When two copiers in the math building are used to print final exams, the job can be completed in 90 minutes. Prior to the new copier being brought in, the old copier would take 4 hours to do the same job on its own. How long would it take the new copier to do the job on its own? Round your answer to the nearest whole minute.

If the two copiers working together can print the final exams in 90 minutes, their rate is \( \frac{1}{90} \) of the job per minute.

If the old copier can print the final exams on its own in 4 hours, its rate is \( \frac{1}{4} \) of the job per hour. However these two rates are not consistent because one is in terms of minutes and one is in terms of hours. Remember that the rates must be consistent, so if the rate together is in terms of minutes, the rate of the old copier on its own must be in terms of minutes as well. Since 4 hours is 240 minutes, the rate of the old copier on its own is \( \frac{1}{240} \) of the job per minute.

We don’t know how many minutes it will take the new copier to do the job on its own, so if we call that \( x \), then its rate will be \( \frac{1}{x} \) per minute.

Since the rate of the old copier alone plus the rate of the new copier alone must equal their rate together, this results in the following equation:

\[
\text{old copier’s rate} + \text{new copier’s rate} = \text{rate together}
\]

\[
\frac{1}{240} + \frac{1}{x} = \frac{1}{90}
\]
To eliminate the fractions, we could multiply both sides of the equation by 240, \(x\), and 90, or we could simply multiply by the least common multiple of those three factors, which is 720\(x\).

\[
(240)(x)(90)\left(\frac{1}{240} + \frac{1}{x}\right) = \left(\frac{1}{90}\right)(240)(x)(90)
\]

\[
90x + (240)(90) = 240x
\]

\[
90x + 21,600 = 240x
\]

\[
21,600 = 150x
\]

\[
\frac{21,600}{150} = x
\]

\[
x = 144
\]

Since \(x\) is the number of minutes it will take the new copier to print the final exams on its own, it will take \textbf{144 minutes}.