WelTec Mathematics Series

Multiplication Trade Based Problems

All trades based jobs will require you to use multiplication to a certain extent. Additionally, you will probably need to be able to add, subtract and divide fairly accurately to make sure you're able to do what work you need to do as well.
In order to be able to multiply well, you'll need to understand the place value of the digits that make up a number. This has been covered in another handout. This handout will cover trade based multiplication problems.

Multiplying Whole Numbers in Practical Applications

Example 1

The total cost of fixtures and lights for an office lighting installation is found by an electrician. The following fixtures and lights are:

- 12 incandescent fixtures at $18 each.
- 22 indirect fluorescent lights at $37 each
- 33 direct fluorescent lights at $28 each.

Find the total cost.

Solution

Work out the process

Multiply the required number of each light or fixture by the cost of each. The total cost is the sum of the products.

Estimate the answer

Total cost = (10 x $20) + (20 x $40) + (30 x $30)

= $200 + $800 + $900

= $1900

Work out the answer

Total cost = (12 x $18) + (22 x $37) + (33 x $28)

= $216 + $814 + $924

= $1954

Check the answer to the estimate

$1954 is about the same as $1900.

Question 1

An offset press feeds at a rate of 2,050 impressions per hour. How many impressions can a press operator print in 14 hours?

Answers

2,050 x 14 = 2050 x

14

8200 +

2050

28700

So, there are 28700 impressions in 14 hours.

Question 2

An engineer works out the total weight of I beams required for a building. The table below lists the data used in finding the weight. Find the total weight of the I beams for the building.

	75mm x 40mm Weight: 36kg/m	100mm x 50mm Weight: 25kg/m	150mmx 75mm Weight: 15kg/m
Number of 3m lengths	15	0	24
Number of 5m lengths	12	18	7
Number of 6m lengths	8	32	25
Number of 9m lengths	17	8	0

Answers

Total length of 75mm x 40mm beams = (3m x 15) + (5m x 12) + (6m x 8) + (9m x 17)
= 45m + 60m + 48m + 153m
= 306m

Total weight of the 75mm x 40mm beams = 306m x 36kg/m
= 11,016 kg

Total length of 100mm x 50mm beams = (3m x 0) + (5m x 18) + (6m x 32) + (9m x 8)
= 0m + 90m + 192m + 72m
= 354m

Total weight of the 100mm x 50mm beams = 354m x 25kg/m
= 8,850 kg

Total length of 150mm x 75mm beams = (3m x 24) + (5m x 7) + (6m x 25) + (9m x 0)
= 72m + 35m + 150m + 0m
= 257m

Total weight of the 150mm x 75 mm beams = 257m x 15kg/m
= 3,855 kg

Total weight of the I beams = 11,016 kg + 8,850 kg + 3,855 kg
= 23,721 kg

Problems

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

1. **Plumbing:** A plumber receives $19 per hour. How much is she paid for 40 hours work? What would her pay be if she completed another 7 hours at time and a half?

Answer

Total Pay = 40 x Total Pay = 760 + ($19.00 x 7 x 1.50
= 760 + 199.50
= 959.50

19
360
40
760

2. **Electrical Technology:** What is the total length of wire on 14 spools if each spool contains 170 metres?

Answer

Total Wire = 170 x 14

680

170

2380

3. **Automotive Services:** An auto body shop does 17 paint jobs at $159 each and 43 paint jobs at $267 each. How much money does the shop receive from these jobs?

Answer

Total Job One = 159 x 17

1113

1590

2703

Total Job Two = 267 x 43

801

1068

11481

Total 2703 + 11481

14184

4. **Office Services:** Three different sized boxes of envelopes contain 50, 100 and 500 envelopes respectively. How many envelopes total are there in 18 boxes of the first size, 16 of the second size and 11 of the third size?

Answer

Total Envelopes (50) = 50 x 18

400

50

900

Total Env (100) = 100 x 16

600

100

1600

Total Env (500) 500 x 11

500

500

5500

Total Envelopes All Sized Packs = 900 + 1600 + 5500 = 8000

5. **Machine Technology:** A machinist needs 25 lengths of steel each 9” long. What is the total length of steel that he needs? No allowance is needed for cutting.

Answer

Total Wire = 25 x 9

225

6. **Machine Technology:** The WelTec Machine Company advertises that one of its machinists can produce 2 parts per hour. How many such parts can 27 machinists produce if they work 45 hours each?

Answer

Total Parts from One Machinist = 45 x $\frac{2}{90}$

Total Parts from 27 machinists = 90 x $\frac{27}{630}$

$\frac{180}{2430}$

So, 2430 parts are made

Calculator Problems

7. **Office Services:** The WelTec Corporation started a business with $200,000 of capital on January 1st. Unfortunately, they mismanaged these funds, and lost on average $375.47 every day for a year. What would be its financial position on the last day of the year?

Answer

Losses over the year = $375.47 x 365

= $ 137046.55

Financial Position = $200000 - $ 137046.55

= $62953.45

8. **Office Services:** Which of the following pay schemes gives you the most money over a one year period?

a) $100 per day
b) $700 per week
c) $400 for the first month and $400 raise each month
d) 1c for the first two week pay period, 2c for the second two week pay period, 4c for the third two week pay period, and so on doubling each two weeks.

Answer

a) $100 x 365 = $36500 b) $700 x 52 = $36400

c) $400 + $800 + $1200 + $1600 + $2000 + $2400 +
$2800 + $3200 + $3600 + $4000 +$4400 + $4800 = $31200

d) 1c + 2c + 4c + 8c + 16c + 32c + 64c + 128c ……33554432c = 67108863c
= $671,088.63

The fourth pay scheme is best, as it gives you over half a million dollars

9. **Machine Technology:** In the WelTec Machine Shop there are 9 lathes each weighing 2285 lbs, 5 milling machines each weighing 2570 lbs, and 3 drill presses each weighing 395 lbs. What is the total weight of these machines?

Answer

Lathe Weight = $2285 \times \frac{9}{20565}$ Milling Weight = $2570 \times \frac{5}{12850}$ Drill Press Weight = $395 \times \frac{3}{1185}$

Total Machine Weight = 20565 lbs + 12850 lbs + 1185 lbs

= 34600 lbs

10. **Manufacturing:** The WelTec calculator Company makes five models of calculator. The following table gives the weekly (5 –day) production output.

Model	Alpha	Beta	Gamma	Delta	Tau
Cost of production of each model	$6	$17	$32	$49	$178
Number produced during a typical day	117	67	29	37	18

Find the weekly (5 – day) production costs for each model.

Answer

Alpha = $117 \times \frac{6}{702}$ Beta = $67 \times \frac{17}{469}$ Gamma = $29 \times \frac{32}{58}$ Delta = $37 \times \frac{49}{333}$ Tau = $178 \times \frac{18}{1424}$

$\frac{702}{}$ $\frac{1139}{67}$ $\frac{928}{87}$ $\frac{1813}{148}$ $\frac{3204}{178}$

The weekly (5 –day) production cost = 702 + 1139 + 928 + 1813 + 3204

= $7786