

Dividends and Earnings

Lesson Summary

Dividends and Earnings will teach students how an investor receives a return on a stock purchase.

Lesson Objectives

- Draw conclusions as to how to examine a company before making investments.
- Describe the factors that influence investment decisions.
- Calculate dividends paid out to stockholders.
- Calculate net gain/loss for an investor.
- Explain the difference between earnings and dividends.

NCTM Standards

- 1A - Understand numbers, ways of representing numbers, relationships among numbers, and number systems.
- 1B - Understand meanings of operations and how they relate to one another.
- 1C - Compute fluently and make reasonable estimates.
- 2A - Understand patterns, relations, and functions.
- 5A - Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them.
- 5B - Select and use appropriate statistical methods to analyze data.
- 5C - Develop and evaluate inferences and predictions that are based on data.
- 5D - Understand and apply basic concepts of probability.
- 6A - Build new mathematical knowledge through problem solving.
- 6B - Solve problems that arise in mathematics and in other contexts.
- 6C - Apply and adapt a variety of appropriate strategies to solve problems.
- 6D - Monitor and reflect on the process of mathematical problem solving.
- 7C - Develop and evaluate mathematical arguments and proofs.
- 8A - Organize and consolidate mathematical thinking through communication.
- 8B - Communicate mathematical thinking coherently and clearly to peers, teachers, and others.
- 9B - Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
- 9C - Recognize and apply mathematics in contexts outside of mathematics.
- 10A - Create and use representations to organize, record, and communicate mathematical ideas.
- 10B - Select, apply, and translate among mathematical representations to solve problems.

Mathematical Strands

	Thinking Algebraically	Students use a simple formula for calculating dividend payments to investors.	
	Interpreting Statistics	Students use information presented in a chart to answer questions	
	Communicating Quantitative Information	Students make recommendations for selling stocks, based on when dividends will be awarded.	
	Tackling Complex Problems	Students compute the value of investments over time by applying their knowledge of dividends, reinvestment of dividends, and broker's fees.	

THINKING ALGEBRAICALLY

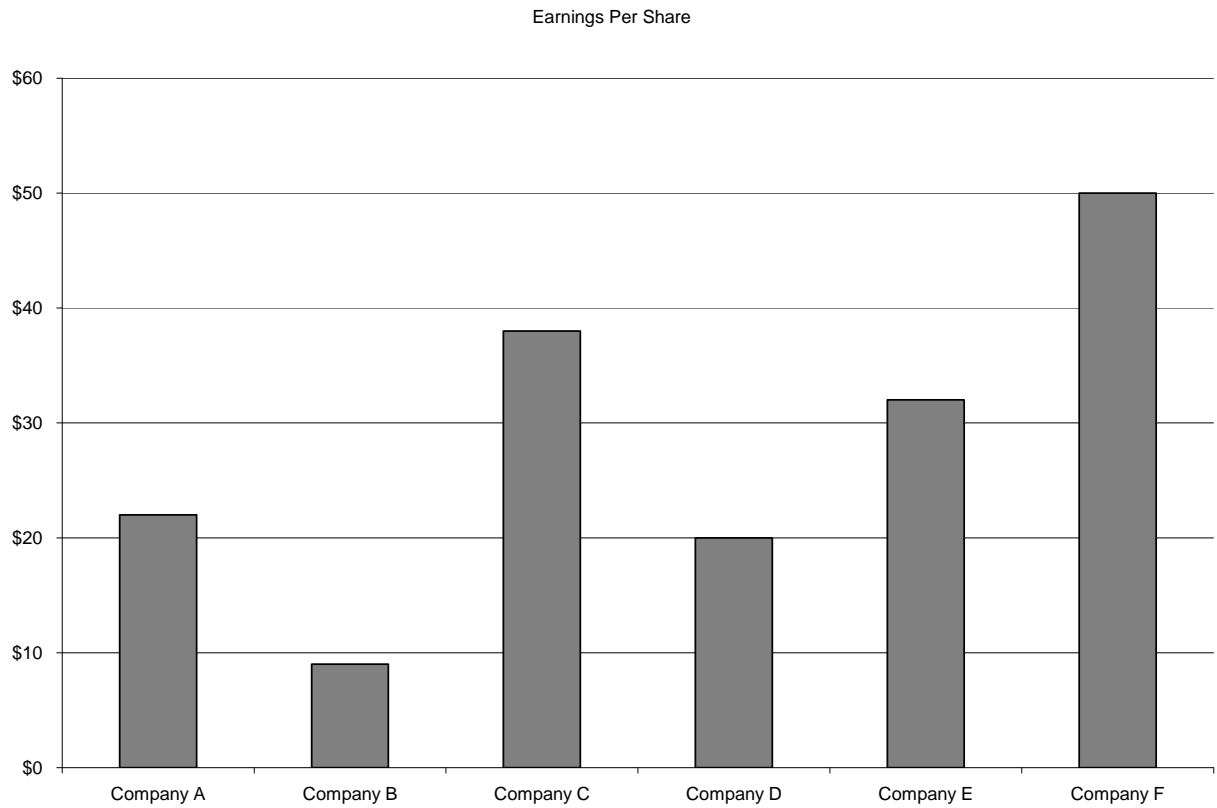
Use the formula below to determine the answer to each question.

