F03-1hour Risk (Foundation): 1-hour Pack

EDEXCEL 1ST0 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Two towns compare their risk of a seasonal infection:
Town E: risk = 1 in 300
Town F: risk = 0.4%
Write down which town has the higher risk, showing your reasoning.

(Total for Question 1 is 2 marks)

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2 A factory tests two batches of phone screens for cracks.
Batch 1: risk of a crack = 4 in 200
Batch 2: risk of a crack = 1 in 40
Work out the risk of a crack for each batch as a percentage, and state which batch has the lower risk.

(Total for Question 2 is 3 marks)

3 A factory tests two batches of kettles for faults.

Batch 1: risk of a fault = 3 in 100
Batch 2: risk of a fault = 1 in 40

(a) Write the risk of a fault in Batch 1 as a percentage. **(1)**

.....

(b) Write the risk of a fault in Batch 2 as a percentage. **(1)**

.....

(c) The factory makes 12000 kettles in Batch 1 and 8000 kettles in Batch 2. Work out the number of faulty kettles expected in each batch. **(3)**

.....

(d) A manager claims, "Batch 2 is safer because fewer kettles will be faulty." Comment on whether the manager's claim is fully justified. **(2)**

(Total for Question 3 is 7 marks)

4 Two towns compare their risk of a seasonal infection:

Town C: risk of infection = 1 in 250
Town D: risk of infection = 0.6%

(a) Write the risk for Town D as a fraction in its simplest form. **(2)**

.....

(b) Write the risk for Town C as a percentage. **(1)**

.....

(c) State which town has the greater risk of infection, giving a reason. **(2)**

(d) Town C has a population of 15000 and Town D has a population of 9000. Work out the number of people expected to be infected in each town. **(2)**

.....

(Total for Question 4 is 7 marks)

5 In a health study, 2000 people took Drug X and a separate 2000 people took a placebo (a dummy pill with no active ingredient) instead. 20 of the people taking Drug X developed a headache as a side effect, compared with 5 of the people taking the placebo.

(a) Work out the risk of a headache for someone taking Drug X. Give your answer as a percentage. **(2)**

.....

(b) Work out the risk of a headache for someone taking the placebo. Give your answer as a percentage. **(2)**

.....

(c) Work out the relative risk: how many times as likely is a person taking Drug X to get a headache compared with a person taking the placebo? **(2)**

.....

(d) A newspaper headline says, "New drug quadruples headache risk!" Use your answers to comment on whether this headline gives a fair and complete picture of the risk to an individual patient. **(2)**

(Total for Question 5 is 8 marks)

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6 In a health study, 3000 people took Drug Y and a separate 3000 people took a placebo (a dummy pill with no active ingredient). 45 of the people taking Drug Y reported a headache, compared with 15 of the people taking the placebo. Work out the risk of a headache, as a percentage, for each group, and use these to find the extra risk of a headache caused by taking Drug Y.

(Total for Question 6 is 3 marks)

7 A public health study of 800 people who exercise regularly and 800 people who do not records how many of each group develop a certain health condition over 5 years. 20 of the regular exercisers developed the condition, compared with 60 of those who do not exercise regularly. Work out the risk, as a percentage, for each group, and state how many times higher the risk is for the group that does not exercise regularly.

(Total for Question 7 is 3 marks)

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8 An insurance company compares the risk of a claim for two types of policy.
Policy X: risk = 1 in 25
Policy Y: risk = 1 in 40
Out of 2000 policyholders on each type, work out the expected number of claims for each policy, and state how many more claims Policy X would be expected to have than Policy Y.

(Total for Question 8 is 3 marks)

9 A public health study of 500 smokers and 500 people who have never smoked records how many of each group go on to develop a certain lung condition during their lifetime.

Group	Number in group	Number who develop the condition
Smokers	500	60
Never smoked	500	5

(a) Work out the risk of developing the condition for a smoker, as a fraction in its simplest form. **(2)**

.....

(b) Work out the risk of developing the condition for someone who has never smoked, as a percentage. **(2)**

.....

