N5 Practice Paper E – Solutions (P1)

1) $2\frac{1}{3} + \frac{5}{6}$ of $1\frac{2}{5}$

$= \frac{7}{3} + \frac{5}{6} \times \frac{7}{5}$

$= \frac{7}{3} + \frac{7}{6}$

$= \frac{14}{6} + \frac{7}{6}$

$= \frac{21}{6}$

$= \boxed{\frac{7}{2}}$

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2) $(4x + 2)(x - 5) + 3x$

$= 4x^2 - 20x + 2x - 10 + 3x$

$= \boxed{4x^2 - 15x - 10}$

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3) $m = \frac{4-2}{1-2}$ (1, 4) (2, 2)

$m = \frac{2}{-1} \Rightarrow \boxed{m = -2}$

$y = -2x + c$

$4 = -2(1) + c \Rightarrow \underline{c = 6}$; $\boxed{y = -2x + 6}$

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4)

$$\frac{2}{x} + 9 = 16$$

$$\frac{2}{x} = 7$$

$$2 = 7x$$

$$\boxed{x = \frac{2}{7}}$$

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5)

$$2x^2 - 2x - 1 = 0$$

$$\begin{pmatrix} a = 2 \\ b = -2 \\ c = -1 \end{pmatrix}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{2 \pm \sqrt{(-2)^2 - 4(2)(-1)}}{2(2)}$$

$$x = \frac{2 \pm \sqrt{4 + 8}}{4}$$

$$x = \frac{2 \pm \sqrt{12}}{4}$$

$$x = \frac{2 \pm \sqrt{4}\sqrt{3}}{4}$$

$$x = \frac{2 \pm 2\sqrt{3}}{4}$$

$$\boxed{x = \frac{1 \pm \sqrt{3}}{2}}$$

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6) (a) $\boxed{(2, 36)}$

(b) $\boxed{x = 2}$

(c) $y_R = y_S = 20$

$x_R = 2 - 4 = -2$ $\therefore$ $\boxed{R(-2, 20)}$

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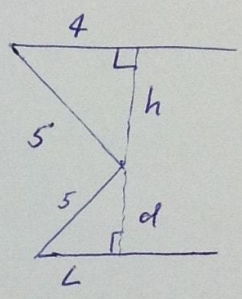
7) $h^2 = 5^2 - 4^2$

$h^2 = 25 - 16$

$h^2 = 9$

$h = 3$



$d = 7 - 3 \Rightarrow d = 4$

$L^2 = 5^2 - 4^2$

$L^2 = 9$

$L = 3$ cm

$w = 2 \times L$

$w = 2 \times 3$

$\boxed{w = 6 \text{ cm}}$

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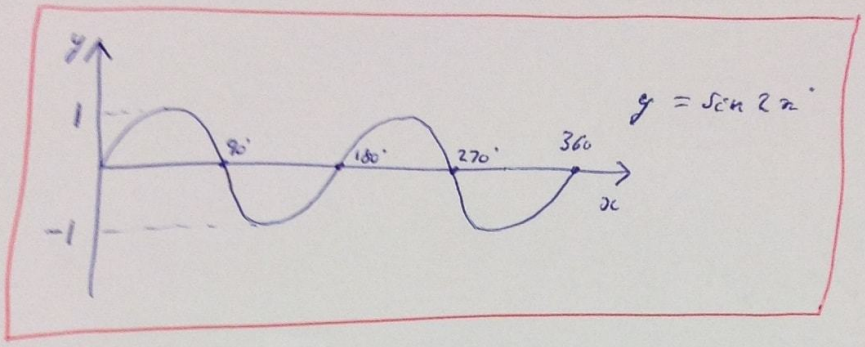
8)



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9) $f(x) = 4\sqrt{x} + \sqrt{2}$

(a) $f(72) = 4\sqrt{72} + \sqrt{2}$

$f(72) = 4\sqrt{36}\sqrt{2} + \sqrt{2}$

$f(72) = 24\sqrt{2} + \sqrt{2}$

$\boxed{f(72) = 25\sqrt{2}}$

(b) $f(t) = 4\sqrt{t} + \sqrt{2} = 3\sqrt{2}$

$4\sqrt{t} = 2\sqrt{2}$

$\sqrt{t} = \frac{\sqrt{2}}{2}$

$t = \frac{2}{4}$

$\boxed{t = \frac{1}{2}}$

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10) $7 = \frac{1}{2} \times 2x \times (2x - 5)$

$x(2x - 5) = 7$

$2x^2 - 5x = 7$

$2x^2 - 5x - 7 = 0$

$(2x - 7)(x + 1) = 0$

$2x - 7 = 0, \quad x + 1 = 0$

$x = \frac{7}{2}, \quad x = -1$

If $x = -1$, $2x$ is negative; but lengths cannot be negative. So,

$$\boxed{x = \frac{7}{2}}$$

N5 Practice Paper E – Solutions (P2)

1) $E = mc^2$

$E = (3.6 \times 10^{-2}) \times (3 \times 10^8)^2$

$E = 3.24 \times 10^{15}$

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2) $Area = \frac{1}{2}(21)(19)\sin 110°$

$Area = 187.468...$

$Area = 187.5 \text{ cm}^2$ (1 d.p.)

