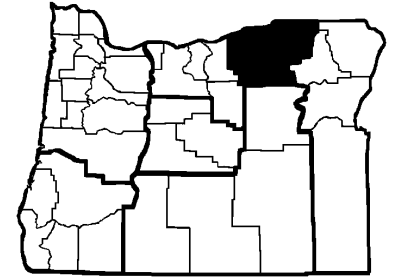


# Enterprise Budget

## Watermelon

### North Central Region

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This enterprise budget estimates the typical costs and returns of producing watermelons in Morrow and Umatilla counties in north central Oregon using drip irrigation. This budget is not representative of any particular farm and thus should be used only as a guide to estimating actual costs. The major assumptions used in constructing this budget are discussed below. Assistance provided by area producers is greatly appreciated.

#### Land and Irrigation

This budget is based on an operation with several fields in drip-irrigated watermelons. Watermelons from the field are delivered to a packing/cooling facility serving 300 acres; there, melons are repacked in cardboard bins and transported to market. The budget describes production costs on a per-acre basis, as well as assets required to produce 300 acres of watermelon. A land charge of \$400/acre/year is included to represent the typical cost of leasing land in the area.

While most crops in the area are grown with center pivot irrigation, watermelons are grown with drip irrigation. The system includes a pump provided as part of the land lease and durable equipment, including pressure regulators, filters, and abs pipe. The straight-line depreciation and interest cost of these components of the irrigation system is \$122.25/acre. Additionally, irrigation equipment that is disposed of each year costs \$395.40/acre and includes drip tape, connectors, and plastic mulch.

#### Labor and Capital

A hired labor cost of \$12/hour includes workers' compensation, social security taxes, and other payroll expenses. In addition, owner/operator labor also is valued at \$12/hour. Operating and long-term costs of capital are charged at a rate of 10 percent to represent either the cost of borrowing or the opportunity cost of owner-operator assets invested in the enterprise.

#### Building, Machinery, and Equipment

The machinery complement is sufficient to farm 300 production acres. A detailed breakdown of machinery, building, and irrigation equipment values and per-acre costs used in this budget is shown in Table 3. June 2001 replacement costs are used in all calculations.

#### Operations

The cultural operations involved in watermelon production are listed in Table 2 in the approximate order in which they typically are performed.

#### Preplant Operations

In late winter, the field is prepared by rototilling, subsoiling, plowing, and bedpressing. Following bed preparation, a barley windbreak is planted between watermelon rows. In the early spring, after verticillium and soil tests, fumigant, gopher control, and granular fertilizer are applied. Next, beds for watermelon are prepared using a v-ditcher and border tool. The final preplant operation involves laying down drip irrigation tape and plastic mulch with a specialized tape and mulch-laying machine.

#### Planting, Irrigation, and Pest Control

Watermelon transplants are planted in late spring at a rate of 2,500 plants per acre. Eighty percent are seedless, and 20 percent are seeded pollinator plants. Rented beehives at a rate of 1.5 per acre are used to pollinate the melons. In mid-summer, three aerial applications of fungicide, insecticide, and foliar nutrient are typical.

After planting, the irrigation district delivers water at a charge of \$37/acre. The water is pumped from an irrigation ditch to the drip irrigation system, requiring a total of 400 Kilowatts per acre per season of electric power. Nitrogen and other nutrients are added to irrigation water to promote growth. Weeds are controlled with three trips through the field by hand hoe crews each season.

#### Harvest, Marketing, and Cleanup

Watermelons are harvested by hand and hauled from the field to loading docks at a rate of 4.8 hours/acre. Once the melons reach the loading dock, they are reloaded into cardboard bins for shipment. The broker fee at the market is 6 percent of total revenue.

Following harvest, the field is mowed, and a crew picks up the plastic mulch. The disposal cost of the mulch is \$300/acre. The field then is disked and prepared for the cover crop.

#### Overhead

In addition to the fixed cost of buildings, machinery, and equipment (depreciation and interest), the cost of two pickups used by management is charged. An additional 3 percent of variable operating expense is charged to cover office and other unallocated costs.

#### Results

The costs and returns on a per-acre basis are listed in Table 1. The field operations and their costs are listed in Table 2. Based on a yield of 50 tons/acre, breakeven cost over direct expense is \$154.56/ton, and breakeven over total expense is \$186.23/ton. A sensitivity analysis included as Tables 4a and 4b shows price and yield combinations required to cover direct and total expenses.

