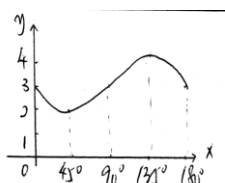# CAMBRIDGE A LEVELS

Answers for AS Trial Exam Papers

Aug/Sept 2012 (P1)

1. $7y = x + 41$
2. $\left(\frac{16}{3}, 8\right)$
3. $243 - 810x + 1080x^2 - 720x^3 + \cdots ; 157\frac{1}{2}$
4. $96078.26; 165080.34; 10.24$
5. $2 \times 6 \times 12$
6. $41.2; 0.873; 3.42$
7. $\frac{32}{2}; 72\frac{8}{15}\pi$
8.

   $1.11, -2.03, -1.25, 1.89$
9. $f(x) \le 2$;
   $not\ one-to-one\ function$
   $4\frac{1}{2}, 3\frac{1}{2}; \frac{1}{x} + 4;$
   $x \in \mathcal{R}, x \ne 0\ ; g^{-1}(x) \in \mathcal{R}, g^{-1}(x)\ \ne 4$
10. $-\boldsymbol{i} - \boldsymbol{j} + h\boldsymbol{k}; -\boldsymbol{i} - 3\boldsymbol{j} - h\boldsymbol{k}; h = 1; 58.5$

Aug/Sept 2012 (P6)

1. $30.5; 5.385$
2. $1.671 < x < 2.329$
3.

x	0	1	2	3
p	$\frac{1}{14}$	$\frac{3}{7}$	$\frac{3}{7}$	$\frac{1}{14}$

   $\frac{3}{2}; \frac{15}{28}$
4. $17.5\ ; 10\ ; 27$
5. $180\ ; 240; 31$
6. $(a)\frac{1}{40}, \frac{21}{200}; \frac{7}{25}; \frac{5}{21}, not\ indepedent$
7. $0.0654\ ; 0.999\ ; 4\ ; 0.536$

March/April 2012 (P1)

1. $(1,3); (-4,8)$
2. $14\frac{2}{3}$
3. $(i)\frac{70}{24}; \frac{70}{243}\quad (ii)\frac{1960}{243}$
4. $0, 180, 221.8, 318.2, 360$
5. $(i)\ \frac{2\pi}{3}; \frac{2\sqrt{3}}{3}: 1\quad (ii)\frac{2\sqrt{3}}{3} - \frac{2}{9}\pi$
6. $\frac{1}{\sqrt{194}}\begin{pmatrix} 11 \\ 5 \\ -7 \end{pmatrix}; 45.3; 3.54$
7. $(i)124\quad (ii)\frac{1}{3}$
8. $(i)8\quad (ii)512\pi\quad (iii)\ max$
9. (i) $(2x - 3)^2 - 5$
   (ii) least value = -5 when $x = \frac{3}{2}$
   (iii) $x \le -1\ or\ x \ge 4$
   (iv) 3/2   (v) $\frac{3-\sqrt{x+5}}{2}$

March/April 2012 (P6)

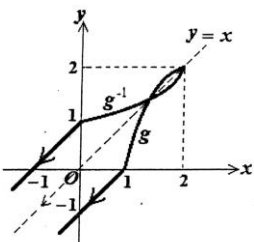1. $15; 1215.39$
2. $720; 2520; 36$
3.

d	0	1	2	3	4	5
$P(D = d)$	$\frac{8}{36} = \frac{2}{9}$	$\frac{8}{36} = \frac{2}{9}$	$\frac{6}{36} = \frac{1}{6}$	$\frac{4}{36} = \frac{1}{9}$	$\frac{6}{36} = \frac{1}{6}$	$\frac{4}{36} = \frac{1}{9}$

   $2.11\ ; 2.88$
4. $0.590\ ; 0.349$
5. $18.5\ ; 19\ ; 120$
6. (i) 0.332 (ii) 52.8 (iii) 0.5426
7. $0.8904\ ; 0.0548;\ 43.972; 439.72$

Aug/Sept 2011 (P1)

