N5 Practice Paper A – Solutions (P1)

1) $3\frac{2}{5} - 1\frac{3}{4}$

$= \frac{17}{5} - \frac{7}{4}$

$= \frac{17\times4}{5\times4} - \frac{7\times5}{4\times5}$

$= \frac{68}{20} - \frac{35}{20}$

$= \boxed{\frac{33}{20}}$

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2) $x^2 + 2x - 15$

$= \boxed{(x+5)(x-3)}$

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3) $m = \frac{70-5}{6\cdot5}$ $\quad (6\cdot5, 70)$ $\quad (0, 5)$

$m = \frac{65}{6\cdot5}$

$\underline{m = 10}$; $\underline{c = 5}$

$\therefore \boxed{y = 10x + 5}$

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4) $y = x^2 + 8x - 7$

$y = (x+4)^2 - 4^2 - 7$

$y = (x+4)^2 - 16 - 7$

$\boxed{y = (x+4)^2 - 23}$

$\boxed{\text{TP coordinates : } (-4, -23)}$

5) $P = R^3 b - 5$

$R^3 b = P + 5$

$R^3 = \dfrac{P+5}{b}$

$\boxed{R = \sqrt[3]{\dfrac{P+5}{b}}}$

6) $\underline{u} = \begin{pmatrix} 2 \\ -5 \end{pmatrix}, \underline{v} = \begin{pmatrix} -4 \\ 3 \end{pmatrix}$

(a) $\underline{u} + 3\underline{v} = \begin{pmatrix} 2 \\ -5 \end{pmatrix} + 3\begin{pmatrix} -4 \\ 3 \end{pmatrix}$

$\underline{u} + 3\underline{v} = \begin{pmatrix} 2 - 12 \\ -5 + 9 \end{pmatrix} \Rightarrow \boxed{\underline{u} + 3\underline{v} = \begin{pmatrix} -10 \\ 4 \end{pmatrix}}$

(b) $|\underline{u} + 3\underline{v}| = \sqrt{(-10)^2 + 4^2}$

$|\underline{u} + 3\underline{v}| = \sqrt{116}$

$|\underline{u} + 3\underline{v}| = \sqrt{4}\sqrt{29} \Rightarrow \boxed{|\underline{u} + 3\underline{v}| = 2\sqrt{29}}$

7) $\boxed{b = 3}$

8) $2x + y = 5, \quad x - 3y = 6 \Rightarrow \underline{x = 3y + 6}$

$2(3y+6) + y = 5$

$6y + 12 + y = 5$

$7y + 12 = 5$

$7y = -7$

$\underline{y = -1}$

$x = 3(-1) + 6 \Rightarrow x = -3 + 6 \Rightarrow \underline{x = 3}$

$\therefore \boxed{(3, -1)}$

9) $y = x^2 - 3x + 7$

$D = b^2 - 4ac \qquad \begin{pmatrix} a = 1 \\ b = -3 \\ c = 7 \end{pmatrix}$

$D = (-3)^2 - 4(1)(7)$

$D = 9 - 28$

$\underline{D = -19}$

$\boxed{\text{As } D < 0, \text{ no real roots}}$

10) $3x - y = 9$

$\underline{y = 3x - 9}$; $m = 3$; $\underline{m_{\parallel} = 3}$

$y - (-3) = 3(x - 5)$

$y + 3 = 3x - 15$

$\boxed{y = 3x - 18}$

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11) (a) $\boxed{(2, -9)}$

(b) $\underline{x_c = 0}$; $y_c = (0-2)^2 - 9 = 4 - 9 \Rightarrow \underline{y_c = -5}$

$\therefore \boxed{C(0, -5)}$

(c) $x_A = -1$; min. TP has $x = 2$. So,

$x_B = 2 + 3 \Rightarrow \underline{x_B = 5}$.