$$\text{Dividend Payment} = (\text{Dividend per Share}) \cdot (\text{Number of Shares})$$

1. Carol has 7,400 shares of a stock that is paying a dividend of \$0.40 per share. What will her dividend payment be?
2. Lilliana owns 1,560 shares of a stock which pays a dividend of \$0.28 per share. How much is her dividend payment?
3. Jon's stock pays dividends of \$0.78 per share, and he owns 7,980 shares of the stock. How much money will he receive in dividends?
4. Hanna has 980 shares of a stock which will pay dividends of \$0.354 per share. What will her dividend payment be? How much will she be paid over the course of three dividend payments?
5. Irene is getting a dividend payment of \$1,418.75 from her 6,250 shares of stock. How much was the dividend payment per share?
6. Darryl is getting a dividend payment of \$72.75 from a dividend of \$0.15 per share. How many shares does he own?
$$\begin{aligned} \text{Number of shares} &= \text{dividend payment} \div \text{dividend amount per share} \\ &= \$72.75 \div \$0.15 = 485 \end{aligned}$$
7. Leigh is receiving dividends of \$2,016.70 for her 6,020 shares of stock. How much did the company pay in dividends for each share?
8. Robert owns 680 shares of stock which gave him a total dividend payment of \$155.04. How much was the dividend per share?

INTERPRETING STATISTICS

Below is a chart that shows the earnings per share for three different companies. Use the information provided in the chart to answer the questions below.



1. Which company shows the greatest earnings per share?
2. Which company shows the least earnings per share?
3. What is the difference in earnings per share between the company with the greatest earnings per share and the least earnings per share?
4. Which companies have greater earnings per share than Company A?
5. Which companies have earnings per share that are less than \$25?

COMMUNICATING QUANTITATIVE INFORMATION

Pretend that you are a financial advisor and one of your clients has come to you looking for advice. She wants to sell some investments in order to pay a \$5,000 tuition bill.

Here is a list of her stocks.

Stock	Current Price	Number of Shares	Price 1 Year Ago	Dividend*
A	\$40	200	\$31	-
B	\$102	125	\$100	\$2.50 / quarter
C	\$36	150	\$32	-
D	\$68	250	\$63	\$1.50/quarter
E	\$52	100	\$54	-

*Dividends have been paid four times over the course of the investment and will be paid again in two weeks.

1. Calculate the gain per share (or loss per share) for each stock.
gain per share = (current price) - (price one year ago)
2. Calculate the overall gain or loss for each stock, not including dividends.
overall gain = (gain per share) (number of shares)
3. The client wants to sell the stock that showed the smallest growth over the past year.
Which stock would that be?
4. Now calculate the gain or loss for each stock, but include profit from dividends.
quarterly dividend payment over 1 year = (dividend) (number of shares) (4).
5. Which stock now has the smallest profit?
6. Which stock would you advise your client to sell? Why?