1. 210
2. $b^2 - 4ac < 0$
3. 0, 180, 360, 45, 225
4. A(12,2) ; B(-4,-6) ; $2x + y = 6$
5. (-2,3); $\frac{dy}{dx} < 0$ $decreasing$; $2y = x - 4$
6. $\frac{1}{2}\sqrt{15 - \lambda^2}$; $-\frac{1}{2}\mathbf{i} + \frac{\lambda}{2}\mathbf{j} + \frac{1}{2}\sqrt{15 - \lambda^2}\mathbf{k}$; $\mathbf{i} + \lambda\mathbf{j}$; 70.4
7. 4, -2 ; 36 ; $81\frac{1}{15}\pi$
8. $\frac{4}{7}$; 11250
9. 9.32 ; 17.8 ; 4.53
10. $f(x) \le 2$; f is not one to one; $k = 2$
$$g^{-1}(x) = \begin{cases} x + 1, & x < 0 \\ 2 - \sqrt{\dfrac{2 - x}{2}}, & 0 \le x \le 2 \end{cases}$$

March/April 2011 (P1)

1. $243 + 810x + 1080x^2$
2. $x = 4, y = -2$; $x = -2, y = 4$
3. (i) $\frac{7}{2}$ (ii) 86.7
4. (i) $-3, -1, 1$ (ii) 2 (iii) $n(n - 4)$
5. (i) $5sin^2x + 3sinx - 2 = 0$
   (ii) 23.6, 156.4, 270
6. (i) 0.9 (ii) 8 (iii) 79.588
   (iv) 0.412
7. (i) $(x - 3)^2 + 9$ (iii) $3 + 4\sqrt{2}$
8. (i) $x = -5, y = 5$; $x = 2, y = 26$
   (ii) $\frac{343}{6}$
9. (i) 5.6 (ii) 15.7 (iii) 5.95
10. (i) $80 - \left[2 + \frac{\pi}{2}\right]x^2$ (ii) $\frac{80}{4 + \pi}$
    (iii) $y'' = -2\left[2 + \frac{\pi}{2}\right] < 0$ (max)
    (iv) A = 448

March/April 2011 (P6)

1. m 8 7 6   2. 20
   n 3 4 5
3.(i) boxes are independent
        Probability is same for each box.
  (ii) 0.187   (iii) 0.160
4(i) 2 (ii) 60 (iii) std dev = 7.63; mean = 12.92
5 (i) 60; 6   (ii) 150; 0.4
6(i) $P(A) = \frac{1}{2}$; $P(A|C) = \frac{1}{2}$,
        $A \& C \ are \ independent.$
  (ii) $P(B|C) = \frac{1}{6}$, $P(B) = \frac{5}{72}$
        B & C are not independent.
7 (i) $a = \frac{4}{5}, b = \frac{1}{5}, c = \frac{1}{4}, d = \frac{3}{4}, e = \frac{3}{4}, f = \frac{1}{4}$
  (ii) 9/20   (iii) ¼   (iv) $1\frac{3}{4}, \frac{63}{80}$

Aug/Sept 2011 (P6)

1. 0.7814
2. 15.9 ; 47.2
3. 4320, 2880, 10
4. 9.5×10^{-5} 5.95×10^{-4} ; 0.160
5. 0.1587 ; 11.056; 11.1 or 14.2 ; 0.337

6.

ω	-2	-1	0	1	2
$P(W = \omega)$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{5}{18}$	$\frac{1}{9}$	$\frac{1}{36}$

$-\frac{2}{3}$; $\frac{10}{9}$; $\frac{11}{18}$

7. 1.85; 0.80; 1.95; 0.0157

Aug/Sept 2010 (P1)

1. $2 + \sqrt{3}$
2. (i) $\frac{\pi}{6}$ (ii) 1.08
3. (i) $1 - 24x + 264x^2$ (ii) 192
4. (ii) 23.6, 156.4, 270
5. (i) $\begin{pmatrix} \frac{2}{3} \\ 2 \\ \frac{2}{3} \end{pmatrix}$; $\overrightarrow{AB} = \begin{pmatrix} -2 \\ 3 \\ 0 \end{pmatrix}$ (ii) 69.3
6. (i) 36 (ii) $40\frac{1}{2}\pi$
7. (i) $2(x+3)^2 - 5$

   (ii) -3 (iii) $-3 - \sqrt{\frac{x+5}{2}}$
8. (i) 1295,
   167000 (ii) 1.0114, 124000
9. (ii) $x = 5$, $y = 6$ minimum
   (iii) 300
10. (i) 6 (ii) $4\sqrt{5}$
    (iii) 10 (iv) $y + 2x = 6$

