1. (T1.5, R, CI) Write these equations in log form, (Oxford, 4.4 p.115)
i. $x=2^{9}$
ii. $x=3^{5}$
iii. $x=10^{4}$
iv. $x=a^{b}$
2. ( $\mathbf{T 1 . 9}, \mathrm{E}, \mathrm{Cl}$ ) The word 'binomial' refers to a mathematical expression with two terms in it. $x+3$, and $y-\frac{1}{x}$, are both examples of binomials. The term 'binomial expansion' refers to a binomial expression raised to a power. $(x+3)^{2}$ is one such example. When the operation is performed $(x+3)^{2}$ becomes $x^{2}+6 x+9$. This is referred to as the binomial expansion of $(x+3)^{2}$.
(Oxford, 6.9 p.184)
a. Write the binomial expansion of $(x+y)^{2}$.
b. Write the binomial expansion of $(x+y)^{3}$.
c. Write the binomial expansion of $(x+y)^{4}$.
d. Using the pattern, write the binomial expansion of $(x+y)^{7}$.
3. (T3.2, R, CA) Amina and Salma are standing 40 meters apart on opposite sides of a flag pole. From Amina's position the angle of elevation to the top of the pole is $34^{\circ}$. From Salma's position the angle of elevation to the top of the pole is $52^{\circ}$. How tall is the flagpole? (Oxford, 11.4 p.380)
4. (T4.2, E, CA) Zeina's test scores in chemistry last year were as follows: 81, 84, 81, 79, 80, 76, 90, 87, 84, 86. (Oxford, 8.4 p.267)
a. Find the,
i. range
ii. median
iii. Lower quartile
iv. Upper quartile v.interquartile range (IQR)
b. Draw a box and whisker plot representing this data.
5. ( $\mathbf{T} 1.5, \mathbf{R}, \mathbf{C I})$ Solve these equations, (Oxford, 4.5 p.118)
i. $\log _{4} x=3$
ii. $\log _{3} x=4$
iii. $\log _{x} 64=2$
iv. $\log _{x} 6=\frac{1}{2}$
v. $\log _{2} x=-5$
6. (T2.5, R, CI) If $f(x)=x-5$ and $g(x)=x^{2}+1$, (Oxford, 1.4 p.14)
a. Find $(f \circ g)(x)$
b. Find $(g \circ f)(x)$
c. Hence solve the equation $(f \circ g)(x)=(g \circ f)(x)$
7. (T2.9, R, CA) The population, $P(t)$, in thousands, of a city is modeled by the function $P(t)=30 e^{0.04 t}$ where $t$ is the number of years after 2000. (Oxford, 4.8 p.131)
a. What was the population of the city in the year 2000?
b. By what percentage will the city's population increase each year?
c. What was the population of the city in 2010?
d. In what year did the city population reach 60,000?
