LESSON MAKER PRO

Warranty Worth It?

Compare a warranty fee with expected repair cost.

HIGH SCHOOL · MA.912.FL.4.2

MA.912.FL.4.2 "Compare the advantages and disadvantages for adding on a one-time warranty to a purchase using spreadsheets and other technology."

NAME _____ DATE _____

COMPARE EXPECTED COSTS

Assume a warranty fully covers one repair and has no deductible. Expected repair cost = probability x repair cost, and a spreadsheet can multiply these values. Compare it with the warranty fee: a lower fee can reduce average cost, while a higher fee adds cost. These hypothetical comparisons assume at most one repair, full coverage, and no deductible or exclusions. A lower expected cost is an average over many possible outcomes, not a guaranteed outcome or universal buying recommendation.

WORKED EXAMPLE

A warranty costs $12. A repair costs $150 and has a 5% chance. Should you buy the warranty?

1. Expected repair cost = 0.05 x $150.
2. Expected repair cost = $7.50.
3. $7.50 is less than $12, so skip the warranty.

Answer: Expected repair cost: $7.50. Do not buy the warranty.

PRACTICE 5 problems

1 A warranty costs $8. A repair costs $100 and has a 10% chance. Find the expected repair cost. Which choice costs less?

ANSWER _____

2 A warranty costs $15. A repair costs $90 and has probability 1/6. Find the expected repair cost. Which choice is cheaper?

ANSWER _____

3 A warranty costs $18. A repair costs $120 and has a 20% chance. Find the expected repair cost. Which choice costs less?

ANSWER _____

4 A warranty costs $25. A repair costs $80 and has a 25% chance. Find the expected repair cost. Which choice costs less?

ANSWER _____

5 A warranty costs $6. A repair costs $70 and has probability 1/14. Find the expected repair cost. Which choice costs less?

ANSWER _____

APPLY IT Show your work

1 In a spreadsheet compare a one-time $16 warranty with no warranty. Assume one fully covered $96 repair with probability 0.125, otherwise no repair. Enter fee, probability and repair cost in separate cells; use formulas for expected cost with and without coverage. Change probability to 0.25 and recalculate. Explain one advantage and one disadvantage beyond the averages. Attach or show formulas.

2 Riley is buying an e-bike for commuting. A warranty costs $22. A covered repair would cost $140, and the chance of one repair is 15%. Use expected cost to decide. State one possible nonmoney disadvantage of buying the warranty.

CHALLENGE One step up

Only one outcome can happen. A $24 warranty covers either repair. Without it, there is a 30% chance of a $40 battery repair, a 10% chance of a $100 controller repair, and a 60% chance of no repair. Should the student buy the warranty? Explain using expected cost.

Warranty Worth It?

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A warranty costs $8. A repair costs $100 and has a 10% chance. Find the expected repair cost. Which choice costs less?	**Expected repair cost: $10. Lower expected cost: buy the warranty, it costs $2 less.**
2	A warranty costs $15. A repair costs $90 and has probability 1/6. Find the expected repair cost. Which choice is cheaper?	**Expected repair cost: $15. The costs are equal.**
3	A warranty costs $18. A repair costs $120 and has a 20% chance. Find the expected repair cost. Which choice costs less?	**Expected repair cost: $24. Lower expected cost: buy the warranty, it costs $6 less.**
4	A warranty costs $25. A repair costs $80 and has a 25% chance. Find the expected repair cost. Which choice costs less?	**Expected repair cost: $20. Lower expected cost: skip the warranty, it costs $5 less.**
5	A warranty costs $6. A repair costs $70 and has probability 1/14. Find the expected repair cost. Which choice costs less?	**Expected repair cost: $5. Lower expected cost: skip the warranty, it costs $1 less.**

PART 2 · APPLY IT

1. **At p=.125: without $12, with $16; no warranty has $4 lower expected cost. At p=.25: without $24, with $16; warranty has $8 lower expected cost.** Without=probability*repair cost; with=fee under the stated coverage assumptions. Coverage limits the out-of-pocket repair risk but costs $16 even if no repair occurs. Expected cost does not determine an individual outcome. Require actual spreadsheet formulas and both cases.
2. **Expected repair cost: $21. Lower expected cost: skip the warranty because it costs $1 more. A possible nonmoney disadvantage is time spent filing a claim.** Multiply $140 by 0.15 to get $21. Compare $21 with the $22 warranty fee.

CHALLENGE

Do not buy the warranty. Expected repair cost = 0.30 x $40 + 0.10 x $100 + 0.60 x $0 = $22. The $22 expected cost is $2 less than the $24 warranty fee.

Accept equivalent probability forms and equivalent expected-cost calculations. For equal costs, accept either choice if the student states that there is no cost advantage.