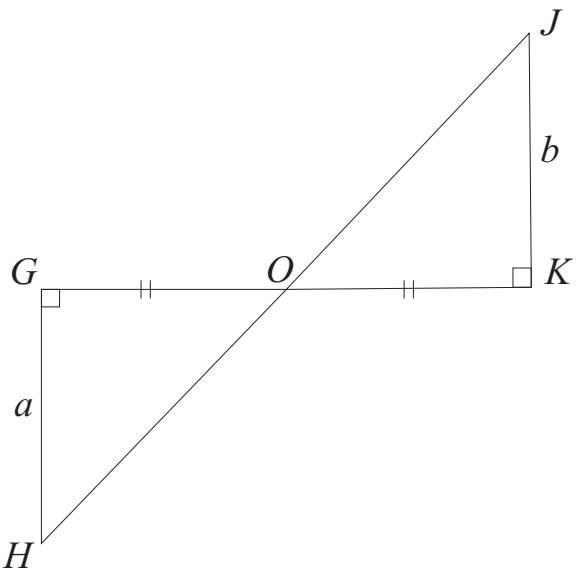
Examination continues next page ...

QUESTION FOUR (13 marks) Start a new page.

(a) Express $\dfrac{1}{\sqrt{3}-1}$ with a rational denominator.

(b) Expand and simplify $(3a-2b)(8b-5a)$.

(c)



In the diagram above, $OG = OK$ and $\angle HGO = \angle JKO = 90^\circ$.

(i) Prove that $\triangle OGH \equiv \triangle OKJ$, giving clear geometric reasons.

(ii) Hence give a reason why $a = b$.

(d) Solve $3x^2 + 20x + 12 = 0$.

(e) (i) Find the gradient of the line that passes through the points $R(-3, 10)$ and $S(2, -8)$.

(ii) Hence find the equation of the line RS, in gradient-intercept form.

(f) The population of koalas in Redland fell by 13% in 2015. By the end of 2016, the population had risen to return to the same number as the beginning of 2015. What was the percentage increase in 2016? Give your answer correct to two decimal places.

Examination continues overleaf ...

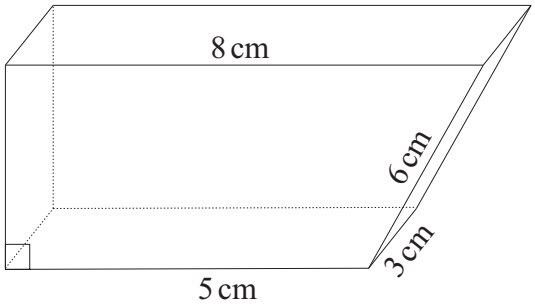
QUESTION FIVE (13 marks) Start a new page.

(a) Sketch the graph of $y = 2x + 1$ and state the x-intercept.

(b) Factorise fully $a^2 - 2a - ba + 2b$.

(c) The mean height of 10 boys in a soccer team is 160 cm. The goalkeeper's height is then recorded and this increases the mean by 2 cm. What is the height of the goalkeeper?

(d)



Find the exact volume of the above trapezoidal prism. Give your answer in simplified form.

(e) Tom walks from A at a bearing of 135°T for 40 km until he reaches B . Tom stops at B and walks north to C which is directly east of A.

(i) By drawing a diagram to represent this information, find $\angle CAB$.

(ii) Find the exact distance Tom walked from B to C.

(f) Simplify $\dfrac{2a-4}{5(a+3)} \div \dfrac{a^2-a-2}{25}$.

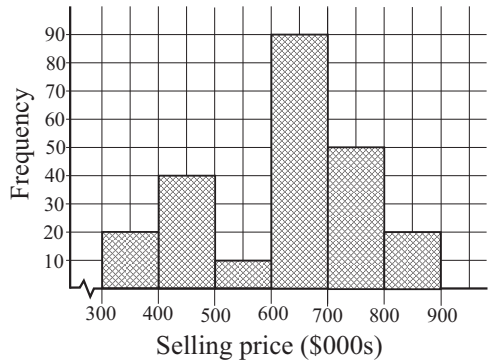
(g) Two lines have equations $kx + y = 2$ and $3x + 8y = 15$. Find the value of k if the lines do not intersect.

Examination continues next page ...

QUESTION SIX (13 marks) Start a new page.