**Table 1. Estimated costs and returns per acre.**

ITEM	UNIT	PRICE (\$)	QUANTITY	AMOUNT (\$)	YOUR FARM
<b>INCOME</b>					
Watermelon	ton	220.00	50.0000	11,000.00	_____
<b>TOTAL INCOME</b>				11,000.00	_____
<b>DIRECT EXPENSES</b>					
Fertilizer					
Nitrogen	lb	0.28	300.0000	84.00	_____
Phosphorus	lb	0.27	200.0000	54.00	_____
Potassium	lb	0.14	100.0000	14.00	_____
Sulfur	lb	0.10	40.0000	4.00	_____
Boron	lb	7.70	10.0000	77.00	_____
Aerial application	acre	6.50	3.0000	19.50	_____
Foliar nutrient	lb	1.00	30.0000	30.00	_____
Pesticides					
Gopher bait	lb	1.30	2.5000	3.25	_____
Watermelon insecticide	acre	65.00	3.0000	195.00	_____
Fungicide					
Watermelon fungicide	acre	35.00	3.0000	105.00	_____
Seed					
Barley seed	lb	0.14	19.0000	2.73	_____
Mulch	ft	0.03	5,000.0000	150.00	_____
Watermelon transplants	unit	0.20	3,000.0000	606.00	_____
Custom					
Test verticillium	acre	1.50	2.0000	3.00	_____
Beehive rental	acre	30.00	1.5000	45.00	_____
Melon hand hoe crew	acre	150.00	3.0000	450.00	_____
Irrigation					
4" layflat pipe	ft	1.00	132.0000	132.00	_____
Hardis reg. yr use	unit	83.30	0.2000	16.66	_____
Nelson reg. 1 year	unit	335.00	0.0400	13.40	_____
Drip tape	ft	0.01	5,000.0000	83.00	_____
Drip connector	unit	0.85	24.0000	20.40	_____
Irrigation district charge	acre	37.00	1.0000	37.00	_____
Irrigation power	acre-inch	0.93	36.0000	33.48	_____
Fumigants					
Telone	lb	9.50	75.0000	712.50	_____
Harvest					
Watermelon harvest	ton	13.00	50.0000	650.00	_____
Melon mulch disposal	acre	200.00	1.0000	200.00	_____
Marketing					
Melon broker fee	ton	13.20	50.0000	660.00	_____
Bins, pallets, lids	acre	125.00	1.0000	125.00	_____
Watermelon market truck	ton	25.00	50.0000	1,250.00	_____
Melon cooler energy	acre	13.33	1.0000	13.33	_____

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**Table 1 (continued). Estimated costs and returns per acre of watermelon.**

<b>ITEM</b>	<b>UNIT</b>	<b>PRICE (\$)</b>	<b>QUANTITY</b>	<b>AMOUNT (\$)</b>	<b>YOUR FARM</b>
Operator labor					
Implements	hour	12.00	15.2000	182.40	_____
Tractors	hour	12.00	18.1584	217.90	_____
Self-propelled equip.	hour	12.00	55.0400	660.48	_____
Hand labor					
Implements	hour	12.00	14.4000	172.80	_____
Irrigation labor	hour	12.00	4.0000	48.00	_____
Diesel fuel					
Tractors	gal	1.40	89.2920	125.00	_____
Gasoline					
Self-propelled equip.	gal	1.65	64.4000	106.26	_____
Repair & maintenance					
Implements	acre	24.85	1.0000	24.85	_____
Tractors	acre	90.40	1.0000	90.40	_____
Self-propelled equip.	acre	110.17	1.0000	110.17	_____
Interest on op. capital	acre	303.30	1.0000	303.30	_____
<b>TOTAL DIRECT EXPENSES</b>				7,830.84	_____
<b>RETURNS ABOVE DIRECT EXPENSES</b>				3,169.15	_____
<b>FIXED EXPENSES</b>					
Implements	acre	53.66	1.0000	53.66	_____
Tractors	acre	206.06	1.0000	206.06	_____
Self-propelled equip.	acre	248.72	1.0000	248.72	_____
Land rent	acre	400.00	1.0000	400.00	_____
Irr. equip. deprec. & interest	acre	122.25	1.0000	122.25	_____
Building deprec. & interest	acre	360.52	1.0000	360.52	_____
Overhead	acre	192.00	1.0000	192.00	_____
<b>TOTAL FIXED EXPENSES</b>				1,583.23	_____
<b>TOTAL SPECIFIED EXPENSES</b>				9,412.07	_____
<b>RETURNS ABOVE TOTAL SPECIFIED EXPENSES</b>				1,557.92	_____

