N5 Expressions & Formulae Extended Practice Test 3

Q1. Simplify to a single fraction

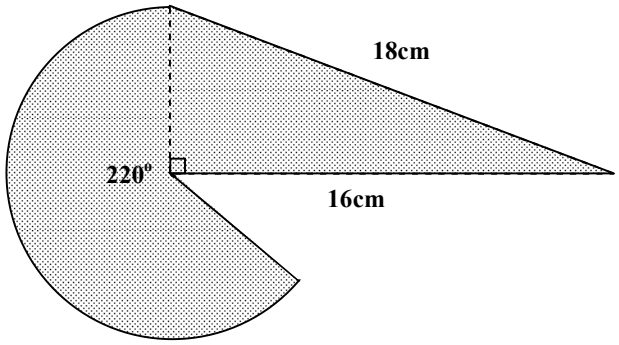
$$5\frac{2}{3} \div \frac{x}{9}$$

Q2. Remove the brackets and simplify where possible:

(a) $pc(1+2pc^3)$ **(b)** $(3y-1)(y+2)$ **(c)** $(2x-3)(x^2-x+1)$

Q3. The shaded shape shown below is constructed from a right-angled triangle and a sector of a circle.

The sector has an angle of 220^o at its centre and the right-angled triangle has two of its sides measuring 18 centimetres and 16 centimetres as shown.



(a) Calculate the length of the third side of the triangle.

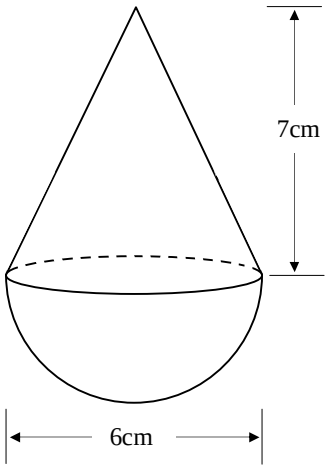
Give your answer correct to 3 significant figures.

(b) Calculate the area of the shaded shape.

Q4. Factorise fully:

(a) $p^2+3p-28$ **(b)** h^3-4he^2 **(c)** $3x^2-13x+12$

Q5. A child's spinning top is shown opposite.



It is made from solid wood.

The shape consists of a hemisphere base with a cone on top.

Calculate the volume of the spinning top if the hemisphere has a diameter of 6 centimetres and the cone has a height of 7 centimetres.

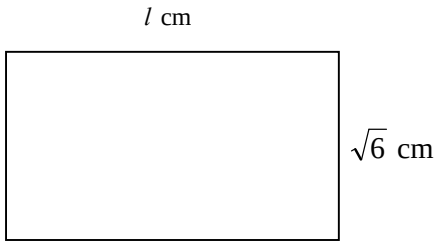
Give your answer correct to 1 decimal place.

(Volume of a cone = $\frac{1}{3}\pi r^2 h$; Volume of a sphere = $\frac{4}{3}\pi r^3$)

Q6. **(a)** Simplify the following fraction $\dfrac{2a^2-8}{a^2-8a+12}$

(b) Express as a single fraction in its simplest form $\dfrac{2x}{y^2} \div \dfrac{4x}{y^3}$

Q7. A rectangle measures l centimetres by $\sqrt{6}$ centimetres as shown.



If the **exact area** of the rectangle is $2(\sqrt{6}+\sqrt{3})$ square centimetres, show clearly that the length l, of the rectangle, measures exactly $2+\sqrt{2}$ centimetres.

Q8. Simplify $(x^{1/2})^4 \times (4x)^{1/2}$

Q9. Express x^2-3x+1 in the form $(x+p)^2+q$

Q10. A satellite orbits the Earth 5.34×10^{24} times in one day. How often does it orbit the Earth in the month of June? Write your answer in scientific notation and round to 3 significant figures.

Q11. Express $\frac{2}{3+\sqrt{7}}$ as a fraction with a rational denominator.

End of question paper