(a) Given that the prefix 'tera' corresponds to 10^{12} and 'kilo' corresponds to 10^3, convert 23 kilolitres to teralitres. Express your answer in scientific notation.

(b)



The above frequency histogram shows the number of houses sold last weekend and their sale price (e.g. the first bar represents 20 houses sold for \$300 000-\$399 999).

(i) Find the percentage of houses that were sold for under \$500 000. Give your answer to the nearest whole percent.

(ii) Calculate the minimum total value that all of the houses together could have sold for last weekend.

(c) Solve the following simultaneous equations:

$$3x + 5y = -2$$
$$5x + 7y = -4$$

(d) The following table shows the current Australian tax rates for individuals.

Taxable income	Tax on this income
\$0 – \$18 200	Nil
\$18 201 – \$37 000	19c for each \$1 over \$18 200
\$37 001 – \$87 000	\$3572 plus 32.5c for each \$1 over \$37 000
\$87 001 – \$180 000	\$19 822 plus 37c for each \$1 over \$87 000
\$180 001 and over	\$54 232 plus 45c for each \$1 over \$180 000

Use the above information to calculate how much tax you would expect to pay if you earn \$92 000.

(e) Solve $x^2 + 6x + 7 = 0$ by completing the square. Give any answers in exact form.

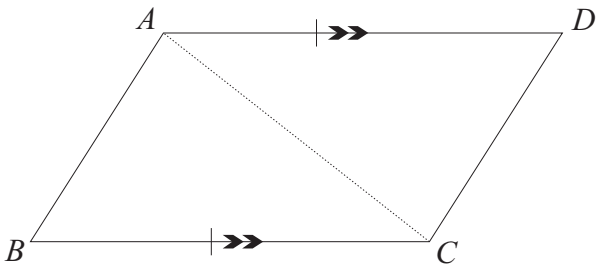
Examination continues overleaf ...

QUESTION SEVEN (13 marks) Start a new page.

(a) Expand and simplify $(a^2 - 2a + 4)(a^2 + 2a - 4)$.

(b) Joe stands at the top of a building x metres away from the Sydney Tower. He observes an angle of elevation θ to the top of Sydney Tower and an angle of depression α to its base. Find the total height of the Sydney Tower in terms of x, θ and α.

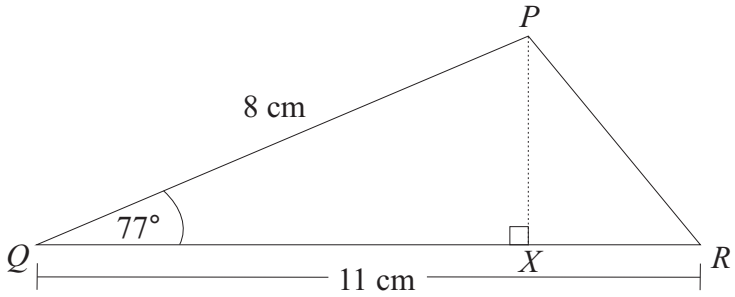
(c)



Use congruence to prove $\triangle ACB \equiv \triangle CAD$ and hence prove $ABCD$ is a parallelogram.

(d) The surface area of a closed cylinder is $60\pi\,\text{cm}^2$. The diameter of the cylinder is 4 times the height. By letting the height be $h\,\text{cm}$, find the exact height of the cylinder.

(e)



Find the area of the triangle above. Give your answer correct to one decimal place.

(f) Solve $\dfrac{1}{3x+4} = \dfrac{2x+1}{8x^2+11x-4}$.

Examination continues next page ...

QUESTION EIGHT (13 marks) Start a new page.

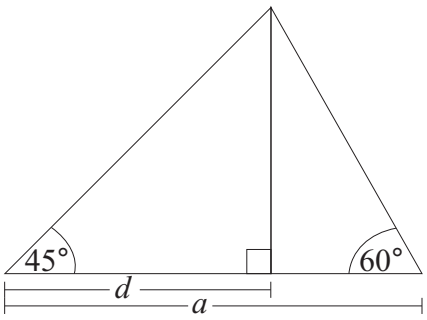
(a) Paint can be purchased at \$10 per litre. Once applied to a surface the paint is consistently 0·1 mm thick.

(i) Find the area that can be painted with one litre of paint. Give your answer in square metres.

(ii) Once built, the Tesla Gigafactory will have a floor area of 125 ha. Find the cost of paint needed to cover the floor of the Tesla Gigafactory.

