Multiple-Choice Tasks – Sample questions

Year 10 Tasks

1. **Financial Mathematics** (calculator allowed)
   Applying successive equal percentage increases and decreases, connecting the compound interest formula to repeated applications of simple interest, using the formula to solve problems involving compound interest and compound depreciation, comparing rates and compounding periods, finding the original amount
2. **Real Numbers**
   Performing operations with surds and fractional indices, using the definition of a logarithm and applying the laws of logarithms, describing, interpreting and sketching exponential functions and their transformations, solving exponential equations
3. **Algebra**
   Simplifying algebraic products and quotients, applying the four operations to algebraic fractions, factorising monic and non-monic quadratic expressions using trial and error, identities, grouping, completing the square, solving equations arising from formulas, investigating polynomials, applying the remainder and factor theorems
4. **Linear Relationships**
   Solving problems involving linear equations, including those derived from formulas and those involving algebraic fractions, solving linear inequalities and graphing their solutions on a number line, solving linear simultaneous equations, algebraically and graphically, solving problems involving parallel and perpendicular lines
5. **Non-linear Relationships**
   Solving quadratic equations from a variety of contexts using a range of strategies including the quadratic formula, describing and interpreting the graphs of parabolas, hyperbolas, circles and polynomial functions and their transformations
6. **Measurement**
   Using Pythagoras' Theorem and solving problems involving surface area and volume of prisms, right pyramids, right cones, spheres and related composite solids
7. **Geometric Reasoning**
   Deducing properties of geometric figures, applying logical reasoning, including the use of congruence and similarity, to proofs and numerical exercises involving plane shapes, proving and applying angle and chord properties of circles
8. **Trigonometry** (calculator allowed)
   Using trigonometry to solve two and three-dimensional problems in right-angled triangles, using the sine, cosine and area rules to solve problems in non-right-angled triangles, defining and graphing trigonometric functions using the unit circle, solving trigonometric equations
9. **Probability and Statistics** (calculator allowed)
   Assigning probabilities to the results of chance experiments both with and without replacements, recognising that an event can be dependent on another event and that this will affect the calculation of its probability, investigating the concept of independence, solving conditional probability questions, finding five-number summaries for data sets, interpreting box plots, calculating and interpreting means and standard deviations, comparing data sets, using scatter plots to investigate bivariate numerical data using a straight line to describe the relationship where appropriate

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Multiple-Choice Tasks – Sample questions

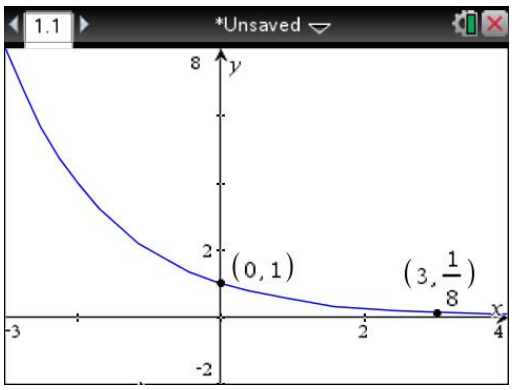
Year 10: Financial Mathematics (calculator allowed)

Question 20
At the end of four years, after being depreciated by 25.5% p.a., a company car is valued at $12,000. The initial purchase price of the car was closest to

A $38,954
B $37,926
C $29,768
D $29,297
E $27,023

Year 10: Real Numbers

Questions 10 to 13 relate to the following graph



Question 11
The equation of the curve is

A $y = 2^x$
B $y = x^2$
C $y = \log_2(x)$
D $y = 2^{-x}$
E $y = x^{-2}$

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Multiple-Choice Tasks – Sample questions

Year 10: Algebra

Question 14

After completing the square, $2x^2+5x+2$ is

A $2\left(x+\frac{5}{4}\right)^2-\frac{9}{8}$

B $2\left(x+\frac{5}{4}\right)^2-\frac{9}{16}$

C $2\left(x+\frac{25}{16}\right)^2-\frac{9}{8}$

D $2\left(x+\frac{25}{16}\right)^2-\frac{9}{16}$

E $2\left(x+\frac{5}{4}\right)^2-\frac{3}{2\sqrt{2}}$

Year 10: Linear Relationships

Question 6

Katie jogs from her front door to the cemetery gate at an average speed of 6 km/h. She then walks back to her front door, along the same route, at an average speed of 4 km/h. If the journey there and back takes 45 minutes then the distance, in km, from Katie's front door to the cemetery gate is

