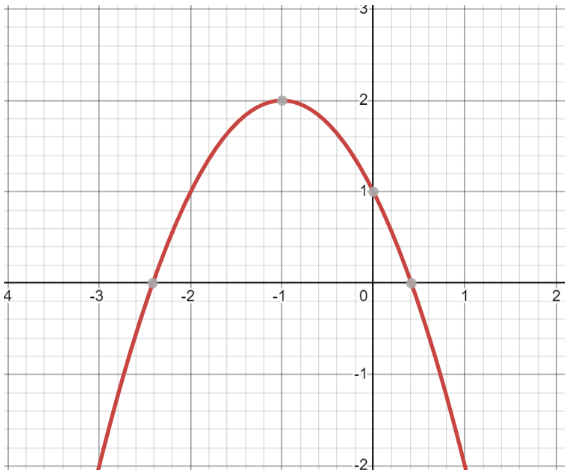
Marking Scheme 3Exp P1

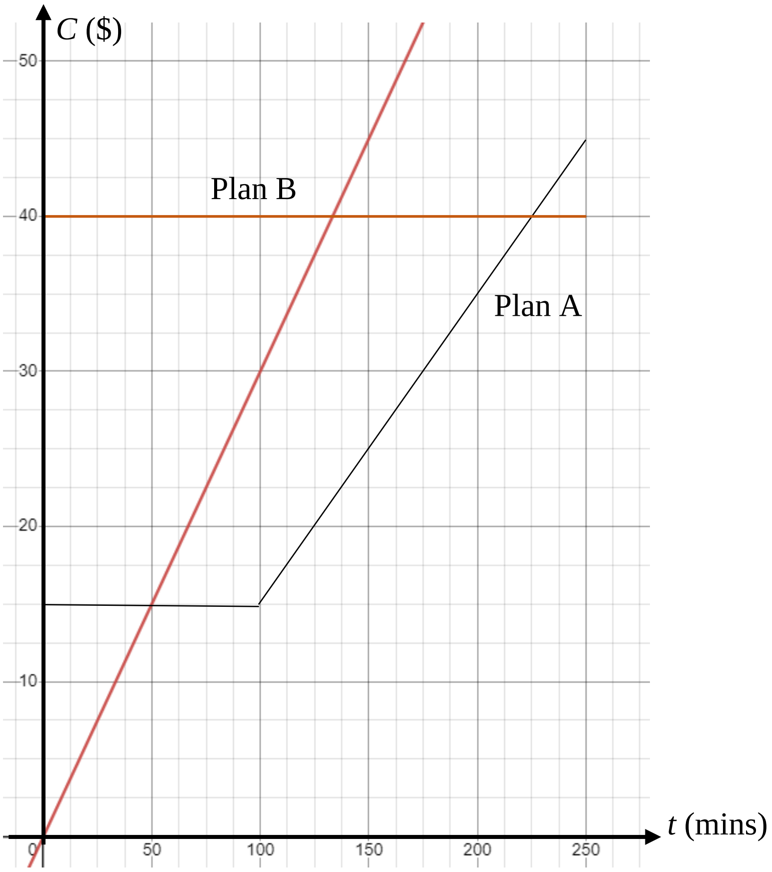
1a	$484 = 2^2 \times 11^2$ Since the power of the factors are in multiple of 2, thus 484 is a perfect square.	AO3 M1 A1
1b	$66 = 2\times3\times11$ $150 = 2\times3\times5^2$ } $\text{HCF} = 6$	AO1 M1 A1
2a	$x^2 - 6x - 2$ $= \left(x - \frac{6}{2}\right)^2 - \left(\frac{6}{2}\right)^2 - 2$ $= (x-3)^2 - 9 - 2$ $= (x-3)^2 - 11$ $\therefore b = -11$	AO1 M1 A1
2b	The minimum point occur at x = 3, therefore the y value is a minimum value.	AO3 B1
3	$\frac{2}{x+1} - \frac{3}{x-6} = 2$ $\frac{2(x-6)-3(x+1)}{(x+1)(x-6)} = 2$ $\frac{2x-12-3x-3}{x^2-5x-6} = 2$ $\frac{-x-15}{x^2-5x-6} = 2$ $-x-15 = 2(x^2-5x-6)$ $-x-15 = 2x^2-10x-12$ $2x^2-9x+3=0$ $x = \frac{-(-9)\pm\sqrt{(-9)^2-4(2)(3)}}{2(2)}$ $x = 0.363$ or $x = 4.14$	AO2 M1 M1 M1 A1