TACKLING COMPLEX PROBLEMS

1. On April 3, 2006, Sarah bought 4,900 shares of American International Group, Inc. (AIG), stock for \$65.67 per share. AIG paid a dividend of \$0.15 on May 31, 2006. She sold 1,000 shares of the stock on August 2, 2006 for \$60.28 each, but the remaining stock earned a dividend of \$0.165 on August 30, 2006. On November 29, 2006, her stocks paid another \$0.165 dividend, and on February 2, 2007, Sarah sold all her remaining AIG stock for \$69.07.

Assuming that Sarah paid a 2% broker's fee for every transaction, how much money did Sarah earn or lose on her investment from April 3, 2006 to February 2, 2007?

2. On November 7, 2006, Emilio bought 23,500 shares of AT&T Incorporated (T) stock for \$34.30 a share. On January 8, 2007, he received a \$0.355 dividend, which he reinvested in more shares of AT&T, which were then valued at \$33.81.

Assuming there are no broker's fees, how many new shares of AT&T did Emilio buy?

How many shares does he now have?

He wants to sell enough shares to make back the amount of money he used to buy the original batch of AT&T stock. How many shares should he sell if they are currently valued at \$38.84 on April 14, 2007?

3. For a Valentine's Day present, Peter bought his new wife 5,000 shares of Honeywell International Inc. (HON) stock for \$40.51 per share. The stock paid four dividends, each worth \$0.227, and each time Peter took the money and bought more stock on behalf of his wife. The prices of the stock at the time he reinvested were \$41.43, \$42.00, \$38.77, and \$43.32. Two days before Valentine's Day the next year, he sold all the stock (to purchase a new house for his family) when each share was valued at \$49.06. Use the following table to keep track of your calculations.

TACKLING COMPLEX PROBLEMS

	Investment	Broker's Fee	Total Number of Shares at Time of Dividend	Dividend Paid	Total Amount Gained from Dividend	New Price per Share	Number of Shares Bought with Dividend Payments (whole units)
Initially			----	----	----	----	----
First Payment							
Second Payment							
Third Payment							
Fourth Payment							
Sale			----	----	----	----	----

Assuming that Peter paid the same 2% broker's fee for every transaction (excluding the receipt of the dividend), how much money did Peter gain or lose during the course of his investment?

Disclaimers: 1. Prices included in lesson are not representative of actual market data and are for instructional purposes only. 2. Discrepancies may occur between student responses and the answer keys as a result of how far calculations were taken past the decimal point. In most instances, numbers were rounded from the thousandth or ten thousandth place.

Dividends and Earnings

ANSWER KEY

Please Note: 1. Prices included in lesson are not representative of actual market data and are for instructional purposes only. 2. Discrepancies may occur between student responses and the answer keys as a result of how far calculations were taken past the decimal point. In most instances, numbers were rounded from the thousandth or ten thousandth place.

Use the formula below to determine the answer to each question.

Dividend Payment = (Dividend per Share)(Number of Shares)

1. Carol has 7,400 shares of a stock that is paying a dividend of \$0.40 per share. What will her dividend payment be?

Answer: Carol's dividend payment is \$2,960.00 = (\$0.40)(7,400)

2. Lilliana owns 1,560 shares of a stock which pays a dividend of \$0.28 per share. How much is her dividend payment?

Answer: Lilliana's dividend payment will be \$436.80 = (\$0.28)(1,560)

3. Jon's stock pays dividends of \$0.78 per share, and he owns 7,980 shares of the stock. How much money will he receive in dividends?

Answer: Jon will receive \$6,224.40 = (\$0.78)(7,980).

4. Hanna has 980 shares of a stock which will pay dividends of \$0.354 per share. What will her dividend payment be? How much will she be paid over the course of three dividend payments?

*Answer: Hanna will receive \$1,040.76 over the course of three dividend payments.
(\$0.354)(980)(3) = \$1,040.76*

5. Irene is getting a dividend payment of \$1,418.75 from her 6,250 shares of stock. How much was the dividend payment per share?

