National 5 Homework

1. Factorise, by first taking out the common factor then writing as a difference of two squares.
   a) $2x^2 - 8$ b) $5x^2 - 45$ c) $16 - 4x^2$
   d) $ka^2 - 4kd^2$ e) $25c - c^3$ f) $2y^3 - 32y$

2. Factorise these trinomials.
   a) $x^2 + 3x + 2$ b) $y^2 - 2y + 1$ c) $w^2 - 6w - 7$
   d) $p^2 + 8p - 20$ e) $m^2 - 12m + 36$ f) $a^2 + 4a - 12$

3. Calculate correct to 3 significant figures.
   a) 1.47×6.85 b) $\frac{292}{3}$ c) $773 \times 15.2 \div 3.14$ d) 13.8^2

4. Multiply out and simplify when necessary.
   a) $(x + 6)(x^2 + 2x - 5)$ b) $(p - 7)(p + 2)(p + 3)$

5. Simplify the following, leaving your answer in surd form where appropriate.
   a) $\sqrt{12} \times \sqrt{3}$ b) $\sqrt{8} \times \sqrt{12}$ c) $\sqrt{10} \times \sqrt{2}$ d) $3\sqrt{2} \times 5\sqrt{2}$
   e) $4\sqrt{3} \times 6\sqrt{3}$ f) $7\sqrt{5} \times \sqrt{5}$ g) $\sqrt{3}(\sqrt{3} - 1)$ h)

6. Write each expression in the form $a(x + p)^2 + q$
   ie complete the square.
   a) $2x^2 + 4x + 6$ b) $3y^2 + 12y + 9$ c) $5a^2 - 30a - 25$

7. A rectangular tank is 2m long, 1m broad and 50cm high. It is open at the top to collect rainwater.
   (a) How many litres of rainwater can it hold?
   (b) If the tank is quarter full of rainwater, what is the depth of water in it?

8. Solve the following equations.
   a) $7 + 2(x-5) = 13$ b) $5 - 3(y - 4) = -2$
   c) $5(d - 6) = 2(d + 3)$ d) $\frac{k}{2} + 4 = 7$

9. Simplify
   a) $2w^2 \times 3w^4$ b) $\frac{15t^4}{12t^8}$ c) $(2k)^3$ d) (p^{-2})

10. If the area of a circle is given as 67 cm^2, find the diameter and the circumference of this circle.