



Calculations

- Finding the square and square root of a number
- Working out calculations involving squares and square roots
- Using your calculator for complex calculations
- Checking calculator answers by estimation

Keywords

You should know

explanation 1a

explanation 1b

explanation 1c

1 Without using a calculator, find each value.

a 3^2

b $\sqrt{9}$

c 6^2

d 7^2

e $\sqrt{25}$

f $\sqrt{36}$

g 8^2

h $\sqrt{16}$

i 12^2

j $10^2 - 9^2$

k $\sqrt{100} - \sqrt{49}$

l $2 \times \sqrt{64}$

2 Say whether each statement below is true or false.

Give a reason for each answer.

a 49 is a square number.

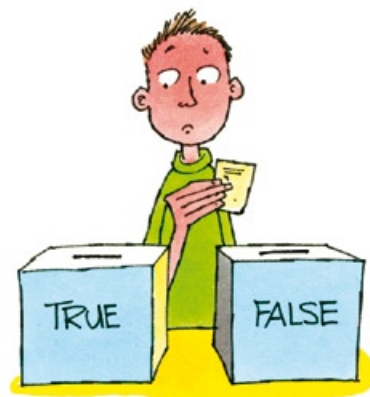
b 10 is the square root of 20.

c There is a square number between 30 and 40.

d $3^2 + 4^2$ makes a square number.

e $\sqrt{4} \times \sqrt{25}$ is the same as $\sqrt{100}$.

f Half of 8^2 is the same as 4^2 .



***3** $\sqrt{10}$ is not a whole number.

$\sqrt{10}$ lies between 3 and 4 because $3 \times 3 = 9$ and $4 \times 4 = 16$.

Copy and complete each statement below without using a calculator.

Each represents a different whole number.

a $\sqrt{3}$ lies between and because ...

b $\sqrt{30}$ lies between and because ...

c $\sqrt{90}$ lies between and because ...

10 is between 9 and 16.
So $\sqrt{10}$ is between $\sqrt{9}$ and $\sqrt{16}$.

explanation 2

- 4** Work out these calculations without using a calculator. Then check that you get the same answers when you use a calculator.

a $7 + 5 \times 2$

b $25 - 3 \times 8$

c $3 \times 8 - 4 \times 5$

d $18 \div 3 + 22 \div 11$

e $20 - 16 \div 4 + 2$

f $4 \times 6 - 12 \div 3$

- 5** Use the x^2 key on your calculator to find the value of each expression.

a 13^2

b 15^2

c $80 - 7^2$

d $49 - 3^2$

e 4×3^2

f $49 - 4 \times 3^2$

- 6** When you key $10 + 5^2$ into your calculator you get 35.

Explain how you would get this answer without using a calculator.

- 7** When you key $10 + 2 \times 3^2$ into your calculator you get 28.

Explain how you would get this answer without using a calculator.

- 8** Use the $\sqrt{\quad}$ key on your calculator to find the value of each expression.

a $\sqrt{256}$

b $\sqrt{529}$

c $\sqrt{3}$

d $\sqrt{30}$

e $2 + \sqrt{5}$

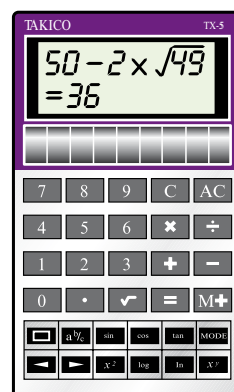
f $\sqrt{5} - 2$

- 9** When you key $10 + \sqrt{144}$ into your calculator you get 22.

How would you get this answer without using a calculator?

- 10** When you key $50 - 2 \times \sqrt{49}$ into your calculator you get 36.

How would you get this answer without using a calculator?



- 11** Look at your answers to questions **7** and **10**.

Now copy and complete the following table. It should show the correct order of operations when you do a calculation. One of the steps has already been filled in for you.

Order	Operations
1st	
2nd	
3rd	Multiply & Divide
4th	

Fill in the table with the following operations.

Add & Subtract

~~Multiply & Divide~~

Square & Square root

Work out brackets

explanation 3a

explanation 3b

- 12** Find the value of each expression. Use bracket keys on your calculator.

a $6.4 \times (12.8 - 7.95)$

b $(3.7 + 5.4)^2$

c $32 - 4.8 \times (7.6 - 1.9)$

d $(18.6 + 19.7) \div 5$

e $29 \div (6.72 + 3.28)$

f $(2.3 + 6.9) \times (3.8 + 4.7)$

- 13** Use your calculator to do these calculations. Use brackets if you need to.

a $\sqrt{78} + 3$

b $\sqrt{78 + 3}$

c $12.5 + 6.2^2$

d $(12.5 + 6.2)^2$

e $\frac{83.2}{4.7 + 2.4}$

f $\frac{23.2 + 3.65}{5.67}$

- 14** Use your calculator to do these calculations.

Round your answers to the nearest whole number.

a $5.87 + 7.9 \times 6.3$

b 4.87^2

c $\sqrt{11.92}$

d $450 - 9 \times (2.7 + 11.8)$

e $\sqrt{11 + 12}$

f 4×2.35^2

- 15** Nadia wants to work out the cost of 12 magazines.

Each magazine costs £1.65.

She used her calculator to work out 12×1.65 and got the answer 19.8.

How much money is this?

16 Sean buys four items at the supermarket. They cost £3, £2.27, 58p and £5.20.

- a** Use your calculator to find the total cost of the four items.
- b** Sean pays with a £20 note. How much change will he get?

17 Use your calculator to work out the following amounts to the nearest pound.

- a** $£27.45 \times 12$
- b** $£428.56 \times 23$
- c** $£521 \div 18$
- d** $8 \times £43.24 + 17 \times £16.35$
- e** $36 \times £1.97 + 85\text{p}$
- f** $36 \times (£1.97 + 85\text{p})$

18 Use your calculator to find the following amounts to the nearest penny.

- a** $£68.51 \times 1.8$
- b** $£3211 \div 7$
- c** $(£5.23 + £3.26) \div 5$
- d** $£5.23 + £3.26 \div 5$
- e** $£428.56 \times 0.175$
- f** $£500 - 24.1 \times 76\text{p}$

explanation 4a

explanation 4b

19 a Leroy estimated 23.7453×12.345 as $20 \times 10 = 200$ by rounding to the nearest 10.

Explain why Leroy's estimate is less than the actual value.

***b** Gina estimated 23.7453×12.345 as $24 \times 12 = 288$ by rounding to the nearest whole number.

Explain why Gina can't be sure if her estimate is more than or less than the actual value.



20 a Copy and complete these estimates. Round each number to the nearest whole number.

i $20.6 + 3.869 \approx 21 + \square = \square$

ii $9.8734 \times 14.91079 \approx 10 \times \square = \square$

iii $2.319 \times 4.346 \approx \square \times \square = \square$

iv $29.827 + 4.98746 \approx \square + \square = \square$

v $8.19243^2 \approx \square^2 = \square$

vi $5.732^2 \approx \square^2 = \square$

b Look at each estimate calculation in part **a**. For each one, say whether the actual answer is more or less than your estimate. (Do not use a calculator to work out the actual answer.)