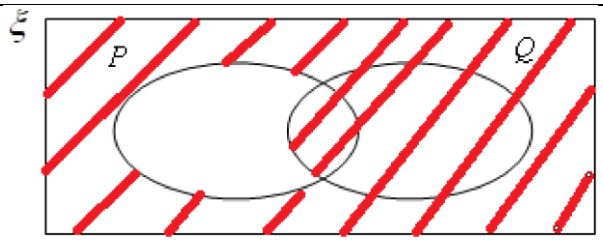
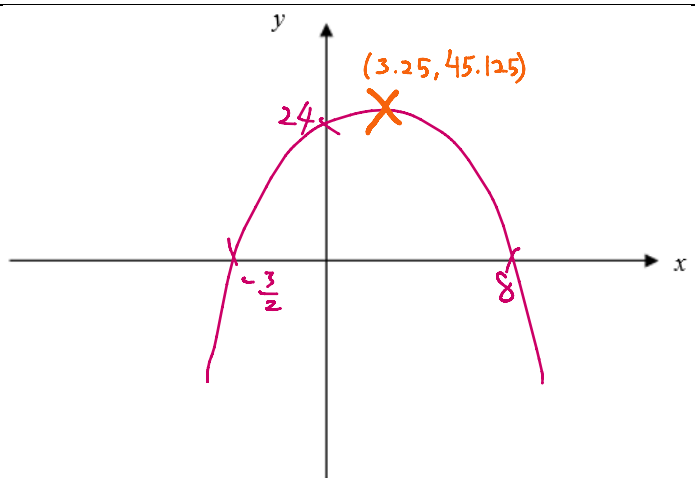
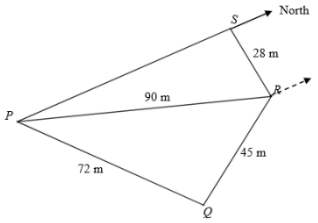
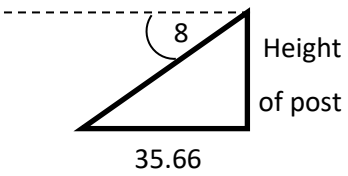
1.		Method 1 42.2km = 42200m 4h 45min = 17100s Speed = $\frac{42200}{17100}$ =2.47m/s	Method 2 $42.2 \div 4\frac{3}{4} = 8.8842\textbf{km/h}$ $\frac{8.8842 \times 1000}{3600}$ =2.47m/s
2.	a.	$\left(\frac{g^{12}}{256f^6}\right)^{-\frac{1}{4}} = \left(\frac{256f^6}{g^{12}}\right)^{\frac{1}{4}} = \frac{256^{\frac{1}{4}} f^{\frac{6}{4}}}{g^{\frac{12}{4}}} = \frac{4f^{\frac{3}{2}}}{g^3}$	
	b.	$5 \times 9^{k-1} = 15 \times 81$ $5 \times 3^{2(k-1)} = 3 \times 5 \times 3^4$ $3^{2(k-1)} = 3^5$ $2(k-1) = 5$ $k = 3.5$	
3.		55.2 or 124.8	
4.	a.	Divisor 245 = 5×7^2 which is a factor of *A*.	
	b.	$k = 2 \times 5 = 10$	
	c.	$A = 2^7 \times 5^{11} \times 7^8$ $B = 2^5 \times 3^6 \times 7^3$ HCF = $2^5 \times 7^3$ LCM = $2^7 \times 3^6 \times 5^{11} \times 7^8$	
5.		$42000\left(1+\frac{\left(\frac{1.6}{12}\right)}{100}\right)^{36}$ = \$44063.76	
6.	a.	$x^2 + 6x + 10 = x^2 + 6x + 3^2 - 3^2 + 10$ $= (x+3)^2 + 1$	

	b.	(i) $x = -3$
		(ii) The minimum point of the graph is above the x-axis.
7.	a.	Paul = 125% Mike → Mike = 80% Paul Mike = 75% Oscar 0.8 Paul = 0.75 Oscar Paul : Oscar = 0.75 : 0.8 = 15:16
	b.	Total cost = 900 × 8 = 7200 Total received = $4\times\frac{180}{100}\times 900+3\times\frac{50}{100}\times 900=7830$ Profit = \$630
8.	a.	(i) 420h±2 (ii) 500 – 330 = 170h
	b.	$x = 470$
9.	a.	Using $2y + 3x = 2$, $y=-\frac{3}{2}x+1$, y intercept = 1
	b.	$2(-4) + 3x = 2$ D ($\frac{10}{3}$, - 4)
10.		$\frac{7y}{y+3}-\frac{y+9}{3-y}=\frac{7y(3-y)-(y+9)(y+3)}{(y+3)(3-y)}$ $=\frac{21y-7y^2-y^2-12y-27}{(y+3)(3-y)}$ $=\frac{9y-8y^2-27}{(y+3)(3-y)}$ or $\frac{8y^2-9y+27}{(y+3)(y-3)}$
11.	a.	(i) $33x^2y + 11xy = 11xy(3x + 1)$ (ii) $x^3 + x^2 – 9x – 9 = x^2(x + 1) –9(x + 1)$ $= (x + 1)(x^2 – 9)$ $= (x + 1)(x +3)(x – 3)$
	b.	$(x + 3y)(4x – 3y) = 4x^2 + 9xy – 9y^2$