$\therefore \boxed{B(5, 0)}$

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12) $P_s = 4(2x + 2)$

$\underline{P_s = 8x + 4}$

$\underline{P_R = 2(x+3) + 2L}$

$P_R = P_S$

$\therefore \quad 2L + 2(x+3) = 8x + 4$

$2L + 2x + 6 = 8x + 4$

$2L = 6x + 2$

$\boxed{L = (3x+1) \text{ cm}}$

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13) (a) $\dfrac{3}{x} - \dfrac{5}{x+2}$

$= \dfrac{3(x+2)}{x(x+2)} - \dfrac{5x}{x(x+2)}$

$= \dfrac{3x+6-5x}{x(x+2)}$

$= \boxed{\dfrac{6-2x}{x(x+2)}}$

(b) $\sqrt{18} - \sqrt{2} + \sqrt{72}$

$= \sqrt{9}\sqrt{2} - \sqrt{2} + \sqrt{36}\sqrt{2}$

$= 3\sqrt{2} - \sqrt{2} + 6\sqrt{2}$

$= \boxed{8\sqrt{2}}$

N5 Practice Paper A – Solutions

(P2)

1) $528000 \times (1.024)^4 = 580\,542.1395$

$\therefore \boxed{581\,000}$

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2) (a) $\bar{x} = \dfrac{(73 + 47 + 59 + 71 + 48 + 62)}{6}$

$\boxed{\bar{x} = 60}$

x	$x - \bar{x}$	$(x-\bar{x})^2$
73	13	169
47	-13	169
59	-1	1
71	11	121
48	-12	144
62	2	4
		$\boxed{608}$

$s = \sqrt{\dfrac{\sum(x-\bar{x})^2}{n-1}}$; $n = 6$

$s = \sqrt{\dfrac{608}{6-1}}$

$s = \sqrt{121.6}$

$s = 11.027...$

$\boxed{s = 11.03 \text{ (2 d.p.)}}$

(b) On average, both groups marks are the same, as $60 = 60$.

Group A marks are more consistent, as $11.03 < 29.8$.

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3) $(x+4)(2x^2+3x-1)$

$$= 2x^3 + 3x^2 - x$$
$$\quad + 8x^2 + 12x - 4$$

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

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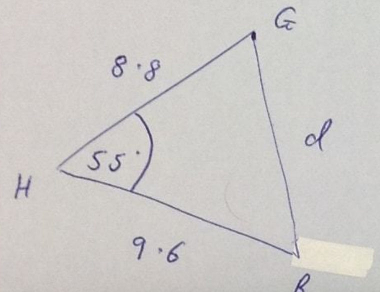
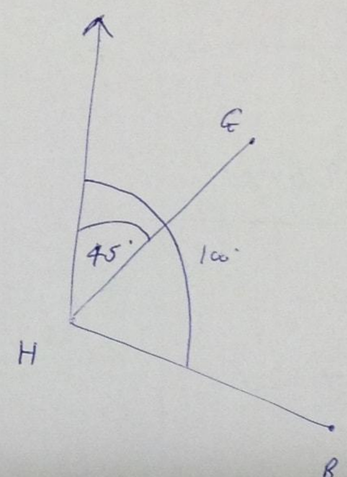
4) $HG = 4.4 \times 2 = 8.8$

$HB = 4.8 \times 2 = 9.6$





$$d^2 = 8.8^2 + 9.6^2 - (2 \times 8.8 \times 9.6 \times \cos 55°)$$

$$d^2 = 77.44 + 92.16 - 96.911\ldots$$

$$d^2 = 72.688\ldots$$

$$d = \sqrt{72.688\ldots}$$

$$d = 8.525\ldots$$

$$\boxed{d = 8.53 \text{ km } (2 \text{ d.p.})}$$

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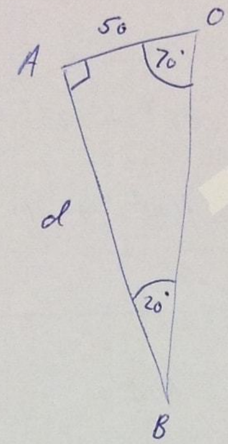
5) $\tan 20^\circ = \dfrac{50}{d}$

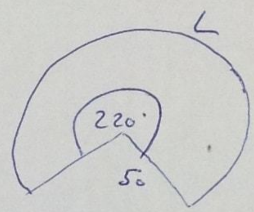
$d = \dfrac{50}{\tan 20^\circ}$

$\underline{d = 137.3738\ldots}$



$L = \dfrac{220^\circ}{360^\circ} \times 2 \times \pi \times 50$

$\underline{L = 191.986\ldots}$



$P = L + 2d$

$P = 191.986\ldots + (2 \times 137.3738\ldots)$

$\underline{P = 466.733\ldots}$

$\boxed{P = 466.73 \text{ cm}}$

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6) (a) $V_{cyl.} = \pi \times 20^2 \times 50$