(b) By completing the square, prove that $x^2 - 7x + 13$ is positive, for all values of x.

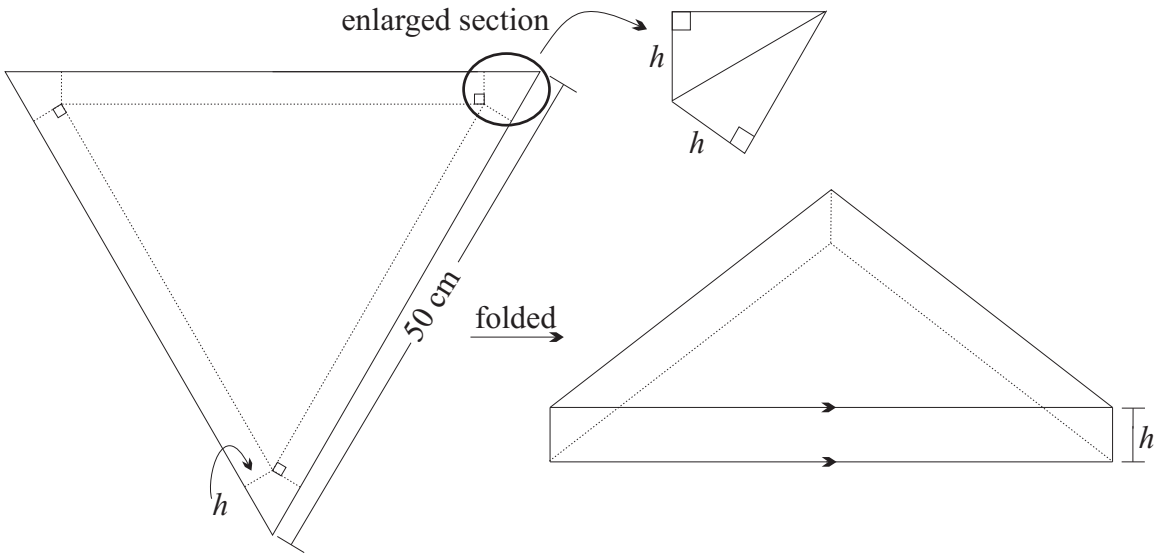
(c)



In the diagram above, find the exact value of a in terms of d, rationalising the denominator where necessary.

(d) Sophie drove 980 km directly from Sydney to Brisbane on Monday at a constant speed. On Tuesday, she drove directly back on the same route 10 km/h faster. This journey was quicker by 2 hours and 20 minutes. At what speed did she drive on Monday?

(e)



A piece of paper in the shape of an equilateral triangle with side length 50 cm is shown above. Folds of width h are made parallel to the sides and equal kites (as shown above) are cut out of the corners to make an open box. Find the formula for the exact volume of the box, in terms of h.

END OF EXAMINATION

Form III 2016 Annual Solutions

Question One

a) $3p$ ✓

b) $x = 9$ ✓

c) b^5 ✓

di) $2(4x+3)$ ✓

ii) $a(a+2)$ ✓

e) $20,000\ cm^2$ ✓

f) $x = 2$ or $x = -3$ ✓ (must be both)

g) 50 ✓

h) Rhombus or Square ✓ (only one needed)

i) $-\sqrt{5}$ ✓ (allow $-1\sqrt{3}$)

j) $\theta = 30°$ ✓

k) $M = \left(\frac{2+4}{2}, \frac{7+13}{2}\right)$

$= (3, 10)$ ✓

l) 4 ✓

Question Two

a) $\sqrt{50} = \sqrt{25} \times \sqrt{2}$

$= 5\sqrt{2}$ ✓

b) $\$80 \times 0.15 = \$12$ ✓

c) $2x + y = 30$ ①

$y = 3x$ ②

sub ② into ① : $2x + 3x = 30$

$5x = 30$

$x = 6$ ✓

sub $x = 6$ into ② : $y = 3 \times 6$

$y = 18$ ✓ (allow elimination for one mark)

$x = 6, \quad y = 18$

d) $A = \frac{1}{2} \times 3 \times 6$

$= 9\ cm^2$ ✓

e) $(x+1)(x+2)$ ✓

f i) Mean $= \dfrac{46+67+34+94+35+63+53}{7}$

$= 56$ ✓

ii) In order : 34, 35, 46, (53), 63, 67, 94

Median = 53 ✓

Question Two Continued...

