Directions

You may write in this book during perusal time.

After the examination

Take this book when you leave the examination room.
Statistics
You will be expected to calculate summary statistics using statistical functions on your calculator.

Geometry

Circumference of a circle
\[ C = \pi D \]
\( D \) = diameter

Area of a circle
\[ A = \pi r^2 \]
\( r \) = radius of the circle

Area of a triangle
\[ A = \frac{1}{2}bh \]
\( b \) = base length
\( h \) = perpendicular height

Area of a parallelogram
\[ A = bh \]
\( b \) = base length
\( h \) = perpendicular height

Area of a trapezium
\[ A = \frac{1}{2}h(a + b) \]
a and \( b \) are parallel sides
\( h \) = perpendicular height

Area of a sector
\[ A = \frac{\theta}{360} \times \pi r^2 \]
\( \theta \) = number of degrees in the central angle

Volume
\( r \) = radius of base
\( h \) = perpendicular height
\( A \) = base area

Cone
\[ V = \frac{1}{3}\pi r^2 h \]

Sphere
\[ V = \frac{4}{3}\pi r^3 \]

Cylinder
\[ V = \pi r^2 h \]

Pyramid
\[ V = \frac{1}{3}Ah \]

Prism
\[ V = Ah \]

Surface area
\( r \) = radius of base
\( h \) = perpendicular height

Sphere
\[ A = 4\pi r^2 \]

Closed cylinder
\[ A = 2\pi rh + 2\pi r^2 \]

Closed cone
\[ A = \pi r^2 + \pi r\sqrt{r^2 + h^2} \]
Trigonometry

\[ \sin \alpha = \frac{y}{z}, \quad \cos \alpha = \frac{x}{z}, \quad \text{and} \quad \tan \alpha = \frac{y}{x} \]

Pythagoras’ theorem: \( z^2 = x^2 + y^2 \)

Financial formulas

Simple interest
\[ I = Prn \]

- \( P \) = initial quantity
- \( r \) = percentage interest rate per period expressed as a decimal
- \( n \) = number of periods

Compound interest
\[ A = P(1+r)^n \]

- \( A \) = final balance
- \( P \) = initial quantity
- \( r \) = percentage interest rate per compounding period expressed as a decimal
- \( n \) = number of compounding periods

Diminishing value formula
\[ S = V_0(1-r)^n \]

- \( S \) = salvage value of an asset after \( n \) periods
- \( V_0 \) = initial value of the asset
- \( r \) = percentage interest rate per period expressed as a decimal
- \( n \) = number of periods

Dividend percentage
\[ \text{Dividend} \% = \frac{\text{dividend per share}}{\text{par value of share}} \times 100 \]

Yield percentage
\[ \text{Yield} \% = \frac{\text{dividend per share}}{\text{market price per share}} \times 100 \]

Flat rate interest reducing balance rate
\[ E = \frac{2Rn}{n+1} \]

- \( E \) = effective rate of interest
- \( R \) = annual flat rate of interest
- \( n \) = number of equal instalments

Navigation

Along a meridian of longitude, \( 1^\circ = 111 \) kilometres

The straight line distance, \( d \), to the horizon from something at a height, \( h \), is given by:

\[ d = 1.927 \sqrt{h} \text{ nautical miles, if } h \text{ is in metres} \]

\[ d = 1.064 \sqrt{h} \text{ nautical miles, if } h \text{ is in feet} \]

Allowance for refraction: increase distance by one-twelfth

When required, note that:
- the radius of the Earth is 6400 kilometres
- 1 nautical mile = 1.852 kilometres
- 1 kilometre = 0.54 nautical miles
- 1 foot = 0.3048 metres
- \( 1^\circ \) subtends 60 nautical miles along a meridian