$V_{cyl.} = 62\,831.85\ldots$

$\boxed{V_{cyl.} = 63\,000 \text{ cm}^3}$

(b) $V_{cone} = V_{cyl.} \div 800$

$V_{cone} = 62831... \div 800$

$\underline{V_{cone} = 78.539...}$

$V_{cone} = \frac{1}{3} \pi r^2 h$

$h = \frac{3 \times V_{cone}}{\pi \times r^2}$

$h = \frac{3 \times 78.539...}{(\pi \times 3^2)}$

$\underline{h = 8.33...}$

$\boxed{h = 8.33 \text{ cm } (2 \text{ d.p.})}$

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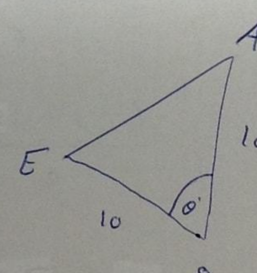
7) Area $\Delta AOE = \frac{1}{2} \times 10 \times 10 \times \sin 72°$

$\underline{\text{Area } \Delta AOE = 47.55...}$



$\theta° = \frac{360°}{5}$

$\theta° = 72°$

Area of pentagon $= 5 \times$ Area ΔAOE

Area of pentagon $= 5 \times 47.55...$

$\underline{\text{Area of pentagon } = 237.764...}$

$\boxed{\text{Area of pentagon } = 237.76 \text{ cm}^2 \ (2 \text{ d.p.})}$

8) (a) $a^2(2a^{-1/2} + a)$

$= 2a^{-1/2} \times a^2 + a^2 \times a^1$

$= 2a^{2-1/2} + a^{2+1}$

$= \boxed{2a^{3/2} + a^3}$

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

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \qquad \begin{pmatrix} a = 3 \\ b = 3 \\ c = -7 \end{pmatrix}$$

$$x = \frac{-3 \pm \sqrt{3^2 - 4(3)(-7)}}{2(3)}$$

$$x = \frac{-3 \pm \sqrt{9 + 84}}{6}$$

$$x = \frac{-3 \pm \sqrt{93}}{6}$$

$$x = \frac{(-3 + \sqrt{93})}{6}, \quad x = \frac{(-3 - \sqrt{93})}{6}$$

$x = 1.107\ldots, -2.107\ldots$

$\boxed{x = 1.1, -2.1 \text{ (1 d.p.)}}$

9) (a) $$4 \tan x + 5 = 0$$

$$\tan x = -\frac{5}{4}$$

$$RA = \tan^{-1}(5/4)$$

$$RA = 51.3^\circ$$

tan is −ve

S ✓	A
$180^\circ - RA$	RA
$180^\circ + RA$	$360^\circ - RA$
T	C ✓

$$\therefore x = 180^\circ - RA,\ 360^\circ - RA$$

$$\boxed{x = 128.7^\circ,\ 308.7^\circ}$$

(b) $$\tan x \cos x = \sin x \quad (*)$$

$$\begin{aligned} LHS &= \tan x \cos x \\ &= \left(\frac{\sin x}{\cos x}\right) \times \left(\frac{\cos x}{1}\right) \\ &= \frac{\sin x \cos x}{\cos x} \\ &= \sin x \\ &= RHS \end{aligned}$$

$$\boxed{\text{As } LHS = RHS,\ (*) \text{ is true}}$$

10) (a) $A = (x+30)(x+10)$

$A = x^2 + 30x + 10x + 300$

$\boxed{A = x^2 + 40x + 300}$

(b) $A_{ORIG.} = 30 \times 10$

$A_{ORIG.} = 300$

75% more than $300 = 1.75 \times 300 = 525$

$x^2 + 40x + 300 = 525$

$x^2 + 40x - 225 = 0$

$x = \dfrac{-40 \pm \sqrt{1600 + 900}}{2}$

$x = \dfrac{-40 \pm 50}{2}$

$x = -45, 5$

$x > 0 \Rightarrow x = 5$

$x + 30 = 35$

$x + 10 = 15$

$\boxed{\text{Dimensions of new vent : } 35\text{ cm by } 15\text{ cm}}$