**Table 2. Estimated resource use and costs for field operations.**

Operation/ Operating unit	Size/ Unit	Tractor Size	Perf. rate	Times over	Month	Tractor cost		Equip. cost		Alloc. labor		Operating input			Total cost (\$)
						Direct (\$)	Fixed (\$)	Direct (\$)	Fixed (\$)	Hours	cost (\$)	Amount	Price (\$)	Cost (\$)	
<b>PREHARVEST OPERATIONS</b>															
Rototiller	7-foot	100	0.800	2.00	Nov	24.16	24.43	4.74	11.14	2.304	27.64	—	—	—	92.13
Test verticillium	acre	—	—	—	—	—	—	—	—	—	—	2.0000	1.50	3.00	3.00
Subsoiler	12-foot	200	0.500	1.00	Nov	13.40	11.39	1.20	2.50	0.720	8.64	—	—	—	37.14
Plow	4-bottom	150	1.660	1.00	Nov	40.30	37.83	6.52	12.26	2.390	28.68	—	—	—	125.61
Bed press	—	150	0.800	1.00	Nov	19.42	18.23	1.05	2.10	1.152	13.82	—	—	—	54.63
Barley seed	lb	—	—	—	—	—	—	—	—	—	—	19.0000	0.14	2.73	2.73
Rototiller	7-foot	100	0.800	1.00	Feb	12.08	12.21	2.37	5.57	1.152	13.82	—	—	—	46.06
Telone	lb	—	—	—	—	—	—	—	—	—	—	75.0000	9.50	712.50	712.50
Rototiller	7-foot	100	0.800	1.00	Feb	12.08	12.21	2.37	5.57	1.152	13.82	—	—	—	46.06
Gopher gun	—	65	0.350	1.00	Feb	2.98	2.79	0.53	0.99	0.504	6.04	—	—	—	13.36
Gopher bait	lb	—	—	—	—	—	—	—	—	—	—	2.5000	1.30	3.25	3.25
Granular fertilizer application	—	85	0.800	1.00	Feb	8.49	7.11	0.48	1.44	1.152	13.82	—	—	—	31.35
Nitrogen	lb	—	—	—	—	—	—	—	—	—	—	300.0000	0.28	84.00	84.00
Phosphorus	lb	—	—	—	—	—	—	—	—	—	—	200.0000	0.27	54.00	54.00
Potassium	lb	—	—	—	—	—	—	—	—	—	—	100.0000	0.14	14.00	14.00
Sulfur	lb	—	—	—	—	—	—	—	—	—	—	40.0000	0.10	4.00	4.00
Boron	lb	—	—	—	—	—	—	—	—	—	—	10.0000	7.70	77.00	77.00
V-ditcher	—	95	0.400	1.00	Apr	5.50	5.65	0.69	1.62	2.976	35.71	—	—	—	49.18
Border tool	—	95	0.100	1.00	Apr	1.37	1.41	0.07	0.22	0.144	1.72	—	—	—	4.81
Bed press-tape layer	—	95	0.800	1.00	Apr	11.00	11.30	0.37	0.87	3.552	42.62	—	—	—	66.18
4" layflat pipe	ft	—	—	—	—	—	—	—	—	—	—	132.0000	1.00	132.00	132.00
Hardie reg. yr use	—	—	—	—	—	—	—	—	—	—	—	0.2000	83.30	16.66	16.66
Nelson reg. 1 year	unit	—	—	—	—	—	—	—	—	—	—	0.0400	335.00	13.40	13.40
Drip tape	ft	—	—	—	—	—	—	—	—	—	—	5,000.0000	0.01	83.00	83.00
Drip connector	unit	—	—	—	—	—	—	—	—	—	—	24.0000	0.85	20.40	20.40
Mulch layer	—	65	0.800	1.00	Apr	6.83	6.38	0.21	0.50	2.752	33.02	—	—	—	46.95
Mulch	ft	—	—	—	—	—	—	—	—	—	—	5,000.0000	0.03	150.00	150.00
Melon transplanter	—	65	0.800	1.00	Apr	6.83	6.38	0.28	0.71	16.352	196.22	—	—	—	210.43
Watermelon transplants	unit	—	—	—	—	—	—	—	—	—	—	3,000.0000	0.20	606.00	606.00
Beehive rental	acre	—	—	—	—	—	—	—	—	—	—	1.5000	30.00	45.00	45.00
Aerial application	acre	—	—	3.00	Jul	—	—	—	—	—	—	3.0000	6.50	19.50	19.50
Watermelon fungicide	acre	—	—	—	—	—	—	—	—	—	—	3.0000	35.00	105.00	105.00
Watermelon insecticide	acre	—	—	—	—	—	—	—	—	—	—	3.0000	65.00	195.00	195.00
Foliar nutrient	lb	—	—	—	—	—	—	—	—	—	—	30.0000	1.00	30.00	30.00
Irrigation labor	acre	—	—	1.00	Jul	—	—	—	—	4.000	48.00	1.0000	—	—	—
Irrigation district charge	acre	—	—	—	—	—	—	—	—	—	—	1.0000	37.00	37.00	37.00
Irrigation power	acre-inch	—	—	—	—	—	—	—	—	—	—	36.0000	0.93	33.48	33.48
Nitrogen	lb	—	—	—	—	—	—	—	—	—	—	100.0000	0.34	34.00	34.00
Melon hand hoe crew	acre	—	—	3.00	Jul	—	—	—	—	—	—	3.0000	150.00	450.00	450.00