g) $\cos 30 = \frac{y}{8}$ ✓

$y = 8\cos 30$

$y = 8 \times \frac{\sqrt{3}}{2}$

$y = 4\sqrt{3}$

$y = 6.93$ m (2dp) ✓

(penalise one mark for incorrect rounding)
(just 6.93 two marks)

h) $\frac{7}{23} \times 100\% = 30.4\%$ (1dp) ✓

i) $\frac{EF}{BC} = \frac{DE}{AB}$ (matching sides in similar triangles are in proportion) ✓

$\triangle ABC \parallel\parallel \triangle DEF$

$\frac{15}{5} = \frac{x}{2}$

$x = 6$ cm ✓

Question 3

a) $-3(x+2) \leq 33$

$x+2 \geqslant -11$ ✓

$x \geqslant -13$ ✓

b) $V = Ah$

$60 = (\frac{1}{2} \times 4 \times z) \times 5$ ✓

$60 = 10z$

$z = 6$ ✓

c) $\tan\theta = \frac{17}{10}$

$\theta = 60^\circ$ (nearest degree) ✓

di) $15a^7b^3$ ✓

ii) $\frac{9}{4}$ ✓

e) $x^2 + 5x - 14 = 0$

$(x-2)(x+7) = 0$ ✓

$x = 2 \quad x = -7$ ✓

f) Distance $AB = \sqrt{(12-4)^2 + (13-7)^2}$ ✓

$= \sqrt{8^2 + 6^2}$

$= \sqrt{100}$

$= 10$ ✓

g) $5x + y = 30$ ①

$2x - y = 19$ ②

① + ② $7x = 49$

$x = 7$ ✓

sub $x = 7$ into ②:

$2 \times 7 - y = 19$

$14 - y = 19$

$-y = 5$

$y = -5$ ✓

$x = 7, y = -5$

(allow substitution for one mark)

Question Four

a) $\frac{1}{\sqrt{3}-1} \times \frac{\sqrt{3}+1}{\sqrt{3}+1} = \frac{\sqrt{3}+1}{3-1}$ ✓

$= \frac{\sqrt{3}+1}{2}$ ✓

b) $(3a-2b)(8b-5a) = 24ab - 15a^2 - 16b^2 + 10ab$

$= 34ab - 15a^2 - 16b^2$ ✓

ci) In ΔOGH and ΔOKJ:

$OG = OK$ (given)

$\angle HGO = \angle JKO$ (given)

$\angle GOH = \angle KOJ$ (vertically opposite) ✓ (allow ⅔ correct but not second mark)

$\therefore \Delta OGH \equiv \Delta OKJ$ (AAS) ✓ with reason

ii) $GH = KJ$ (matching sides in congruent triangles are equal) ✓

$\therefore a = b$

d) $3x^2 + 20x + 12 = 0$

$3 \times 12 = 36$ multiply to

20 add to

$3x^2 + 18x + 2x + 12 = 0$

$3x(x+6) + 2(x+6) = 0$

$(3x+2)(x+6) = 0$ ✓

$x = -\frac{2}{3}$ $x = -6$ ✓

ei) Gradient $RS = \frac{10-(-8)}{(3)-2}$

$= \frac{18}{-5}$ ✓ (allow -3.6)

Question Four Continued...

e ii) $y-(-8)=-\frac{18}{5}(x-2)$ ✓

$y+8=-\frac{18}{5}x+\frac{36}{5}$

$y=-\frac{18}{5}x-\frac{4}{5}$ ✓ (or $y=-3\cdot6x-0\cdot8$)