March/April 2010 (P1)

1. $-2 \le x \le 10$
2. $n = 9$; -34642080
3. $-$
4. 1.4455
5. (i) $s = 6$ (ii) 101.0
6. $\frac{\pi}{6}, \frac{1}{2}$; $\frac{\pi}{2}, 2$
7. (a) $x = \pm 1; 2\frac{2}{3}$ (b) π
8. (ii) 3 (iii) minimum
9. (i) $y = \frac{1}{3}x + \frac{5}{3}$ (ii) $\left(\frac{5}{2}, \frac{5}{2}\right)$

   (iii) $3\sqrt{\frac{5}{2}}$ (iv) 15
10. (i) $(x-3)^2 - 9$ (ii) $k = 3$
    (iii) $g^{-1} = 3 + \sqrt{x+9}; x \ge -9, y \ge 3$
11. (i) $\frac{341}{8}$, $a = 64$, $r = -\frac{1}{2}$, $\frac{128}{3}$
    (ii) $4, \frac{11}{2}, 7$

Aug/Sept 2010 (P6)

1. (i) 90720 (ii) 20160
2. (i) 0.244 (ii) 0.102
3. (i) 0.9332 (ii) 0.5199; 0.4852
4. (i) $\frac{11}{13}; \frac{1}{13}; \frac{1}{13}$ (ii) $\frac{36}{13}; \frac{56}{169}$
5. (ii) generally, marks for country E are
       evenly distributed and marks for
       country C are positively skewed.
    (iii) advantage: illustrate the dispersion
       or spread of the distribution.

       disadvantage: the frequencies of
       data are unknown.
6. (ii) (a) 3   (b) 24.5 (iii) 28.0; 11.2
7. (i) $\frac{2}{5}$ (ii) 0.224 (iii) 0.944 (iv) 0.35
   (v) $P(A \cap B) = P(A).P(B) = 0.224$
       Independent
   (vi) $P(B \cap C) = 0$ $M.E.$

March/April 2010 (P6)

1. (i)40320 (ii) 141120
2. (i) 124.5, 4.8 (ii) 123.5
3. (i) 0.495 (ii) 0.604
4. $(a)(i)$ 0.250 (ii) 0.758 (b) 0.0433
5. (ii) $7 - 9, IQR = 9.13 \pm 0.1$
   (iii) 32 (iv) 10
6. (i) $\frac{1}{30}$ (ii) 5.5; 4.92 (iii)1/2
7. (a)51.3 , 834 (b) 0.8185, 82

Aug/Sept 2009 (P1)

1. 90720
2. 2460
3. 35.1
4. (i) $-\sqrt{x-1}+2, x \geq 1$ (ii) $x-2$
   (iii) $x \geq 1; y \leq 2$
   (iv) reflection in the line $y = x$.
5. (ii) 63.6, 116.4
6. (i) D(10, 0) (ii) 1:3
7. (i) $(x+1)^2 + 2$ (iii) $x \geq 2; x \leq -4$
8. (i) $\frac{1}{\sqrt{21}}\begin{pmatrix} -1 \\ 4 \\ 2 \end{pmatrix}$ (ii) k = -3, p = 2
   (iii) (a) $\begin{pmatrix} 1 \\ -13 \\ -3 \end{pmatrix}$ (b) not a rectangle
9. (a) $1 - \frac{16}{x^2}$; $3y = x + 52$
   (b) (i) $\frac{1}{4}(x^3 - 7x^2 + 8x + 16)$
   (ii) $\frac{2}{3}$; $\frac{125}{27}$
10. (a) (i) $\frac{x^5}{5} - \frac{3x^4}{4} + x^3 - \frac{x^2}{2} + c$
    (ii) $\frac{2}{9}(3x-1)^{\frac{3}{2}} + c$ (b) $\frac{1}{3}$

March/April 2009 (P1)