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Table 2 (continued). Estimated resource use and costs for field operations.

Operation/ Operating unit	Size/ Unit	Tractor Size	Perf. rate	Times over	Month	Tractor cost		Equip. cost		Alloc. labor		Operating input			Total cost (\$)
						Direct (\$)	Fixed (\$)	Direct (\$)	Fixed (\$)	Hours	cost (\$)	Amount	Price (\$)	Cost (\$)	
<b>HARVEST OPERATIONS</b>															
Hauling trucks—melon	hour	—	19.200	1.00	Aug	—	—	135.36	150.21	23.040	276.48	—	—	—	562.05
Watermelon harvest	6% of revenue	—	—	—	—	—	—	—	—	—	—	50.0000	13.00	650.00	650.00
Melon broker fee	ton	—	—	—	—	—	—	—	—	—	—	50.0000	13.20	660.00	660.00
Forklift	hiester 50	—	8.000	1.00	Aug	—	—	55.20	67.59	32.000	384.00	—	—	—	506.79
Bins, pallets, lids	acre	—	—	—	—	—	—	—	—	—	—	1.0000	125.00	125.00	125.00
Watermelon market truck	ton	—	—	—	—	—	—	—	—	—	—	50.0000	25.00	1,250.00	1,250.00
Melon cooler energy	acre	—	—	—	—	—	—	—	—	—	—	1.0000	13.33	13.33	13.33
Tape remover		100	0.800	1.00	Oct	12.08	12.21	0.74	1.75	9.152	109.82	—	—	—	136.62
Melon mulch disposal	acre	—	—	—	—	—	—	—	—	—	—	1.0000	200.00	200.00	200.00
Rotary mower		150	0.800	1.00	Oct	19.42	18.23	1.90	2.37	1.152	13.82	—	—	—	55.76
Offset disk	17-foot	150	0.800	1.00	Oct	19.42	18.23	1.28	4.00	1.152	13.82	—	—	—	56.76
<b>OTHER EXPENSES</b>															
Pickups	hour	—	5.000	1.00	Oct	—	—	25.87	30.91	—	—	—	—	—	56.79
Building deprec. & interest	acre	—	—	1.00	Oct	—	—	—	360.52	—	—	1.0000	—	—	360.52
Irr equip deprec. & interest	acre	—	—	1.00	Oct	—	—	—	122.25	—	—	1.0000	—	—	122.25
—Land rent	acre	—	—	1.00	Oct	—	—	—	400.00	—	—	1.0000	—	—	400.00
Overhead 3% of variable cost	—	—	—	1.00	Oct	—	—	—	192.00	—	—	1.0000	—	—	192.00
<b>TOTALS</b>						215.41	206.06	241.29	1377.16	106.798	1281.58			5,696.25	9,118.10
<b>INTEREST ON OPERATING CAPITAL</b>															293.97
<b>UNALLOCATED LABOR</b>															0.00
<b>TOTAL SPECIFIED COST</b>															9,412.07