(c) A health advisor wants to use these figures to encourage people not to start smoking. Using your answers to parts a and b, write a sentence comparing the risk to smokers and non-smokers that the health advisor could use. **(2)**

(Total for Question 9 is 6 marks)

10 Two towns are compared during a winter flu outbreak. Both towns have the same risk of a resident being affected: 1 in 40.

Town A has a population of 8000.
Town B has a population of 20000.

(a) Work out the expected number of residents affected in Town A. **(2)**

.....

(b) Work out the expected number of residents affected in Town B. **(2)**

.....

(c) A newspaper claims, "Town B is more at risk from flu than Town A, because more people will be affected." Comment on whether this claim is correct, using your answers to parts a and b. **(2)**

(Total for Question 10 is 6 marks)

11 In a trial, 2500 people were given a flu vaccine and a separate 2500 people were given a placebo (a dummy injection). During the flu season, 25 of the vaccinated people caught flu, compared with 100 of the people who had the placebo.

(a) Work out the risk of catching flu for someone who had the vaccine. Give your answer as a percentage. **(2)**

.....

(b) Work out the risk of catching flu for someone who had the placebo. Give your answer as a percentage. **(2)**

.....

(c) Work out the relative risk: how many times as likely is a person who had the placebo to catch flu compared with a person who had the vaccine? **(2)**

.....

(d) A health website states, "This vaccine cuts your personal risk of catching flu by three-quarters." Use your answers to explain whether this is a fair and accurate way to describe the results. **(2)**

(e) The vaccine is offered to two clinics: Clinic 1 has 12000 registered patients and Clinic 2 has 3000 registered patients. Assuming nobody at either clinic is vaccinated, use the placebo risk from part b to estimate how many more people would be expected to catch flu at Clinic 1 than at Clinic 2. **(3)**

.....

(Total for Question 11 is 11 marks)

Mark scheme · F03-1hour Risk (Foundation): 1-hour Pack

Question 1

- **M1** converts 1 in 300 to a percentage, awrt 0.33% oe
- **A1** Town F cao
- **Answer: Town F has the higher risk.**

Question 2

- **M1** 4/200 = 2% oe
- **M1** 1/40 = 2.5% oe
- **A1** Batch 1 cao
- **Answer: Batch 1 = 2%, Batch 2 = 2.5%; Batch 1 has the lower risk.**

Question 3

- (a) **B1** 3% cao
- **(a) Answer: 3%**
- (b) **B1** 2.5% cao
- **(b) Answer: 2.5%**
- (c) **M1** 12000 x 0.03, oe
- (c) **M1** 8000 x 0.025, oe
- (c) **A1** 360 and 200 cao (both correct)
- **(c) Answer: Batch 1 = 360, Batch 2 = 200**
- (d) **B1** recognises Batch 2 does have fewer faulty kettles overall (200 versus 360) because fewer kettles were made in that batch
- (d) **B1** recognises the risk (rate) of a fault is actually similar/not much lower for Batch 2 (2.5% versus 3%), so comparing raw numbers alone when batch sizes differ is misleading, oe
- **(d) Answer: Not fully justified - Batch 2 has fewer faulty kettles only because fewer kettles were made; the risk (rate) of a fault is similar for both batches (3% vs 2.5%).**

Question 4

- (a) **M1** 0.6% = 6/1000, oe (unsimplified fraction or equivalent working)
- (a) **A1** 3/500 cao
- **(a) Answer: 3/500**
- (b) **B1** 0.4% cao
- **(b) Answer: 0.4%**
- (c) **B1** Town D cao
- (c) **B1** correct reason comparing percentages, e.g. 0.6% is greater than 0.4%, oe (dep on correct town)
- **(c) Answer: Town D, because 0.6% is greater than 0.4%.**
- (d) **M1** 15000 divided by 250 or 9000 x 0.006, oe (method for at least one town)
- (d) **A1** 60 and 54 cao (both correct)
- **(d) Answer: Town C = 60, Town D = 54**