12.		Blue: let there be x marbles Green: $x + 3$ Red: $2x + 3$ Total : $4x + 6$ $\mathbf{P(Blue)} = \dfrac{x}{4x+6} = \dfrac{6}{25}$ $25x = 6(4x+6)$ $x = 36$ Green = 39
13.		$x^2(3x-10)+2(x^3+10x-8)-4$ $=3x^3-10x^2+2x^3+20x-16-4$ $=5x^3-10x^2+20x-20$ $=5(x^3-2x^2+4x-4)$ Since expression has a factor of 5 **OR** is a multiple of 5, it is divisible by 5 for any integer x.
14.		Interior angle of polygon C = 140° Exterior angle of polygon C = 40° $\dfrac{360}{40}=9$ or $\dfrac{(n-2)\times 180}{n}=140, n=9$ Polygon C can be a regular polygon with 9 equal sides with each interior angle 140°.
15.		The scale on the vertical axis is different and misleading. It can be misinterpreted that the average score for Company C is higher than Company D.
16.	a)	
	b)	$\dfrac{5}{3} \le x < \dfrac{35}{3}$ $x = \{2,3,4,5,6,7,8,9,10,11\}$ (i) {4, 8} (ii) $A \not\subset B$

17.		
18.		$\frac{6x^2-7xy-5y^2}{18x^2-50y^2} = \frac{(3x-5y)(2x+y)}{2(3x+5y)(3x-5y)}$ $= \frac{(2x+y)}{2(3x+5y)}$
19.		$y = k\sqrt{x}$ When x increased by 300%, $4x$ $y = k\sqrt{4x}$ $y = 2(k\sqrt{x})$ y is 2 times, i.e. increased by 1 times, 100%. r = 100%
20.	a)	**P** = (6 15 8)
	b)	(3105 3402)
	c)	The total money collected from the ticket sales on Saturday and Sunday respectively.
	d)	$\begin{pmatrix}1 & 1 & 1\end{pmatrix}$
21.		Breadth: let it be x cm. Length: x + 7 cm Perimeter = 2 [(2x + 14) + (2x + 7)] = 138 x = 12 area = 4 × 12 × 19 = 912 cm^2

22.		Let AM be x cm. Area of shaded region = $\frac{1}{2}(15+x)^2(2)-\frac{1}{2}(15)^2(2)=136$ $225+30x+x^2-225-136=0$ $x^2+30x-136=0$ $x=$ -34 (rejected) or 4
23.	a)	(i) $\frac{\sin PSR}{90}=\frac{\sin 18}{28}$ **angle** $PSR=83.348\approx 83.4°$
		(ii) angle SRP = 180 – 83.348 – 18 = 78.652 Bearing of P from R = 360 – 78.652 – 83.348 = 198.0° 
	b)	$\cos PQR\frac{72^2+45^2-90^2}{2(72)(45)}$ **angle** $PQR=97.903°$**(shown)**
	c)	(i) area PQR = $\frac{1}{2}\times 72\times 45\sin 97.903=1604.6\approx 1600$**m²** (ii) $\frac{1}{2}\times 90\times h=1604.6$ $h=35.66\approx 35.7m$
	d)	$\tan 8=\frac{\textbf{height}}{35.66}$ **height** = 5.01**m** OR $\tan 82=\frac{35.66}{\textbf{height}}$ **height** = 5.01**m** 

24.	a)	$\overrightarrow{XP} = \frac{2}{5}\overrightarrow{YO}$ $= \frac{2}{5}(-10\mathbf{a} + 5\mathbf{b})$ $\overrightarrow{YP} = \overrightarrow{YX} + \overrightarrow{XP}$ $= (5\mathbf{a} + 4\mathbf{b}) + \frac{2}{5}(-10\mathbf{a} + 5\mathbf{b})$ $= \mathbf{a} + 6\mathbf{b}$
	b)	$\overrightarrow{QY} = \frac{2}{5}\overrightarrow{YO} = \overrightarrow{XP}$ $= \frac{2}{5}(-10\mathbf{a} + 5\mathbf{b})$ $\overrightarrow{QX} = \overrightarrow{QY} + \overrightarrow{YX}$ $= \frac{2}{5}(-10\mathbf{a} + 5\mathbf{b}) + (5\mathbf{a} + 4\mathbf{b})$ $= \mathbf{a} + 6\mathbf{b} = \overrightarrow{YP}$ **(shown)**
	c)	$\frac{2}{5}$