WelTec/Whitireia Trade Mathematics Series

Division Trade Based Problems

The majority of trade based jobs will require you to use division to a certain extent. Also, you will probably need to be able to add, subtract, and multiply fairly accurately to make sure you're able to do what work you need to do as well.

In order to be able to divide well, you'll need to understand the place value of the digits that make up a number. This has been covered in another handout. Also, the basic skills that you need to help you deal with division are covered in the 'Division' handout.

Dividing Whole Numbers in Practical Applications

Example 1

The production schedule for a manufacturing plant completes parts for a series of machines each week. The number of parts manufactured during the first 5 weeks of production are 382, 417, 485, 508 and 513. What is the average number of machine parts that are manufactured during the first 5 weeks of production?

Solution 1

Work out what to do

The number of parts for 5 weeks is the total of the number made each week.

Work out the answer

382 + 417 + 485 + 508 + 513 = 2305

Calculate the average by dividing the total by the number of weeks

2304 ÷ 5 = 461

So, the average number of parts produced is 461.

Question 1

The production schedule for a manufacturing plant completes parts for a series of machines each week. The number of parts manufactured during the first 5 weeks of production are 363, 317, 425, 539 and 412. What is the average number of parts which have been manufactured during the first 5 weeks?

Answers

Work out what to do

Add up the number of parts completed

Work out the answer

362 + 317 + 425 + 539 + 412 = 2,055

Calculate the average by dividing the total by the number of weeks

2,055 ÷ 5 = 411

So the average is 411 machine parts

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Question 2

Five stamping machines in a manufacturing plant produce the same product. Each machine has a counter that records the number of parts produced. The table below shows the counter readings for the beginning and the end of one week's production, and the number of parts produced by each machine.

	Machine A	Machine B	Machine C	Machine D	Machine E
Counter reading beginning of the week	17,854	13,935	7,536	38,935	676
Counter reading end of the week	48,951	42,007	37,881	72,302	29,275
Number of parts made by machine	31,097	28,072	30,345	33,367	28,599

a) What is the total weekly production?
b) What is the average weekly production for the five machines?
c) In the second week Machine 1 produces 2,000 more parts than week 1. Machine 2 produces another 2,300 more parts than week 1. Machine 3 produces 1,356 more parts. Machine 4 produces 1,560 more parts and Machine 5 produces 2,780 more parts.
   i) How many parts does each machine produce?
   ii) What is the total weekly production for the second week?
   iii) What is the average weekly production for the second week?
   iv) What is the average weekly production for the two weeks?

Answers

a) 151,480

b) 151,480 ÷ 5 = 30,296

c) i) Machine A 33,097
Machine B 30,372
Machine C 31,701
Machine D 34,927
Machine E 31,379

ii) 161,475 parts

iii) 161,475 ÷ 5 = 32,295 parts

iv) (151,489 + 161,475) ÷ 10 = 31,295.5 parts

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Question 3

On a particular job, the contractor's expenses were $794 for materials, $537 in carpenter labour, and $486 for taxes and insurance. The contractor is paid $1974.

a) What was the contractor's total expenses?
b) If the profit is the difference between the amount paid and the expenses, what was the profit on this job?
c) What are the contractor's average expenses?

Answers

a) Total Expenses = $1,818
b) 1,974 – 1,818 = $156
c) $1,818 ÷ 3 = $606

Question 5

At the beginning of the week, an electrical supply house has 853 solenoids in stock. During the week, the following number of solenoids were sold: Monday: 57; Tuesday: 73; Wednesday: 64; Thursday: 49 and Friday: 62.

a) Round off the number of solenoids sold to the nearest ten and add to find out the approximate number of solenoids sold during the week.
b) Round off the number of solenoids in stock at the beginning of the week to the nearest ten. Use this number and your answer to approximate the number of solenoids in stock at the end of the week.
c) Find the actual number of solenoids in stock at the end of the week.
d) Find the average number of solenoids sold each day during the week.

Answers

a) Total Solenoids = 60 + 70 + 60 + 50 60 = 300
b) Solenoids in Stock = Solenoids in Stock – Solenoids Sold
= 900 -300
= 600
c) Actual Solenoids in Stock = 853 – 305 = 548
d) (57 + 73 + 64 + 49 + 62) ÷ 5 = 61 solenoids

Question 6

The table below lists various kinds of flour ordered and received by a commercial baker in pounds (lbs) in the first **two** months of operation.

	Bread Flour	Cake Flour	Rye Flour	Rice Flour	Potato Flour	Soybean Flour
Ordered	3875 lb	2000 lb	825 lb	180 lb	210 lb	85 lb
Received	3650 lb	2670 lb	910 lb	75 lb	165 lb	85 lb

a) Is the total amount of flour received greater or less than the total amount ordered?
b) How many pounds greater or less?
c) What is the average amount of cake flour received for each month

Answers
a) Total Ordered = 7,175 lbs.
Total Received = 7,555 lbs.
b) 7,555 – 7175 = 380 lbs
c) 2670 ÷ 2 = 335 lbs

Problems

The problems below are specific to the trades in the titles.