1. $2(x+2)^2 + 5 > 0$ 2. 2160
3. 45, 135, 225, 315
4. $\frac{1}{2}$; D(-5/2, 0); $\sqrt{45}$
5. 2.22; 0.928; 19.2
6. $\sqrt{\frac{10}{11}}$; $12\sqrt{10}$ 7. $\frac{14}{3}$; $\frac{188}{15}\pi$
8. d = 2a ; d = 2, a = 1; $r = \frac{1}{3}$
9. $\left(\frac{1}{\sqrt{3}}, -\frac{2}{3\sqrt{3}}\right), \left(-\frac{1}{\sqrt{3}}, \frac{2}{3\sqrt{3}}\right)$;
   $-\frac{2}{3\sqrt{3}} < k < \frac{2}{3\sqrt{3}}$

March/April 2009 (P6)

1. $\bar{y} = 0.34, s_y^{\,2} = 0.94815$;
   $\bar{x} = 25.34, s_x = 0.974$
2. 120; 120
3. median = 4.60; IQR = 1.1
4. 0.65; 0.35; $\frac{2}{7}$
5. 0.410; 0.672; $\mu = 20, \sigma^2 = 16$;0.130
6. 0.159; 0.625; a = 11; a = 14.8; 0.337
7. 2/9; 1/18; [2,1/36; 3,8/36; 4,8/36; 5,8/36; 6,2/9; 7,1/18; 8,1/36]; 14/3

Aug/Sept 2009 (P6)

1. (i) 8 (ii) 9.17
2. (i) (a) 2 (b) 3 (c) 2; 4
   (ii) L =1, H=7
3. (ii) 0.115 (iii) 0.391
4. 362880 (i) 100800 (ii) 302400
5. (i) 0.571 (ii) 0.360 (iii) 0.734
6. (i) 14.25 (ii) 736 (iii) 462
7. 0,1/8; 1,3/8; 2,3/8; 3,1/8
   (i) (18 + 3x)/8 (ii) 4 (iii) 18.75

1. 5/3   2. 74.5, -74.5

3. $\dfrac{7}{1100}; 5$

4. $2y - x + 4 = 0$; $D(8/5, -6/5)$;
   $E(4,0)$

5. k>6, k<-6; $a = -2\sqrt{3}, b = -3$; $\sqrt{3}, 3\sqrt{3}$

6. $\dfrac{2}{3}\pi; \dfrac{\pi}{3} - \dfrac{\sqrt{3}}{4}; 39\%$

7. $d = \dfrac{15}{2}; a = 12; r = 3/2$,
   $a = 8; r = -3/2, a = -8$

8. $b^2 - 4ac = -8 < 0$ (no real roots);
   $x \geq -4$; $f^{-1}(x) = -2 + \sqrt{x + 4}$

9. $\left(\dfrac{1}{4}, \dfrac{1}{4}\right), \dfrac{d^2 y}{dx^2} < 0$ (max); 1/6; $\dfrac{1}{30}\pi$

10. $\begin{pmatrix} 1 - \mu - \lambda \\ 1 \end{pmatrix}, \begin{pmatrix} -1 \\ 1 - \mu - \lambda \end{pmatrix}; \overrightarrow{PR} \bullet \overrightarrow{QS} = 0$;

   $\overrightarrow{OT} = \begin{pmatrix} 2 - \mu \\ \lambda + \mu \end{pmatrix}; \begin{pmatrix} 1 \\ a - 1 \end{pmatrix}; \begin{pmatrix} 2 - a \\ a \end{pmatrix}; 45^0$

1. $b^2 - 4ac \geq 0 \Rightarrow$ the roots are real.
2. $\alpha = 18.43; 80.79, 170.79$
3. $1 - 10x + 40x^2 + ...; 1 + 27x + 324x^2 + ...;$
   $1 + 17x + 94x^2 + ...$
4. $\theta = 2.1617 rad; \alpha = 0.9799 rad; 59.41$
5. $-2; 10; \dfrac{5}{8}$
6. $2y = x + 3; y = x^2 - 4x + 5$
7. $\begin{pmatrix} 2 \\ -2 \\ -2h \end{pmatrix}; \sqrt{2}; \begin{pmatrix} -1 \\ -1 \\ 1 \end{pmatrix}$
   $x \leq 1 \text{ or } x \geq 1$; $\sqrt{x - 1} + 1; x \geq 1$
8. $\dfrac{1}{(x-1)^2 + 1}; 0 < gf(x) \leq 1$
9. 90; $y = 2x - 15$; (5, -5); $3\sqrt{5}$
10. $\dfrac{5}{6}; \dfrac{8}{15}\pi$

