1 Complete these product tables.

a

×	−2	−1	0	1	2
−2	4	2	0	−2	−4
−1	2	1	0	−1	−2
0	0	0	0	0	0
1	−2	−1	0	1	2
2	−4	−2	0	2	4

b

×	−4	−2	0	2	4
−4	16	8	0	−8	−16
−2	8	4	0	−4	−8
0	0	0	0	0	0
2	−8	−4	0	4	8
4	−16	−8	0	8	16

2 Write down the missing number.

a $2 \times (-3) = -6$, so $-6 \div (-3) =$ 2

b $2 \times (-3) = -6$, so $-6 \div 2 =$ -3

c $-16 \div 4 = -4$, so -4 $\times 4 = -16$

d $16 \div (-4) = -4$, so -4 $\times (-4) = 16$

3 Complete each sentence by inserting the missing word *positive* or *negative*.

a The product (×) of two positive numbers is positive.

b The product (×) of two negative numbers is positive.

c The product (×) of two numbers with opposite signs is negative.

d The quotient (÷) of two positive numbers is positive.

e The quotient (÷) of two negative numbers is positive.

f The quotient (÷) of two numbers with opposite signs is negative.

4 Calculate the answer to these products.

a $3 \times (-5) = -15$ **b** $1 \times (-10) = -10$ **c** $-3 \times 2 = -6$ **d** $-9 \times 6 = -54$

e $-8 \times (-4) = 32$ **f** $-2 \times (-14) = 28$ **g** $-12 \times (-12) = 144$ **h** $-11 \times 9 = -99$

i $-13 \times 3 = -39$ **j** $7 \times (-12) = -84$ **k** $-19 \times (-2) = 38$ **l** $-36 \times 3 = -108$

m $-6 \times (-11) = 66$ **n** $5 \times (-9) = -45$ **o** $-21 \times (-3) = 63$ **p** $-36 \times (-2) = 72$

5 Calculate the answer to these quotients.

a $14 \div (-7) = -2$ **b** $36 \div (-3) = -12$ **c** $-40 \div 20 = -2$ **d** $-100 \div 25 = -4$

e $-9 \div (-3) = 3$ **f** $-19 \div (-19) = 1$ **g** $-25 \div 5 = -5$ **h** $38 \div (-2) = -19$

i $84 \div (-12) = -7$ **j** $-108 \div 9 = -12$ **k** $-136 \div 2 = -68$ **l** $-1000 \div (-125) = 8$

m $-132 \div (-11) = 12$ **n** $-39 \div (-3) = 13$ **o** $78 \div (-6) = -13$ **p** $-156 \div (-12) = 13$

6 Work from left to right to find the answer. Check your answer using a calculator.

a $2 \times (-3) \times (-4) = 24$ **b** $-1 \times 5 \times (-3) = 15$ **c** $-10 \div 5 \times 2 = -4$

d $-15 \div (-3) \times 1 = 5$ **e** $-2 \times 7 \div (-14) = 1$ **f** $100 \div (-20) \times 2 = -10$

g $48 \div (-2) \times (-3) = 72$ **h** $-36 \times 2 \div (-4) = 18$ **i** $-125 \div 25 \div (-5) = 1$

j $-8 \div (-8) \div (-1) = -1$ **k** $46 \div (-2) \times (-3) \times (-1) = -69$ **l** $-108 \div (-12) \div (-3) = -3$

7 Write down the missing number in these calculations.

a $5 \times \boxed{-7} = -35$ b $\boxed{4} \times (-2) = -8$ c $16 \div \boxed{-4} = -4$

d $-32 \div \boxed{8} = -4$ e $\boxed{27} \div (-3) = -9$ f $\boxed{-140} \div 7 = -20$

g $-5000 \times \boxed{2} = -10\,000$ h $-87 \times \boxed{-3} = 261$ i $243 \div \boxed{-3} = -81$

j $50 \div \boxed{-1} = -50$ k $-92 \times \boxed{2} = 184$ l $-800 \div \boxed{40} = -20$

8 Remember that $\frac{9}{3}$ means $9 \div 3$. Use this knowledge to simplify each of the following.

a $\frac{-12}{4} = -3$ b $\frac{21}{-7} = -3$ c $\frac{-40}{-5} = 8$ d $\frac{-124}{-4} = 31$

e $\frac{-15}{-5} = 3$ f $\frac{-100}{-20} = 5$ g $\frac{-900}{30} = -30$ h $\frac{20\,000}{-200} = -100$

9 Given that $3^2 = 3 \times 3 = 9$ and $(-3)^2 = -3 \times (-3) = 9$, simplify each of the following.

a $(-2)^2 = 4$ b $(-1)^2 = 1$ c $(-9)^2 = 81$ d $(-10)^2 = 100$

e $(-6)^2 = 36$ f $(-8)^2 = 64$ g $(-3)^2 = 9$ h $(-1.5)^2 = 2.25$

10 List the different pairs of integers that multiply to give these numbers.

a 6 2 and 3, 1 and 6 -2 and -3, -1 and -6 b 16 (1,16) (−1,−16) (2,8) (−2,−8) (4,4) (−4,−4) c -5 (1,−5) (−1,5) d -24 (1,−24) (−1,24) (3,−8) (−3,8) (4,−6) (−4,6) (2,−12) (−2,12)

11 Insert a multiplication or division sign between the numbers to make a true statement.

a $2 \boxed{\times} -3 \boxed{\div} -6 = 1$ b $-25 \boxed{\div} -5 \boxed{\times} 3 = 15$

c $-36 \boxed{\times} 2 \boxed{\times} -3 = 216$ d $-19 \boxed{\div} -19 \boxed{\times} 15 = 15$

12 a There are two distinct pairs of numbers whose product is -8 and difference is 6. What are the two numbers? ① (−4, 2) as $(-4) \times 2 = -8$ and $2 - (-4) = 6$ ② (4, −2) as $4 \times (-2) = -8$ and $4 - (-2) = 6$

b The quotient of two numbers is -11 and their difference is 36. What are the two numbers?
There are two distinct pairs to find. (33, −3) as $\frac{33}{-3} = -11$ and $33 - (-3) = 36$
and (−33, 3) as $-33 \div 3 = -11$ and $3 - (-33) = 36$

13 Given that 2^4 means $2 \times 2 \times 2 \times 2$ and $(-2)^4 = -2 \times -2 \times -2 \times -2$

a Calculate:

i $(-2)^3 = -8$ ii $(-2)^6 = 64$ iii $(-3)^3 = -27$ iv $(-3)^4 = 81$

b Which questions from part a give positive answers and why? ii and iv as the power is an even number of negative

c Which questions from part a give negative answers and why? i and iii as there is an odd number of negative

14 $a \times b$ is equivalent to ab, and $2 \times (-3)$ is equivalent to $-(2 \times 3)$. Use this information to simplify these expressions.

a $a \times (-b) = -(a \times b)$ b $-a \times b = -(a \times b)$ c $-a \times (-b) = -(-a \times b) = a \times b$