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3) $28 \times (0.896)^3 = 20.14...$

$\therefore$ 20.1°C (1 d.p.)

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4) (a) C(4, 3, 4), D(6, 2, 2)

(b) B(6, 4, 2)

5) $V_B = V_S \times k^3$ $(k = LSF)$

$1600 = 200\,k^3$

$k^3 = 8$

$k = 2$

$h = 2 \times 12$

$h = 24$ cm

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6)

$2b + 5p = 5.2$ ① $\times 3$

$3b + 2p = 5.6$ ② $\times 2$

(b = length of 1 bead, p = length of 1 pearl)

$6b + 15p = 15.6$ ③

$6b + 4p = 11.2$ ④

③ − ④:

$11p = 4.4$

$p = 0.4$

Substitute $p = 0.4$ into ①:

$2b + 5(0.4) = 5.2$

$2b + 2 = 5.2$

$2b = 3.2$

$b = 1.6$

Length of 1 bead = 1.6 cm
Length of 1 pearl = 0.4 cm

7) (a) $V = \frac{4}{3}\pi r^3$, $r = 0.5$

$V = \frac{4}{3}\pi (0.5)^3$

$V = 0.523599...$

$V = 0.524 \text{ cm}^3$ (3 s.f.)

(b) $V = \pi r^2 h$

$\pi (0.7)^2 h = 0.523...$

$h = 0.3401...$

$h = 0.34 \text{ cm}$ (2 d.p.)

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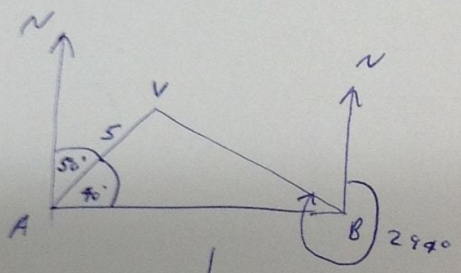
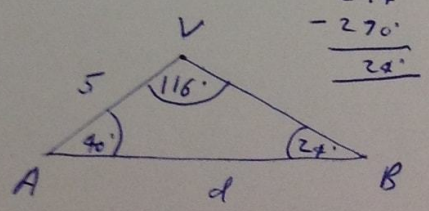
8) $\frac{d}{\sin 116^\circ} = \frac{5}{\sin 24^\circ}$

$d = \frac{5 \times \sin 116^\circ}{\sin 24^\circ}$

$d = 11.048...$

$d = 11.05 \text{ km}$ (2 d.p.)

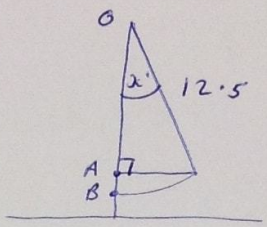




294° − 270° = 24°

180° − 40 − 24° = 116°

9) (a)



$AB = 2.5 - 1.5 = 1$

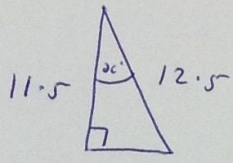
$OA = 12.5 - 1 = 11.5$

$\cos x^\circ = \frac{11.5}{12.5}$

$x^\circ = \cos^{-1}\left(\frac{11.5}{12.5}\right)$

$x^\circ = 23.07...^\circ$

$x^\circ = 23^\circ$ (nearest degree)



(b) $L = \frac{\theta^\circ}{360^\circ} \times 2\pi r$

$L = \frac{(23.07... \times 2)^\circ}{360^\circ} \times 2 \times \pi \times 12.5$

$L = 10.06...$

$L = 10.1\ m$ (3 s.f.)

10) $kx^2 - 4x + 2 = 0$

$\begin{pmatrix} a = k \\ b = -4 \\ c = 2 \end{pmatrix}$

$D = b^2 - 4ac$

$D = 16 - 8k$

Real roots means $D \geq 0$. So,

$16 - 8k \geq 0$

$8k \leq 16$

$\boxed{k \leq 2}$

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11) (a) $\sqrt{3} \sin x^\circ - 1 = 0, \quad 0 \leq x < 360$

$\sin x^\circ = \frac{1}{\sqrt{3}}$

$RA = \sin^{-1}(1 \div \sqrt{3})$

$RA = 35.3^\circ$

Sin cos +ve

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

$x^\circ = 180^\circ - RA, \; RA$

$x^\circ = 35.3^\circ, \; 180^\circ - 35.3^\circ$

$\boxed{x^\circ = 35.3^\circ, \; 144.7^\circ}$

(b) $\tan x^\circ \cos x^\circ = \left(\frac{\sin x^\circ}{\cos x^\circ}\right) \times \left(\frac{\cos x^\circ}{1}\right)$

$= \frac{\sin x^\circ \cos x^\circ}{\cos x^\circ}$

$= \boxed{\sin x^\circ}$