1. 5040; 10080
2. 2.5; 2, 4, 4-2 = 2
3. 0.1754; 25.2
4. c = 0.5, b = 1/3, a = 1/6
5. 11/36; 1/6; 1/162
6. 4.6; 2;
   $\sum y^2 = 1210; \bar{x} = 4.56, s = 2.04$
7. 0.111; $0.3\sqrt{n}; 65$

1. 30240; 23520
2. median is most appropriate; mean is not suitable, too many small sizes/distribution is (positively) skewed, etc ; mod is not suitable, the 1st class is the modal class; mean = 60.1 or median = 21.5 (accept answer 20 to 22)
3. 0.00053; 0.943
4. 1/10; [0, 3/10; 1, 6/10; 2, 1/10]; 4/5, 9/25
5. 0.159; 3.04; 0.774
6. 0.180; 0.998; 0.0658
7. Experienced rats: median = 128.5, 1st Quartile = 125, 3rd quartile = 131 Inexperienced rats: median = 145, 1st Quartile = 137, 3rd quartile = 150.5; Experienced rats are faster, etc; experienced rats move with more constant times/ move with less variable times.

Aug/Sept 2007 (P1)

1. $a^4 + 8a^3b + 24a^2b^2 + 32ab^3 + 16b^4 ; 240$
2. $3\theta = 2(\pi - \sin\theta)$
3. $-3 < k < 3$
4. $-4;\ \dfrac{5}{4}\pi, \dfrac{7}{4}\pi$; max = 6, min = 2
5. $y = \sqrt{20 - x^2} ; 4$
6. $y + 2x - 4 = 0; (3,-2); 4\sqrt{5}$
7. $4m;\ 90;\ \sqrt{\dfrac{1}{20}t^2 - \dfrac{2}{5}t + 40}$
8. $x \geq 1;\ (x-1)^2, 1 + x; 3$
9. $\dfrac{32}{3}; \dfrac{32}{3}; x = 1; y = 6x + 1$
10. 5674; 12; 6

March/April 2007 (P1)

1. $4455\,x^4$
2. $2;\ y = 2x^3 + 2x^2 + 1$
3. $y = \dfrac{1}{4}(3x+1)^{\frac{4}{3}} + x + c;\ 2.34$
4. $x = 8, r = \dfrac{2}{3}; x = 1, r = -\dfrac{1}{2}$
5. $\dfrac{6}{5}\pi$ 6. $4\mathbf{j} + 3\mathbf{k}; 93.0^o$
7. $1 - \dfrac{1}{x^2}, \dfrac{2}{x^3};\ x = \pm 1,\ (1,2)\ \text{minimum},$ $(-1,-2)\ \text{maximum}$
8. $(p, -p^2 + p), 0 < p < 1; \dfrac{-1 + \sqrt{5}}{2}$
9. $4; 20; (11,11,), (-1,-5)$
10. $4\pi; 0^o, 180^o, 45^o, 135^o, 225^o, 315^o$
11. $-6; x^2 - 6; x \geq 0; f^{-1}(x) \geq -6; -\dfrac{1}{5}; (3,3)$

Aug/Sept 2007 (P6)

1. 10;24
2. -
3. (i) 16; 35; 19
   (ii) 25; L = 11, H = 46
4. 2.597; 950
5. 0.525; 0.811
6. 1/3; E(x) = 0(1/2)+1(1/3)+2(1/6)=2/3 ; Var(x) = 5/9
7. 69300; 46200; 479001600; 33868800
8. 1; 0.052

March/April 2007 (P6)

1. 12;96
2. 30;11.5; distribution is positively skewed.
3. $E(x) = 1(1/4) + 1(1/3) + 2(10/36) + 3(1/9)$ $+ 4(1/36) = 4/3;$ $\text{var}(x) = 10/9$
4. 0.024;0.452;0.496
5. 4.6; 2; 4.56; 2.04
6. 0.765; 0.0130; 0.951
7. 0.106; 45.256; 0.266; 0.0188

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Aug/Sept 2006 (P1)