A 1.8
B 2.0
C 2.5
D 2.8
E 3.75

Year 10: Non-linear Relationships

Questions 2 and 3 relate to the graph of the parabola $y=4x^2-4x-15$

Question 3

The equation of the axis of symmetry is

A $x = 0.5$
B $x = 1$
C $x = -7$
D $x = -1$
E $x = -0.5$

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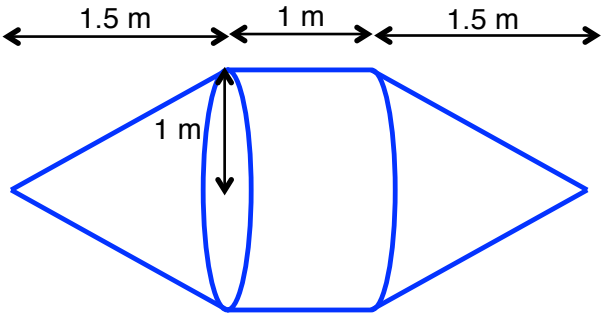
Multiple-Choice Tasks – Sample questions

Year 10: Measurement

Questions 14 to 16 relate to the following diagram and information



The cylinder has radius 1 m and height 1 m. Each cone has radius 1 m and height 1.5 m, as shown above.

Question 16

The surface area of the composite shape, in m^2, is

A $\left(\sqrt{13}+4\right)\pi$

B $\left(\sqrt{5}+2\right)\pi$

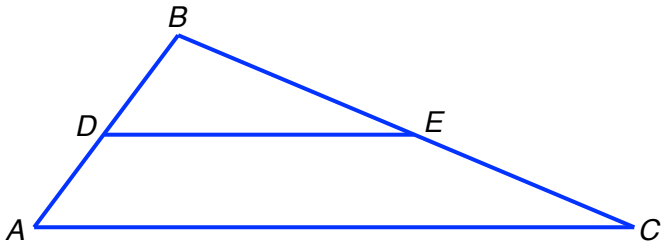
C $\left(\sqrt{13}+2\right)\pi$

D $\left(\sqrt{5}+4\right)\pi$

E $\left(\sqrt{13}+3\right)\pi$

Year 10: Geometric Reasoning

Questions 6 to 8 relate to the following diagram and information



D and E are the midpoints of AB and CB respectively

Question 6

AD : *AB* =

A *AD* : *DB*

B *CB* : *EB*

C *DB* : *DE*

D *DA* : *DE*

E *CE* : *CB*

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Multiple-Choice Tasks – Sample questions

Year 10: Trigonometry (calculator allowed)

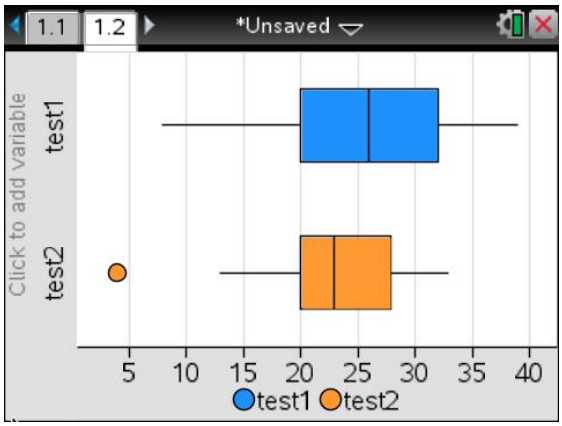
Question 4

The angle of depression from the top of a cliff to a sailing boat is first observed to be 20°. A short time later a second observation is made and the angle of depression has increased to 25°. If the cliff is 30 m high and the boat is travelling directly towards the cliff then the distance travelled by the boat between the two observations is closest to

A 16.0 m
B 16.7 m
C 16.8 m
D 18.0 m
E 18.1 m

Year 10: Probability and Statistics (calculator allowed)

Questions 12 and 13 relate to the following diagram and information



The parallel box plots show the marks in a Year 10 class across two successive Mathematics tests, titled *test1* and *test2*.

Question 12

The five-number summary for *test2* is

A	13	20	23	28	33
B	4	20	23	28	33
C	4	20	23	28	39
D	8	20	26	32	39
E	4	20	26	32	39

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