f) Pre 2015 → 100%

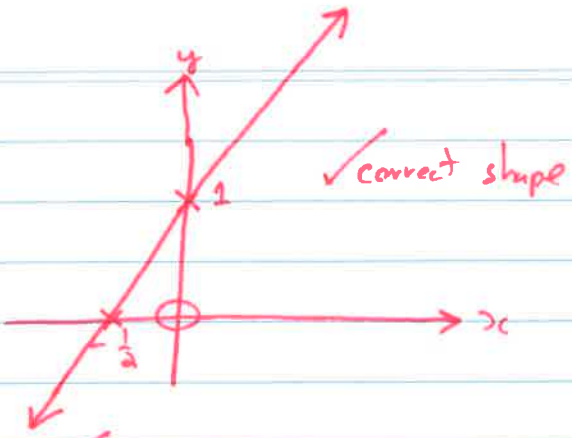
Post 2015 → 87% ✓

$100\div87=1\cdot14942...$

so 14.94% (2dp) increase (allow 15%) ✓

Question Five

a) $y = 2x + 1$



✓ correct shape

when $x = 0$, $y = 1$

when $y = 0$, $x = -\frac{1}{2}$

x intercept at $(-\frac{1}{2}, 0)$ ✓

b) $a^2 - 2a - ba + 2b$

$= a(a-2) - b(a-2)$

$= (a-b)(a-2)$ ✓

c) 10 boys total height $= 160 \times 10$

$= 1600\text{cm}$

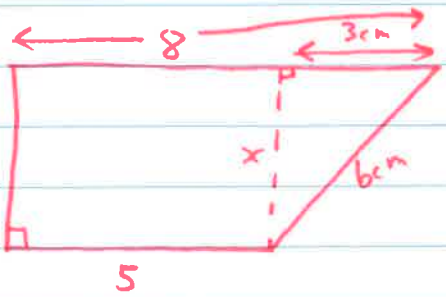
11 boys total height $= 162 \times 11$

$= 1782\text{cm}$

✓ either calculation

$1782\text{cm} - 1600\text{cm} = \underline{182\text{cm}}$ ✓

d)



$x^2 = 6^2 - 3^2$

$x = \sqrt{27}$ ✓

$x = 3\sqrt{3}$

$V = Ah$

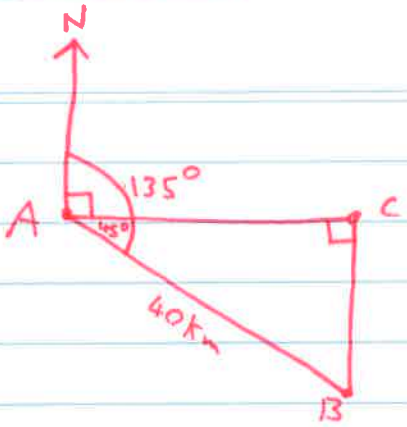
$V = \frac{1}{2}(\frac{5+8}{2}) \times 3\sqrt{3} \times 3$

$V = \frac{117}{2}\sqrt{3}\ \text{cm}^3$ ✓

(penalise one mark for no or incorrect units)

Question Five Continued...

ei)



$\angle CAB = 135 - 90$

$= 45^\circ$ ✓

ii) $\sin 45 = \frac{BC}{40}$

~~$BC = 40 \sin 45$~~ $BC = 40 \sin 45$

$BC = 40 \times \frac{\sqrt{2}}{2}$

$= 20\sqrt{2}$ km ✓ (allow $\frac{40}{\sqrt{2}}$)

f) $\frac{2a-4}{5(a+3)} \div \frac{a^2-a-2}{25} = \frac{2a-4}{5(a+3)} \times \frac{25}{a^2-a-2}$

$= \frac{2(a-2)}{5(a+3)} \times \frac{25}{(a-2)(a+1)}$ ✓ reciprocal and factorising attempt

$= \frac{10}{(a+3)(a+1)}$ ✓

g) $kx + y = 2$ $\quad 3x + 8y = 15$

$y = -kx + 2$ $\quad 8y = -3x + 15$

$y = -\frac{3}{8}x + \frac{15}{8}$ ✓ one correct rearrangement

If they do not intersect, they are parallel

$\therefore -k = -\frac{3}{8}$

$k = \frac{3}{8}$ ✓

Question Six

a) $23\ kL = 23\times10^3\ L$ ✓ some correct method

$= \frac{23\times10^3}{10^{12}}$ terralitres

$= 23\times10^{-8}$ terralitres

$= 2.3\times10^{-8}$ terralitres ✓

b i) Total houses sold = 230

Houses sold under \$500,000 = 60

$\frac{60}{230}\times100\% = 26\%$ ✓

ii) Minimum $= 20\times300,000$
$+ 40\times400,000$
$+ 10\times500,000$
$+ 90\times600,000$
$+ 50\times700,000$
$+ 20\times800,000$ ✓ method