Question 5

- (a) **M1** 20 divided by 2000, oe
- (a) **A1** 1% cao
- **(a) Answer: 1%**
- (b) **M1** 5 divided by 2000, oe
- (b) **A1** 0.25% cao
- **(b) Answer: 0.25%**
- (c) **M1** 1% divided by 0.25% or 20 divided by 5, oe
- (c) **A1** 4 (times) cao
- **(c) Answer: 4 times**
- (d) **B1** recognises the relative risk figure (4 times) used in the headline is correct/consistent with part c
- (d) **B1** recognises the headline could still be misleading because the absolute risk stays low (only 1%, i.e. 1 in 100 patients), so almost all patients will not get a headache, oe
- **(d) Answer: The 'quadruples' figure is correct (relative risk = 4), but it could be misleading on its own because the absolute risk is still only 1% (1 in 100 patients), so most patients will not get a headache.**

Question 6

- **M1** 45/3000 = 1.5% oe
- **M1** 15/3000 = 0.5% oe
- **A1** 1% cao
- **Answer: Drug Y risk = 1.5%, placebo risk = 0.5%; the extra risk of a headache caused by Drug Y is 1%.**

Question 7

- **M1** 20/800 = 2.5% oe
- **M1** 60/800 = 7.5% oe
- **A1** 3 times (awrt) cao
- **Answer: Regular exercisers = 2.5%, non-exercisers = 7.5%; the risk for non-exercisers is 3 times higher.**

Question 8

- **M1** 2000/25 = 80 oe
- **M1** 2000/40 = 50 oe
- **A1** 30 more cao
- **Answer: Policy X = 80 expected claims, Policy Y = 50 expected claims; Policy X would be expected to have 30 more claims.**

Question 9

- (a) **M1** 60/500, oe (unsimplified fraction or equivalent working)
- (a) **A1** 3/25 cao
- **(a) Answer: 3/25**
- (b) **M1** 5 divided by 500, oe
- (b) **A1** 1% cao
- **(b) Answer: 1%**
- (c) **B1** correctly converts/uses both risks as percentages, 12% (smokers) and 1% (never smoked), oe
- (c) **B1** correct comparison stated, e.g. 'smokers are 12 times more likely to develop the condition than people who have never smoked', oe (dep on correct percentages/relative risk)
- **(c) Answer: e.g. Smokers are 12 times more likely to develop the condition than people who have never smoked (12% compared with 1%).**

Question 10

- (a) **M1** 8000 divided by 40, oe
- (a) **A1** 200 cao
- **(a) Answer: 200**
- (b) **M1** 20000 divided by 40, oe
- (b) **A1** 500 cao
- **(b) Answer: 500**
- (c) **B1** recognises the claim is not correct/is misleading, since both towns have the same individual risk (1 in 40)
- (c) **B1** recognises Town B simply has a larger population, so a larger absolute number of people are affected even though the risk to each resident is identical, oe
- **(c) Answer: The claim is not correct - both towns have the same risk (1 in 40) for each resident. Town B has more people affected only because it has a larger population, not because residents there are more at risk.**

Question 11

- (a) **M1** 25 divided by 2500, oe
- (a) **A1** 1% cao
- **(a) Answer: 1%**
- (b) **M1** 100 divided by 2500, oe
- (b) **A1** 4% cao
- **(b) Answer: 4%**
- (c) **M1** 4% divided by 1% or 100 divided by 25, oe
- (c) **A1** 4 (times) cao
- **(c) Answer: 4 times**
- (d) **B1** recognises the risk falls from 4% (placebo) to 1% (vaccine), a drop of 3 percentage points
- (d) **B1** recognises this drop is 3/4 (75%) of the original 4% risk, so 'cuts risk by three-quarters' is a fair/accurate description, oe (accept a reasoned alternative view)
- **(d) Answer: Yes, it is fair - the risk falls from 4% to 1%, and 1% is one quarter of 4%, so the risk has indeed been cut by three-quarters (75%).**
- (e) **M1** 12000 x 0.04, oe (=480)
- (e) **M1** 3000 x 0.04, oe (=120)
- (e) **A1** 360 cao (dep on both M marks)
- **(e) Answer: 360**