**Table 3a. Self-propelled machines: estimated performance rate, useful life, annual use, purchase price, repair cost, fuel consumption rate, and direct and fixed cost per hour and per acre.**

Item name	Size	Perf rate (hr/ac)	Useful life (yr)	Annual use (hr)	Purchase price (\$/each)	Repair cost (%)	Fuel cons. rate (per hr)	Direct cost		Fixed cost	
								(\$/hr)	(\$/ac)	(\$/hr)	(\$/ac)
3 Forklift	50	8.000	15	400	27,000	80	2.00	6.90	55.20	8.44	67.59
5 Hauling trucks-melon	—	19.200	10	400	20,000	75	2.00	7.05	135.36	7.82	150.21
2 Pickups	—	5.000	12	400	18,000	50	2.00	5.17	25.87	6.18	30.91

**Table 3b. Tractors: estimated useful life, annual use, purchase price, repair cost, fuel consumption rate and direct and fixed cost per hour.**

Item name	Size	Useful life (yr)	Annual use (hr)	Purchase price (\$/each)	Repair cost (%)	Fuel cons. rate (per hr)	Direct cost (\$/hr)	Fixed cost (\$/hr)
150 hp tractor	150	20	600	100,000	100	8.50	20.23	18.99
200 hp tractor	200	20	600	100,000	100	10.00	22.33	18.99
65 hp tractor	65	20	600	35,000	100	3.00	7.11	6.64
85 hp tractor	85	20	800	52,000	100	4.00	8.85	7.40

**Table 3c. Implements: estimated performance rate, useful life, annual use, purchase price, repair cost, and direct and fixed cost per hour and per acre.**

Item name	Size	Perf. rate (hr/ac)	Useful life (yr)	Annual use (hr)	Purchase price (\$/each)	Repair cost (%)	Direct cost		Fixed cost	
							(\$/hr)	(\$/ac)	(\$/hr)	(\$/ac)
Bed press	—	0.800	10	200	3,500	75	1.31	1.05	2.63	2.10
Bed press-tape layer	—	0.800	15	400	3,500	80	0.46	0.37	1.10	0.87
Border tool	—	0.100	20	50	969	80	0.77	0.07	2.20	0.22
Gopher gun	—	0.350	10	200	3,800	80	1.52	0.53	2.85	0.99
Melon transplanter	—	0.800	15	400	2,840	75	0.35	0.28	0.89	0.71
Mulch layer	—	0.800	15	400	2,000	80	0.26	0.21	0.63	0.50
Plow	4-bottom	1.660	15	200	11,800	100	3.93	6.52	7.38	12.26
Rotary mower	—	0.800	15	400	9,500	150	2.37	1.90	2.97	2.37
Rototiller	7-foot	0.800	15	133	7,400	80	5.925	4.74	13.93	11.14
Subsoiler	12-foot	0.500	15	125	5,000	90	2.40	1.20	5.00	2.50
Tape remover	—	0.800	15	400	7,000	80	0.93	0.74	2.19	1.75
V-ditcher	—	0.400	15	200	6,500	80	1.73	0.69	4.06	1.62

**Table 3d. Other durable inputs.**

Item name	Useful life (yr)	Purchase price (\$)	Interest/acre (\$/ac)	Depreciation (\$/ac)	Total fixed cost (\$/ac)
Buildings and irrigation (300 acres)					
15 sand media filters	10	121,755	28.77	40.59	69.35
15,000 ft 6" abs pipe	5	27,750	6.92	18.50	25.42
Hardie pressure regulators	5	30,000	7.48	20.00	27.48
Cooling shed, 24 x 36	30	23,380	6.47	2.60	9.07
Machine shed, 60 x 100	30	108,000	29.88	12.00	41.88
Cardboard storage shed, 60 x 175	30	189,000	52.29	21.00	73.29
Melon shed with dock, 50 x 150	30	142,500	39.42	15.83	55.26

Table 4a. Estimated per-acre return to watermelon above direct expenses for various price–yield combinations.