$= \$132,000,000$ ✓

c) $3x + 5y = -2$ ①

$5x + 7y = -4$ ②

① × 5: $15x + 25y = -10$ ③

② × 3: $15x + 21y = -12$ ④ ✓ same x or y coefficient

③ − ④: $4y = 2$

$y = \frac{1}{2}$ ✓ (allow substitution)

sub $y = \frac{1}{2}$ into ①: $3x + \frac{5}{2} = -2$

$x = -\frac{3}{2}$ ✓, $y = \frac{1}{2}$ $x = -\frac{3}{2}$

Question Six Continued...

d) Tax on $92,000 : $19822 + 0.37 x $5000 ✓

= $19822 + $1850

= $21,672 ✓

e) $x^2 + 6x + 7 = 0$

$x^2 + 6x + 9 - 9 + 7 = 0$

$(x+3)^2 - 9 + 7 = 0$

$(x+3)^2 - 2 = 0$ ✓

$(x+3)^2 = 2$

$x + 3 = \pm\sqrt{2}$

$x = -3 \pm \sqrt{2}$ ✓ one ✓ both

Question Seven

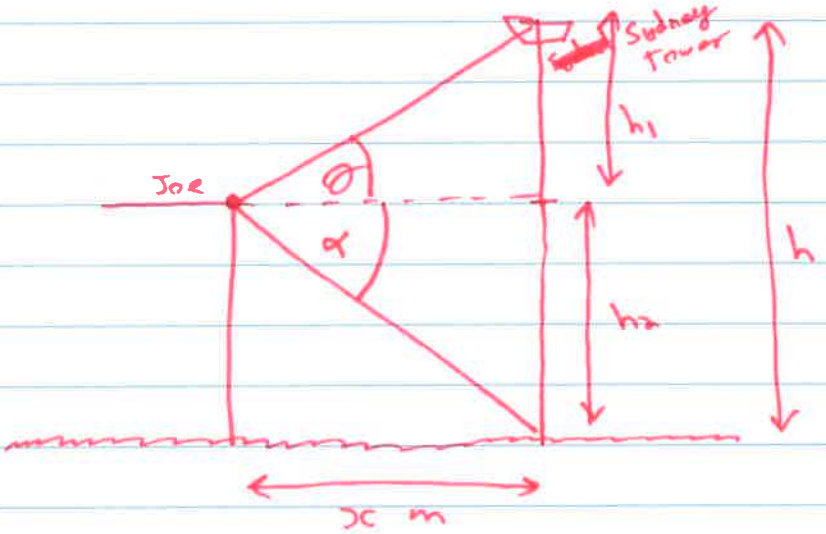
a) $(a^2 - 2a + 4)(a^2 + 2a - 4) = (a^2 - (2a - 4))(a^2 + (2a - 4))$

$= a^4 - (2a - 4)^2$

$= a^4 - (4a^2 - 16a + 16)$

$= a^4 - 4a^2 + 16a - 16$ ✓¾ terms ✓all

b)



Let h be height of Sydney Tower top of

Let h_1 be height from top of Joe's building to n Sydney Tower

Let h_2 be height from top of Joe's building to bottom of Sydney Tower

$\tan\theta = \frac{h_1}{x}$ $\tan\alpha = \frac{h_2}{x}$

$h_1 = x\tan\theta$ $h_2 = x\tan\alpha$ ✓method

$h = h_1 + h_2$

$= x\tan\theta + x\tan\alpha$ ✓ no need to factorise

$= x(\tan\theta + \tan\alpha)$

Question Seven Continued...

c) In ΔACB and ΔCAD

$AC = AC$ (common)
$BC = DA$ (given)
$\angle BCA = \angle DAC$ (alternate angles, $AD \parallel BC$) ✓ $\frac{3}{5}$ correct

$\therefore \Delta ACB \equiv \Delta CAD$ (SAS) ✓ with reason

$CD = AB$ (matching sides equal in congruent triangles)

$\therefore$ ABCD parallelogram ✓ (opposite sides are equal)

OR

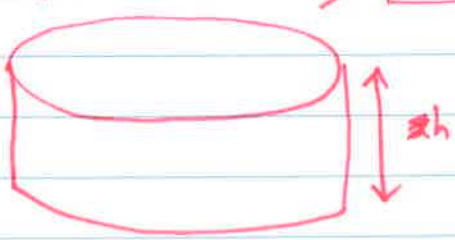
$\angle ABC = \angle CDA$ (matching angles equal in congruent Δ's)
$\angle DCA = \angle BAC$ (matching angles in equal in congruent Δ's)

so $\angle BAD = \angle DCB$

$\therefore$ ABCD parallelogram ✓ (opposite angles are equal)

OR $\angle BAC = \angle DCA$ (matching $\angle$'s in congruent Δ's)
$\therefore BA \parallel CD$ (alternate $\angle$'s) $\therefore$ ABCD parallelogram ✓

d) Let height be h.