1. $-\dfrac{1}{6}$

2. (a) $\dfrac{2\pi}{5}\,rad$ (b) $8.58\ units^2$

3. (i) $\left(\dfrac{3+a}{2},\dfrac{10+b}{2}\right)$

4. (a) -720 (b) $193+132\sqrt{2}$

5. (i) 3.5 (ii) 86.7

6. (a) Domain $x<1$

    (b)(i) $(2-3x)^3$ (ii) $\dfrac{1}{3}(2-x^{1/3})$

7. (a) 31.7, 121.7, 211.7, 301.7
    (b) 71.6, 251.6

8. (a) 36 (b) $\dfrac{81}{2}\pi$

10. (a) 0.646 (b) -20

11. (b)(i) 8

    (ii) $60\dfrac{3}{4}$

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March/April 2006 (P1)

1. $k<-\dfrac{1}{3}$

2. (a) $2\sqrt{14}$ (b) $\dfrac{13\sqrt{7}}{35}$

3. $\dfrac{5\pi}{6}$

4. (a) $\dfrac{1}{4}$ (b) 0.1298

5. (a) $\dfrac{23}{4};60^0$ (b) 7.5, 37.5, 97.5, 127.5

6. (b) $2\dfrac{1}{2}$

7. (a) $2x+\dfrac{8}{(1-x)^2};2+\dfrac{16}{(1-x)^3}$

    (b) minimum

8. (a) $2y=x+11$ (b) (13,12) (c) 35.78

9. (a)$\dfrac{15}{2}$ (c) $\dfrac{x-2}{3};\dfrac{6-3x}{2x};-\dfrac{9}{2},2$

10. (a) 1;2 (b) 69

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Aug/Sept 2006 (P6)

1. (i) 134 (ii) 13.4
    (iii) Skewed to the right

2. $\dfrac{108}{155}$

3. (i) A and B are not mutually exclusive
    (ii) A and B are not independent

4. 2454

5. (i) 0.0111 (ii) 0.8413
    (iii) Ashley. There are 1.11% of adult mullet longer than Ashley's catch but 15.87% adult bream longer than Kim's catch. Therefore, Ashley has performed better.

6. (i) 0.669 (ii) 0.027

7. $P(r=0)=7/15$ $P(r=1)=7/15$

    $P(r=2)=1/15$

    Number of point $=0$

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March/April 2006 (P6)

1. $\dfrac{1}{5}$

2. (ii) 1,2/5; 2,3/10; 3,1/5; 4,1/10

3. (ii) $\dfrac{9}{26}$

4. (i) 3.74×10^{-7} (ii) 0.9949

5. (i) Weight gained (ii) 3.05
    (iii) 3 ± 0.2

6. (i) 0.0264
    (ii) 0.870

7. (i) 38.6
    (ii) 0.115
    (iii) 17

8. (i) 30240
    (ii) 15120
    (iii) 151200

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Aug/Sept 2005 (P1)

1. -1080
2. $y = x^3 + 3x^2 - 5x + 6$
3. (i) $r = \dfrac{4\theta}{2+\theta}, A = \dfrac{8000}{(2+\theta)^2}$

    (ii) $A = \dfrac{3200\pi}{(8+\pi)^2}$
4. (i)   9   (ii)   - 4, 85
5. (i) (4, 6)   (ii) $y = 3x - 6$ (iii) 28
6. (i) $\begin{array}{l} -4(x-4)^{-2} + (x-1)^{-2}; \\ 8(x-4)^{-3} - 2(x-1)^{-3} \end{array}$

    (ii)   (2, -3) Max ; (-2, -1/3) Min
7. (i) $f(x) \le 4$ (ii) $\pm\sqrt{6};\pm\sqrt{2}$
8. (i)   3   (ii) 199.5, 340.5, 90
9. (i) $\begin{pmatrix} 1/3 \\ -2/3 \\ -2/3 \end{pmatrix}$ (ii) ± 2
10. (i)   (9,0), (0,6), (0,-6)

    (ii)   72

    (iii) 162π
11. (i) $2(x-2)^2 - 3$

Aug/Sept 2005 (P6)

