

INDEX

A

accuracy, and trigonometric questions xv
addition rule for probabilities 210
adjacent (right-angled triangle) xiii
algebraic equations ix–x
algebraic expressions, manipulating ix
amplitude 158, 159, 163
'and' in probability questions 205
angle of depression xv
 of elevation xv
 of inclination of a line 29
 sum and difference identities 181–3
arc length 33, 36, 43–49
area of a triangle xiv
 given two sides and the angle between
 them 9–12
asymptotes 136, 138

B

bearings xv
binomial expansion 243

C

chord length 33, 34
co-domain 53
collinear points 19
combinations 239–42
 and Pascal's triangle 243
complement xvi
complementary events xviii, 219
completing the square 106–7, 120, 124
concavity 88, 138
conditional probability 197–202, 203, 219
coordinates of midpoint 71–2
cosine of an angle, unit circle definition
 7–8, 159
cosine function 159
 positive or negative? 169

cosine ratio xiii–xiv
cosine rule xiv, 16–9, 21–2
counting 235–45
cubic functions 129–134
cyclic quadrilateral 19

D

degrees, converting to radians 39–40
dependent variable xi
direct proportion (direct variation) viii, 67
discriminant 122
distance between two points 72, 73
domain 53, 54, 55, 139

E

elements xvi
empirical probability xviii
equally likely outcomes xviii
equation of a circle 148–151
equation of a straight line 64–70, 75–7
exact values (trigonometry) 26–8, 171–3

F

factorials 237–8
function notation xi
functions xi, 53–4, 56–9
 general 142–7
 graphs of 56, 57
 linear xi, 63–81
 machine analogy xi, 55
 natural domain 55
 polynomial 129–35
 quadratic xii, 85–107
 reciprocal ix, xii–xiii, 136–7
 trigonometric 157–73
 types of xi–xiii

G

gradient
 line joining two points 70, 72, 73
 parallel lines 80
 perpendicular lines 80–1
 straight line graphs 64–6
graphs
 cubic functions 130
 functions 56, 57
 quadratic functions 86–98
 reciprocal functions xii–xiii, 136–7
 trigonometric functions 157–68

H

hexagonal numbers 244
horizontal inflection 138
horizontal lines 66
hyperbolas 136
hypotenuse xiii

I

implied domain of a function 55
independent events 218, 219, 221–3, 226–7
independent variable xi
intersection (sets) xvi
inverse proportion viii–ix

L

length of the line joining two points 72, 73
line symmetry 139
line of symmetry 86, 88, 91, 94, 96
linear functions xi, 63–81
lines parallel to the axes 66–7

M

many-to-one function 53, 54
 maximum turning point 88, 94, 96, 138
 minimum turning point 86, 88, 94, 96, 138
 multiplication principle 236–8
 multiplication rule for probabilities 210, 218
 mutually exclusive events 209, 210, 218,
 219, 221, 227–8

N

natural domain of a function 55
 “not” in probability questions 205
 numbers, types of vii

O

odd functions 158, 160
 one-to-one function 53, 54
 opposite (right-angled triangle) xiii
 “or” in probability questions 205
 order of the polynomial 129

P

parabolic shape 86, 148
 parallel lines, gradient 80
 parity of the integer 159
 Pascal’s triangle x , 243–5
 and combinations 243
 pentagonal numbers 244
 period 158, 159, 162–3
 permutations 238
 perpendicular lines, gradient 80–1
 phase 159
 points of inflection 138
 polygonal numbers 244
 polynomial functions 129–35
 cubic functions 129–35
 probability xvii–xviii, 193–4, 196–230
 conditional 197–202, 203, 219
 empirical xviii
 independent events 218, 219, 221–3, 226–7
 mutually exclusive 209, 218–219, 221,
 227–8
 tree diagrams 203–4, 208–17
 probability questions, terminology 205
 probability rules 210, 218–19
 Pythagorean identity 178–80
 Pythagorean theorem xiii–xiv

Q

quadrants 130, 169
 quadratic equations 114–24
 quadratic formula 121–2, 124
 quadratic functions xii, 85–107, 115
 transformations 135

R

radians 38–9, 40–49
 converting to degrees 39, 40
 range 53, 54, 55, 139
 real numbers vii
 reciprocal functions ix, xii–xiii, 136–7,
 139–40
 rotational symmetry 139

S

sample space xviii
 scientific notation vii
 sector area 33, 34, 35, 43–49
 segment area 34, 35, 37, 43–49
 sets xvi–xvii, 195–6
 sine of an angle, unit circle definition
 5–6, 157
 sine function 157
 positive or negative? 169, 170
 sine ratio xiii–xiv
 sine rule xiv, 13–15, 20–1
 sketching, graphs 92
 quadratic functions 92–8
 cubic functions 132–4
 SOHCAHTOA xiv
 square numbers 244
 standard form vii
 straight line graphs 61–6, 68–9
 and direct proportion 67, 70
 lines parallel to the axes 66–7
 subsets xvi
 subtending an angle at a point 19

T

tangent function 160–1
 positive or negative? 170
 tangent ratio xiii–xiv
 three figure bearings xv
 transformations
 cubic functions 135
 general function $y = f(x)$ 142–7
 quadratic functions 135

tree diagrams xviii, 203–4
 showing probabilities 208–17
 triangle, area xiv, 9–12
 triangular numbers 244
 trigonometric complementarity 182
 trigonometric equations 173–80, 186
 trigonometric functions 157–72
 graph of 157–68
 trigonometric identities
 angle sum and difference identities
 181–3
 Pythagorean identity 178–80
 trigonometric ratios xiii–xiv
 trigonometry xiii–xv, 3–4
 accuracy in questions xv
 applications 22–25
 cosine rule xiv, 16–9, 21–2
 exact values 26–8, 171–3, 183–5
 sine rule xiv, 13–15, 20–1
 turning points 88–9, 91–6, 138

U

union (sets) xvi
 unit circle 5–8, 157–61
 universal set xvi

V

Venn diagrams xvi–xvii, 197, 199
 vertical line test 56, 148, 158
 vertical lines 67

X

x -axis intercepts 94, 138

Y

$y = ax^2 + bx + c$ 86, 91, 96, 98, 106–7
 $y = a(x - b)(x - c)$ 86, 91, 94–5, 97
 $y = a(x - b)^2 + c$ 86, 91–4, 97, 106–7
 $y = \cos x$ 159, 164
 $y = f(x)$, transformations 142–7
 $y = \sin x$ 157–8, 163
 $y = \tan x$ 160–1, 165
 y -axis intercepts 64–5, 91, 94, 138
 $y^2 = x$ 148, 150–1