$SA = \pi dh + 2\pi r^2$
$60\pi = 4h\pi h + 2\pi(2h)^2$ ✓ forming equation
$60 = 4h^2 + 8h^2$
$60 = 12h^2$
$h^2 = 5$
$h = \sqrt{5}$ ✓

Question Seven Continued...

e) $\sin 77 = \frac{PX}{8}$

$PX = 8\sin 77 \quad (\approx 7.8)$ ✓

Area $\Delta PQR = \frac{1}{2} \times 11 \times PX$

$= \frac{1}{2} \times 11 \times 8 \sin 77$

$= 42.9 \text{ cm}^2 \quad (1dp)$ ✓

g) $\frac{1}{3x+4} = \frac{2x+1}{8x^2+11x-4}$

$8x^2+11x-4 = (2x+1)(3x+4)$ ✓ no fractions

$8x^2+11x-4 = 6x^2+11x+4$

$2x^2-8 = 0$

$x^2-4 = 0$

$x^2 = 4$

$x = 2 \quad$ or $\quad x = -2$ ✓ both

Question Eight

ai) $1\ L = 1000 mL$

$= 1000 cm^3$

$0.1 mm = 0.01 cm$

$1000 cm^3 \div 0.01 cm = 100,000 cm^2$

$= 10 m^2$ ✓

ii) $12.5 ha = 1,250,000 m^2$

1 Litre covers $10 m^2$

so 125,000 Litres covers $1,250,000 m^2$ } $\times 125,000$

$10 per litre so 125,000 Litres costs $1,250,000 ✓

b) $x^2 - 7x + 13 = x^2 - 7x + \frac{49}{4} - \frac{49}{4} + 13$

$= (x - \frac{7}{2})^2 + \frac{3}{4}$ ✓

as $(x - \frac{7}{2})^2 \geq 0$ as it is a square number

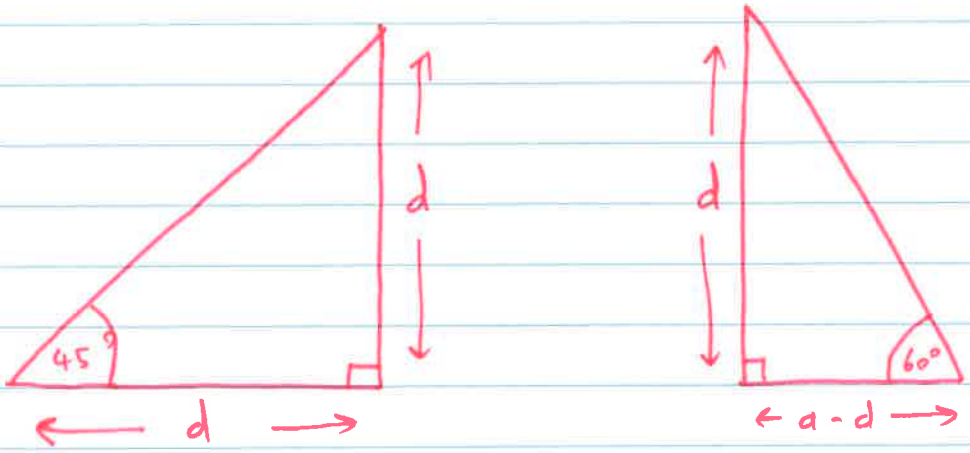
$\therefore (x - \frac{7}{2})^2 + \frac{3}{4} \geq \frac{3}{4}$ so it is always positive for all values of x.