1. 0.994
3. (i) $\dfrac{1}{8}; \dfrac{5}{24}$
4. (i)   0.004

    (ii)   0.604

    (iii)   0.00662
5. 0.322;0.0845
6. (ii) 116 ± 5

    (iii) 35.5 ± 2
7. (i)(a)   45

    (b)   240

    (c)   210

    (ii)(a)126

    (b)$\dfrac{4}{9}$

March/April 2005 (P1)

1. $y = 5x - 16$
2. (a) (-3, -6) (b) $-3 - \sqrt{6} < x < -3 + \sqrt{6}$
3. (a) $-\dfrac{1}{x} - 2\sqrt{x} + c$ (b) $y = -\dfrac{1}{x} - 2\sqrt{x} + 3$
4. (a) $f(x) \ge -1$

    (b)   The inverse function exists because
    in the restricted domain of $x \ge 0$, f is
    one-to-one Function

    (c)   -6   (d) $4x + 23$
5. (b) $\dfrac{25}{3}\pi$ (c)   17
6. (a) $\dfrac{3}{2};63;189$ (b)   126
7. $3;7;\dfrac{\sqrt{41}}{2}$
8. (a)   26, 66, 146
9. (a) $a_6 = a + 5d$ (d)   660
10. (a) $y = -6x + 8$ (c) $5\dfrac{1}{3}$

March/April 2005 (P6)

1. (i) 27;4 (ii) m-unchanged   s-reduced
2. (i)   34560   (ii)   56;30
3. (a)   0.234   (b)   7.02
4   (i)   0.678 (ii)   14
5. (iii) $1\dfrac{1}{16}$
6. (i)   33;22

    (iv)   Male doctor-positively skewed
    Female doctor-approximately
    symmetrical
    Median male doctor > median
    female doctor
    Range male doctor > range
    female doctor
7. (i) 0.571 (ii) $\dfrac{1}{15}$ (iii)   0.734

Aug/Sept 2003 (P1)

1. 240
2. $4y = 15x - 12$, $30y + 8x = 151$
3. (b) 52.6°
4. (a) 2, 14 (b) (3, 2)
5. $3 \leq x \leq 4$
6. $-15°$, $-75°$, 45°
7. (a) 12 (b) 0.75 (c) 0.0482
8. Min. pt. (2, 2)
9. (a) $\pi\sqrt{2}$ cm (b) $4\pi - 8$ cm^2
10. (a) $3x^2 - \dfrac{2}{x^2} + c$ (b) $\dfrac{128\sqrt{2}}{3}$
11. (a) $3(x + 1)^2 - 12$ (b) -12; -1 (c) -1
    (d) $-\dfrac{\sqrt{x+12}}{3} - 1$

Aug/Sept 2003 (P6)

1. 25.3, 0.963
2. 0.136
3. (ii) 33 yrs. (iii) 38.8 yrs.
4. (i) 0.45 (ii) $\frac{1}{3}$
5. $\frac{8}{25}$, $\frac{1}{45}$; loss $= \frac{2}{9}p$
6. (i) A & C (iii) $\frac{1}{10}$

March/April 2003 (P1)

1. $\overline{1 - 12x + 60x^2 - 160x^3 + ...}$; 0.8858
2. 7
3. $(-2,3), (5,4)$
4. (a) 27, 697 (b) 43.113 cm^2
5. (a) $\begin{pmatrix} -2 \\ 5 \\ 2 \end{pmatrix}$; B divides AC in the ratio 1 : 2
   (b) 41°
6. (a) $-28,500$ (b) $a = 5$, $r = 2$
7. (b) $0 < m < \dfrac{1}{4}$
8. (a) $f(x) \geq -1$ (b) $f(x)$ is one-one,
   $f^{1}(x) = \dfrac{1}{2}\sqrt{x+1}$
   (c) $0 \leq x \leq 3$
9. (a) $\dfrac{2}{3}$ units^2 (b) $\dfrac{8}{15}\pi$ units^3
10. (b) 0 , π , $\dfrac{1}{3}\pi$, $\dfrac{2}{3}\pi$
11. (a) $a = 6$, $b = 15$ (b) $r = 4$ cm, $h = 8$ cm

March/April 2003 (P6)

1. (i) $\frac{1}{4}$ (ii) $\frac{1}{12}$
2. (i) (a) 495 (b) 252 (ii) $\frac{42}{55}$
3. (i) 0.210, 105 (ii) 47.2, 15.9
4. (i) $\frac{23}{50}$ (ii) $\frac{7}{10}$ (iii) $\frac{8}{23}$
5. (i) 57.5 (iii) 8
6. (i) $\frac{7}{3}$, 0.745