Yield (ton/ac)	Product price (\$)										
	165.00	176.00	187.00	198.00	209.00	220.00	231.00	242.00	253.00	264.00	275.00
25	-3,733.84	-3,458.84	-3,183.84	-2,908.84	-2,633.84	-2,358.84	-2,083.84	-1,808.84	-1,533.84	-1,258.84	-983.84
30	-2,908.84	-2,578.84	-2,248.84	-1,918.84	-1,588.84	-1,258.84	-928.84	-598.84	-268.84	61.15	391.15
35	-2,083.84	-1,698.84	-1,313.84	-928.84	-543.84	-158.84	226.15	611.15	996.15	1,381.15	1,766.15
40	-1,258.84	-818.84	-378.84	61.15	501.15	941.15	1,381.15	1,821.15	2,261.15	2,701.15	3,141.15
45	-433.84	61.15	556.15	1,051.15	1,546.15	2,041.15	2,536.15	3,031.15	3,526.15	4,021.15	4,516.15
50	391.15	941.15	1,491.15	2,041.15	2,591.15	3,141.15	3,691.15	4,241.15	4,791.15	5,341.15	5,891.15
55	1,216.15	1,821.15	2,426.15	3,031.15	3,636.15	4,241.15	4,846.15	5,451.15	6,056.15	6,661.15	7,266.15
60	2,041.15	2,701.15	3,361.15	4,021.15	4,681.15	5,341.15	6,001.15	6,661.15	7,321.15	7,981.15	8,641.15
65	2,866.15	3,581.15	4,296.15	5,011.15	5,726.15	6,441.15	7,156.15	7,871.15	8,586.15	9,301.15	10,016.15
70	3,691.15	4,461.15	5,231.15	6,001.15	6,771.15	7,541.15	8,311.15	9,081.15	9,851.15	10,621.15	11,391.15
75	4,516.16	5,341.14	6,166.15	6,991.15	7,816.15	8,641.15	9,466.15	10,291.15	11,116.15	11,941.15	12,766.15

Table 4b. Estimated per-acre return to watermelon above total specified expenses for various price–yield combinations.

Yield (ton/ac)	Product price (\$)										
	165.00	176.00	187.00	198.00	209.00	220.00	231.00	242.00	253.00	264.00	275.00
25	-5,317.07	-5,042.07	-4,767.07	-4,492.07	-4,217.07	-3,942.07	-3,667.07	-3,392.07	-3,117.07	-2,842.07	-2,567.07
30	-4,492.07	-4,162.07	-3,832.07	-3,502.07	-3,172.07	-2,842.07	-2,512.07	-2,182.07	-1,852.07	-1,522.07	-1,192.07
35	-3,667.07	-3,282.07	-2,897.07	-2,512.07	-2,127.07	-1,742.07	-1,357.07	-972.07	-587.07	-202.07	182.92
40	-2,842.07	-2,402.07	-1,962.07	-1,522.07	-1,082.07	-642.07	-202.07	237.92	677.92	1,117.92	1,557.92
45	-2,017.07	-1,522.07	-1,027.07	-532.07	-37.07	457.92	952.92	1,447.92	1,942.92	2,437.92	2,932.92
50	-1,192.07	-642.07	-92.07	457.92	1,007.92	1,557.92	2,107.92	2,657.92	3,207.92	3,757.92	4,307.92
55	-367.07	237.92	842.92	1,447.92	2,052.92	2,657.92	3,262.92	3,867.92	4,472.92	5,077.92	5,682.92
60	457.92	1,117.92	1,777.92	2,437.92	3,097.92	3,757.92	4,417.92	5,077.92	5,737.92	6,397.92	7,057.92
65	1,282.92	1,997.92	2,712.92	3,427.92	4,142.92	4,857.92	5,572.92	6,287.92	7,002.92	7,717.92	8,432.92
70	2,107.92	2,877.92	3,647.92	4,417.92	5,187.92	5,957.92	6,727.92	7,497.92	8,267.92	9,037.92	9,807.92
75	2,932.92	3,757.92	4,582.92	5,407.92	6,232.92	7,057.92	7,882.92	8,707.92	9,532.92	10,357.92	11,182.92

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