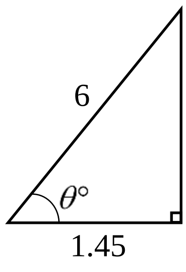
4	$3y+5x=15$ $y=-\frac{5}{3}x+5$ subst $m=-\frac{5}{3}, x=1, y=-3$ $y=mx+c$ $-3=-\frac{5}{3}(1)+c$ $c=-\frac{4}{3}$ $y=-\frac{5}{3}x-\frac{4}{3}$	AO2 M1 M1 A1
5a	$\left(\frac{2}{3a}\right)^{-3}$ $=\left(\frac{3a}{2}\right)^{3}$ $=\frac{27a^3}{8}$	AO1 M1 A1
5b	$25x^2y\times\frac{1}{10x^{-3}y^{-2}}$ $=\frac{5x^5y^3}{2}$	AO1 B2,1,0
6a	$SQ=RW$ (Given) $\angle QST=\angle WRT=90°$ $\angle QTS=\angle WTR$ (vert. opp $\angle$) $\therefore\ \Delta STQ\equiv\Delta RTW$ (AAS)	AO2 M2, 1, 0 A1
6b	$\angle PWS=180°-90°-62°$ $\angle PWS=28°$ $\angle RTW=180°-90°-28°$ $\angle RTW=62°$	AO1 M1 A1

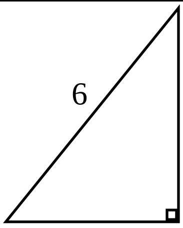
7a	$\frac{1}{6}\times 2\pi$ $=\frac{1}{3}\pi$ $=1.0472$ $=1.05rad$	AO1 M1 A1
7b	area of sector $=\frac{1}{2}r^2\theta$ $8\frac{1}{3}=\frac{1}{2}r^2\left(\frac{\pi}{3}\right)$ $r=3.9894$ $r=3.99$	AO1 M1 A1
7c	Perimeter $=r\theta+2r$ Perimeter $=3.9894(1.0472)+2(3.9894)$ Perimeter $=12.2$ cm	AO2 M1 A1
8a	$5x-3(2x-7)+9$ $=5x-6x+21+9$ $=-x+30$	AO1 M1 A1
8b	$\frac{3}{2x-1}-\frac{7}{x+1}$ $=\frac{3(x+1)-7(2x-1)}{(2x-1)(x+1)}$ $=\frac{3x+3-14x+7}{(2x-1)(x+1)}$ $=\frac{10-11x}{(2x-1)(x+1)}$	AO1 M1 M1 A1
9a	$YW^2=5^2+12^2$ $YW=13$ By converse of Pythagoras theorem, angle WZY is a right angle	AO2 M1 A1
9b	$WX^2=9^2+12^2$ $WX=15$	AO1 M1 A1
9c	$\cos\angle XYW=-\cos\angle WYZ$ $\cos\angle XYW=-\frac{5}{13}$	AO1 B1

9d	area of triangle $WXY = \frac{1}{2} \times 4 \times 12$ area of triangle $WXY = 24\text{ cm}^2$	AO1 B1
10a	 Correct curve – 1 mark *x* intercepts (0.414 and -2.414) and *y* intercepts (1) – 1 mark maximum point (-1 , 2) – 1 mark	AO2
10b	*x* = -1	AO1 B1
11a	3 – (-4) = 7	AO1 B1
11b	$\frac{3}{-1} = -3$	AO1 B1
11c	$(-4)^2 + (3)^2$ $= 25$	AO1 B1
12a	$22 \times 500 \times 5$ $= 55000g$	AO1 B1

