

Number

Order of operations and exact answers

Working with negatives

1 Complete the following:

1a $-5 - 3 =$

1b $-7 - 2 =$

1c $-9 - 8 =$

1d $-4 - 4 =$

1e $-3 - 8 =$

1f $-5 - 9 =$

2 Complete these calculations:

2a $-5 + \square = -9$ 2b $-3 + \square = -7$ 2c $-7 + \square = -10$

2d $-8 + \square = -6$ 2e $-4 + \square = -1$ 2f $-10 + \square = -6$

3 Complete these multiplication tables:

3a

\times	\square	-1	\square
2			
\square	-2	2	
-3			-9

3b

\times	-2	\square	\square
\square	10		
-2		6	
3			-12

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Order of operations

4 Calculate:

4a $6 + 7 \times 2 =$

4b $8 - 3 \times 2 =$

4c $19 - 4 \times 3 =$

4d $3 \times 6 - 9 =$

4e $15 - 4 + 7 \times 2 =$

4f $11 \times 3 + 2 =$

4g $16 \times 4 - 3 =$

4h $6 + 7 \times 2 - 20 \div 4 =$

5 Put brackets into each of the statements below to make it correct:

5a $3 \times 6 + 1 = 21$

5b $5 + 6 \times 2 = 22$

5c $45 \div 6 + 3 = 5$

5d $49 - 3 + 2 = 44$

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Simplifying surds

8 Write the following in simplified surd form.

8a $\sqrt{8} = \square \sqrt{\square}$

8b $\sqrt{32} =$

8c $\sqrt{100} =$

8d $\sqrt{63} =$

8e $\sqrt{180} =$

8f $\sqrt{192} =$

7 For thousands of years people have been trying to find accurate ways of calculating the circumference of a circle. They all knew it was 3-and-a-bit times the diameter - but how big was the 'bit'?

These are some of the values used by early civilisations:

Babylonian $\frac{25}{8}$

Chinese $\frac{355}{113}$

Egyptian $\frac{256}{81}$

Indian $\sqrt{10}$

Greek $\frac{22}{7}$ and $\frac{377}{120}$

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7a Use your calculator to find decimal forms for these values.

Civilisation	Fraction	Decimal
Babylonian	$\frac{25}{8}$	
Egyptian	$\frac{256}{81}$	
Greek 1	$\frac{22}{7}$	
Greek 2	$\frac{377}{120}$	
Chinese	$\frac{355}{113}$	
Indian	$\sqrt{10}$	

7b Write down all the figures that your calculator gives for π

$\pi =$

7c List the civilisations in order, starting with the one with the closest estimate to π and ending with the one with the least close estimate.

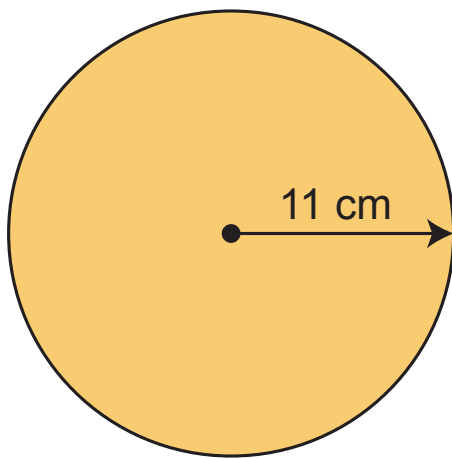
1	
2	
3	
4	
5	
6	

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Multiples of pi

8 A circle has radius $r = 11\text{cm}$.



Leaving your answers as multiples of π , calculate:

8a Its diameter

$$D = 2 \times r$$

$$D = 2 \times \square = \square \text{ cm}$$

8b Its circumference

$$C = 2\pi r$$

$$C = 2 \times \square \times \square = \square \pi \text{ cm}$$

8c Its area

$$A = \pi r^2$$

$$A = \square \times \square \times \square = \square \pi \text{ cm}^2$$

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- 9 A semi-circle has radius of 7cm.
Find its perimeter in terms of π .