1. **Electrical technology:** In setting up her latest wiring job, an electrician cut the following lengths of wire: 118m, 278m, 23m, 805m and 256m. Find the total length of the wire used and the average amount of wire used.

Answer
Total Wire = 118 +
278
23
805
256
1480

Average Wire = 1480 ÷ 5
= 296m

2. **Building Construction:** The Acne Building Company made four deliveries of 25mm x 150mm flooring. These were: 1000m, 905m, 752m and 906m. What was the total number of board metres delivered?

Answer
Total Board = 1000 +
905
752
906
3536

3. **Machine Technology:** A stockroom has eight boxes of no.10 hexhead cap screws. How many screws of this type are in stock if the boxes contain 346, 275, 84, 128, 325, 98, 260 and 120 screws respectively?

Answer

Total Screws = 346 +
275
84
128
325
98
260
120
1636

4. **Office Services:** In calculating her weekly expenses, a contractor found that she had spent the following amounts: materials, $386; labour, $537; salaried help, $293; overhead expense, $132. What was her total expense for the week?

Answer

Total Expense = 386 +
537
293
132
1348

5. **Machine Technology:** The head machinist at Tetris Tool co. is responsible for totalling time cards to determine job costs. He found that five different jobs in a week to 78, 428, 143, 96, and 385 minutes each. What was the total time in minutes of the five jobs?

Answer

Total Time = 78 +
428
143
96
385
1130

6. **Carpentry:** On a home construction job, a carpenter laid 1480 wood shingles the first day, 1240 the second, 1560 the third, 1320 the fourth and 1070 the fifth day. How many shingles did he lay min the five days?

Answer

Total Shingles = 1480 +
1240
1560
1320
1070
6670

7. **Industrial technology:** Eight individually powered machines in a small production shop have motors using 420, 260, 875, 340, 558, 564, 280, and 310 watts each. What is the total wattage used when
   a) The total shop is in operation?
   b) The three largest motors are running?
   c) The three smallest motors are running?

Answer

a) Total Wattage = 420 +
260
875
340
558
564
280
310
3607

Answer

b) Total Wattage = 875
558
564
1997

Answer

c) Total Wattage = 260
280
310
850

Calculator Problems

The following trade based problems have been designed to give you some practice using a calculator.

1. **Manufacturing:** The following table lists the number of widget fasteners made by each of the six machines at the Aztec Widget Co. during the last ten working days.

	Machine						Daily Totals
Day	A	B	C	D	E	F	
1	347	402	406	527	237	143	
2	451	483	312	563	316	167	
3	406	511	171	581	389	201	
4	378	413	0	512	291	151	
5	399	395	452	604	342	173	
6	421	367	322	535	308	132	
7	467	409	256	578	264	156	
8	512	514	117	588	257	145	
9	302	478	37	581	269	135	
10	391	490	112	596	310	126	
Machine Totals							

a) Complete the table by finding the number of fasteners produced each day. Enter these totals under the column “Daily Totals” on the right.

b) Find the number of fasteners produced by each machine during the ten-day period and enter these totals along the bottom row marked “Machine Tools”.

c) Does the sum of the daily totals equal the sum of the machine totals?

2. **Office Services:** John's Air Conditioning Installation Co. has not been successful and John is wondering if he should sell it and move to a better location. During the first six months of the year his expenses were:

Rent $1620	Taxes $143
Supplies $2540	Advertising $250
Part-time helper $2100	Miscellaneous $187
Transportation $948	

His monthly income was:

January $609	April $1381
February $1151	May $1687
March $1269	June $1638

a) What was his total expense for the six-month period?

b) What was his total income for the six-month period?

c) Rotate your calculator 180° to see what John should do about this unhappy situation.

3. **Electrical Technology:** A mapper is a person employed by an electrical utility company who has the job of reading diagrams of utility installationsand listing the materials to be installed or removed by engineers. Part of a typical job list might look like this:

Location Code	#12 BHD (Bar hard-drawn copper wire)	#TX (Triplex)	410 AAC (All-aluminium conductor)	110 ACSR (Aluminium core steel-reinforced conductor)	6B (No.6, bare conductor)
A3	1740	40	1400		350
A4	1132		5090		2190
B1	500			3794	
B5		87	3995		1400
B6	4132	96	845		
C4		35		3258	2780
C5	3949		1385	1740	705

a) How many total metres of each kind of conductor must the installer have to complete the job?

b) How many metres of conductor are to be installed at each of the seven locations?