12b	Supermarket A no. of 3 packs set $= \frac{55000}{2700}$ no. of 3 packs set $= 20.4$ no. of 3 packs set $= 21$ $21 \times 2700 = 56700g$ (more than the require amount) total cost $= 21 \times (8.45 + 8.45)$ total cost $= \$354.90$ Supermarket B no. of 6 tins $= \frac{55000}{1800 \times 6}$ no. of 6 tins $= 5.09$ $5 \times 6 \times 1800 = 54000g$ total cost $= 5 \times 91 + 16$ total cost $= \$471$ Supermarket A, not only will the owner get more milo powder and it cost lesser than Supermarket B	AO3 M1 A1 M1 A1 A1
13a	length of $AB = \sqrt{(-6-6)^2 + (-1-7)^2}$ length of $AB = 14.422$ length of $AB = 14.4$	AO1 M1 A1
13b	grad $BC = \frac{-1-2}{-6-6} = \frac{1}{4}$ $y = mx + c$ $2 = \frac{1}{4}(6) + c$ $c = \frac{1}{2}$ eqn : $y = \frac{1}{4}x + \frac{1}{2}$	AO2 M1 M1 A1
14a	$2ab^2 + 8ab^3$ $= 2ab^2(1 + 4b)$	AO1 B1
14b	$2x^2 - 5x + 3$ $= (2x-3)(x-1)$	AO1 B1
14c	$6ab - 2ad + 3bc - cd$ $= 2a(3b-d) + c(3b-d)$ $= (3b-d)(2a+c)$	AO1 M1,M1 A1

15a	$\text{total amt} = P\left(1+\frac{r}{100}\right)^{n}$ $768.80 = P\left(1+\frac{24}{100}\right)^{2}$ $P = \$500$	AO2 M1 A1
15b	$\text{total amt} = P\left(1+\frac{r}{100}\right)^{n}$ $\text{total amt} = 500\left(1+\frac{\frac{24}{2}}{100}\right)^{2\times 2}$ $\text{total amt} = \$786.76$	AO2 M1,M1 (FT) A1
16a		AO2 B1 B1
16b	Plan A	AO1 B1
16c	225 mins	AO1 B1
17a	Graph E	AO1 B1
		AO1

17b	Graph C	B1
17c	Graph D	AO1 B1
18a	$\angle ACB = 325° - 270° = 55°$ $\frac{AB}{\sin 55°} = \frac{52}{\sin(90° - 18°)}$ $AB = 44.788$ $AB = 44.8\text{m}$	AO2 M1 M1 A1
18bi	$\angle ACD = 180° - 55° = 125°$ area of triangle $ACD = \frac{1}{2} ab \sin C$ $1256 = \frac{1}{2}(52)(CD)\sin 125°$ $CD = 58.973$ $CD = 59.0\text{m}$	AO2 M1 M1 A1
18bii	$AD^2 = 52^2 + 58.973^2 - 2(52)(58.973)\cos 125°$ $AD = 98.487$ $AD = 98.5\text{m}$	AO2 M1 A1
19a	$6^2 = 1.45^2 + h^2$ $h = 5.8222$ $h = 5.82$ m	AO1 M1 A1
19b	$\cos\theta = \frac{1.45}{6}$ $\theta = 76.02°$ $\theta = 76.0°$ 	AO1 M1 A1

19c		AO3
	$\text{height} = 5.8222 - 0.6$ $\text{height} = 5.2222$	M1
	$\text{distance from the wall} = \sqrt{6^2 - 5.2222^2}$ $\text{distance from the wall} = 2.9544$ $\text{ratio} = \dfrac{5.2222}{2.9544} = 1.7676$	M1
	Since the ratio of the height to the distance from the wall does not follow the 4 to 1 safety rule. Thus it is not safe to use the ladder.	A1