✓ good reasoning

→

Question Eight Continued...

c)



height d as 45° angle makes isosceles triangle ✓

Right triangle: $\tan 60 = \frac{d}{a-d}$ ✓

$$(a-d)\tan 60 = d$$
$$(a-d)\sqrt{3} = d$$
$$\sqrt{3}a - \sqrt{3}d = d$$
$$\sqrt{3}a = d + \sqrt{3}d$$
$$a = \frac{d+\sqrt{3}d}{\sqrt{3}}$$
$$a = \frac{d}{\sqrt{3}} + d$$
$$a = \frac{d\sqrt{3}}{3} + d \quad \left(\text{or } a = \frac{d(\sqrt{3}+3)}{3}\right)$$ ✓

d) Monday: Let speed be x km/h, time be t hours

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}} \qquad t = \frac{980}{x}$$

Tuesday: Speed $(x+10)$ km/h, time $(t - 2\frac{1}{3})$ hours

$$t - 2\tfrac{1}{3} = \frac{980}{x+10}$$ ✓

continued →

Question Eight continued...

d continued...) $t = \frac{980}{x}$ ① $\quad t - 2\frac{1}{3} = \frac{980}{x+10}$ ②

sub ① into ②: $\frac{980}{x} - \frac{7}{3} = \frac{980}{x+10}$ ✓ using simultaneous equations

$(x+10)\left(\frac{980}{x} - \frac{7}{3}\right) = 980$

$980 - \frac{7}{3}x + \frac{9800}{x} - \frac{70}{3} = 980$

$\times -3x$

$7x^2 + 70x - 29400 = 0$

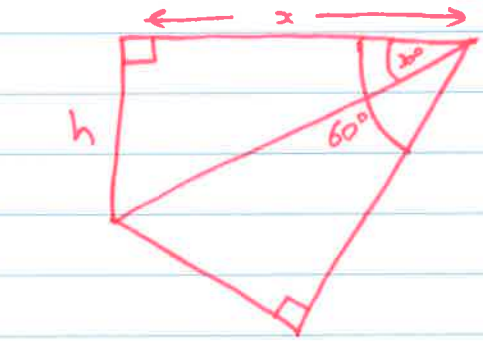
$x^2 + 10x - 4200 = 0$

$(x + 70)(x - 60) = 0$

$x = 60$ or $x = -70$ but cannot be negative

$x = 60$ km/h ✓ (allow trial and error)

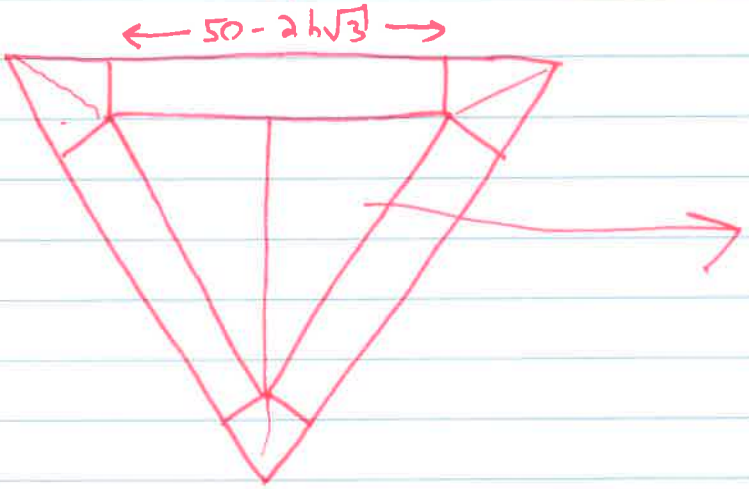
e)

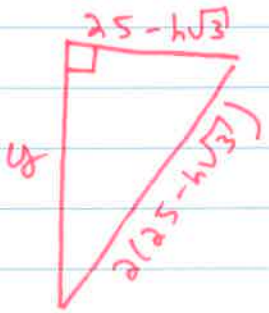


$\tan 30 = \frac{h}{x}$

$\frac{1}{\sqrt{3}} = \frac{h}{x}$

$x = h\sqrt{3}$ ✓





Question Eight Continued ...

e continued ...)

$$y^2 = (2(25-h\sqrt{3}))^2 - (25-h\sqrt{3})^2$$
$$y^2 = 4(25-h\sqrt{3})^2 - (25-h\sqrt{3})^2$$
$$y^2 = 3(25-h\sqrt{3})^2$$
$$y = \sqrt{3}(25-h\sqrt{3}) \quad \checkmark$$

$$\text{Volume} = Ah$$
$$= \tfrac{1}{2} \times (50-2h\sqrt{3}) \times (\sqrt{3}(25-h\sqrt{3})) \times h$$
$$= (25-h\sqrt{3}) \times \sqrt{3}(25-h\sqrt{3}) \times h$$
$$= h\sqrt{3}(25-h\sqrt{3})^2 \quad \checkmark$$