(ii)
x	2	3	4	5	6
P(X=x)	$\frac{1}{36}$	$\frac{1}{9}$	$\frac{5}{18}$	$\frac{1}{3}$	$\frac{1}{4}$

(iii) $\frac{14}{3}$, $\frac{10}{9}$
7. (i) (a) 0.0133 (b) 0.642 (c) 0.223

1. $1 - 20x + 180x^2 - 960x^3 + \ldots$;
   $2 - 35x + 260x^2$

2. (b) $\left(\dfrac{18}{5}, 0\right)$

3. (b) $0°, 180°, 360°$; $70.5°, 289.5°$

5. (a) $\left(\dfrac{15}{2}, 0\right)$ (b) $29\dfrac{1}{4}$ units^2

6. (a) ± 4 (b) $2k - 7$; $\dfrac{7}{2}$

7. (a) $\dfrac{1}{3}\pi$ (b) $\dfrac{2\sqrt{3}}{3}\pi$ cm (c) 0.645 units^2

8. (a) $x < 0 , x > 4$ (b) $12y = -x + 194$

9. (a) $\dfrac{9}{4}$, 3 , $\dfrac{15}{4}$

10. (a) $f(x) \le 4$ (b) $f^1(x) = \sqrt{4-x}$, $x \le 4$ (c) 1.56

11. (b) $V = \dfrac{xc}{2b} - \dfrac{\pi x^3 a}{2b}$

1. $25, 538$
2. (i) 0.973 (ii) 0.857
3. (ii) 0.0395
4. (a) (i) $2,520$ (ii) $151,200$ (b) 76
5. (b) $744, 15.2$ (c) $745, 737, 753$
6. (i) 0.01 (ii) 0.72 (iii) 0.008 (iv) 0.02
(v) 0.01 (vi) $0.81 - 0.27k, 8.1 - 2.7k$ (vii) 3

1. $\dfrac{4}{3}\left(26\sqrt{2} - 22\right)$

2. (a) $-\dfrac{1}{2}$ (b) $2\sqrt{5}$ (c) $(1,5)$

3. $161.8°, 341.8°$

4. (i) 8π cm (ii) 40π cm^2

5. 5π cm^2/s

6. $-1 \le p \le 3$

7. $2y = 6 - x$

8. (a) $\dfrac{14}{3}$ units^2

9. (i) $\begin{pmatrix} 7 \\ -3 \\ 10 \end{pmatrix}$ (ii) $\sqrt{21}$ (iii) 45 (iv) $83.1°$

10. (i) $-\dfrac{7\sqrt{5}}{15}$, $-\dfrac{2\sqrt{5}}{15}$ (ii) $60°$

11. (i) (i) $\dfrac{11}{4}$ (ii) $\dfrac{3}{2}$

12. (a) $3y = x + 3$ (b) $y = -tx + at^3 + 2at$

13. (a) $12, 13.5, 15, 16.5$ (b) (i) $\dfrac{1}{3}$, $-\dfrac{1}{4}$ (ii) $\dfrac{27}{2}$

14. (i) $f(x) \ge -6$ (ii) $f(x)$ is one-one for $x \ge 1$;
$1 + \sqrt{x+6}$, $x \ge 1, f^1(x) \ge 1$ (iii) $\dfrac{3 + \sqrt{29}}{2}$

1. 0.27
2. (a) $0.3, 0.51$; (b) 8
3. (i)

x	1	2	3	4
P(X=x)	$\frac{1}{6}$	$\frac{5}{36}$	$\frac{25}{216}$	$\frac{125}{216}$

(ii) 1.17
4. (i) 0.0428 (ii) 0.142 (iii) 0.189; 0.642
5. (a) $6,720$ (i) 720 (ii) $2,400$ (b) $540,000$
6. (a) 20.1 (b) Grouped data – exact values not known, rounding of errors. (c) 21 hrs.
(d) slightly negative or normal skewness
7. (a) (i) 0.0881 (ii) 0.624 (b) 0.881;
accurate as large n, p= $\frac{1}{2}$ (c) H