

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.

WORKED EXAMPLE

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

1. Expected repair cost = $0.05 \times \$150$.
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 $\frac{1}{6}$. 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 $\frac{1}{14}$. Find the expected repair cost. Which choice costs less?

ANSWER _____

APPLY IT Show your work

- 1** Sam wants a tablet for school and art. A one-time warranty costs \$16. A covered repair would cost \$96, and a spreadsheet estimates a 12.5% chance of one repair. Use expected cost to decide. State one nonmoney advantage of buying the warranty.

WORK SPACE

ANSWER _____

- 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.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

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.

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. 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. 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. 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. Skip the warranty, it costs \$1 less.

PART 2 • APPLY IT

- Expected repair cost: \$12. Skip the warranty because it costs \$4 more. One nonmoney advantage of buying it is more predictable repair coverage.** Multiply \$96 by 0.125 to get \$12. Compare \$12 with the \$16 warranty fee.
- Expected repair cost: \$21. 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 \times \$40 + 0.10 \times \$100 + 0.60 \times \$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.