*Answer: Irene will receive a dividend share of \$0.227 per share.
Dividend payment per share = dividend payment ÷ numbers of shares
= \$1,418.75 ÷ 6,250 = \$0.227*

6. Darryl is getting a dividend payment of \$72.75 from a dividend of \$0.15 per share. How many shares does he own?

*Answer: Darryl owns 485 shares.
Number of shares = dividend payment ÷ dividend amount per share
= \$72.75 ÷ \$0.15 = 485*

7. Leigh is receiving dividends of \$2,016.70 for her 6,020 shares of stock. How much did the company pay in dividends for each share?

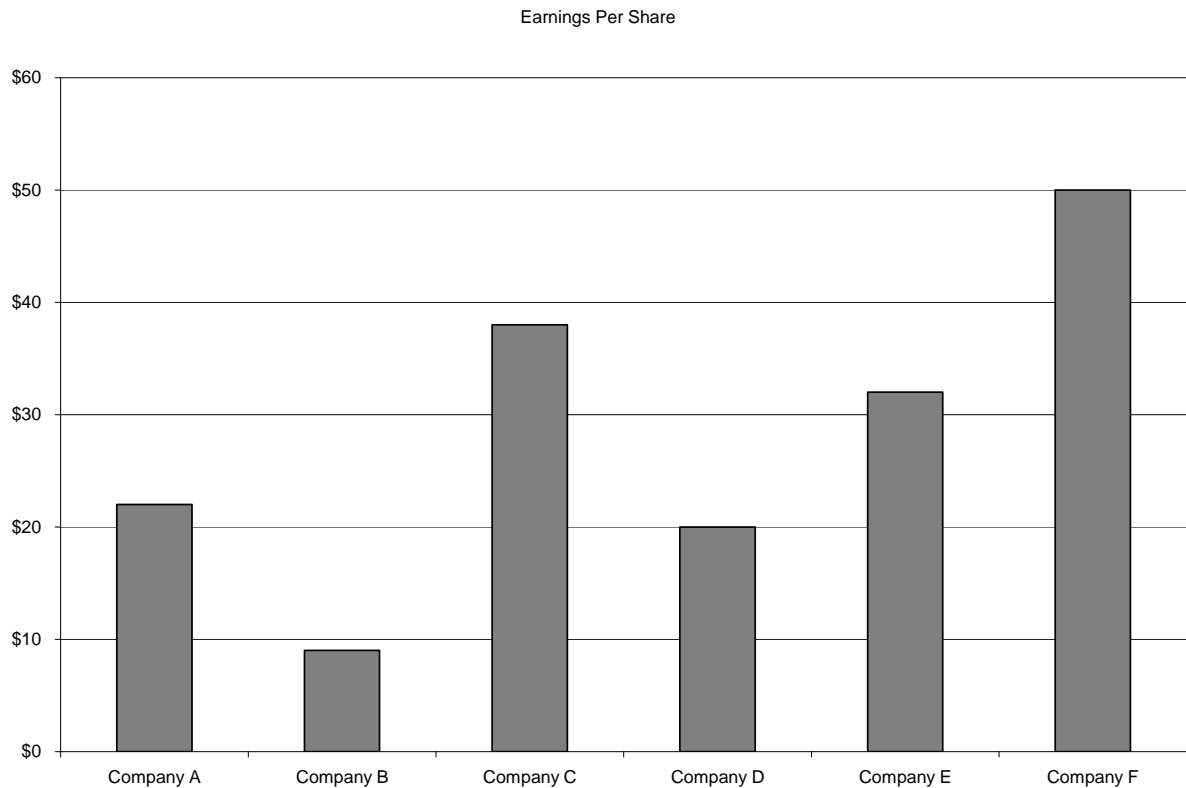
*Answer: Leigh dividend payment will be \$0.335 per share.
Dividend per share = dividend payment ÷ number of shares
= \$2,016.70 ÷ 6,020 = \$0.335*

8. Robert owns 680 shares of stock which gave him a total dividend payment of \$155.04. How much was the dividend per share?

*Answer: Robert will receive \$0.228 per share.
Dividend per share = dividend payment ÷ number of shares
= \$155.04 ÷ 680 = \$0.228*

INTERPRETING STATISTICS

Below is a chart that shows the earnings per share for three different companies. Use the information provided in the chart to answer the questions below.



1. Which company shows the greatest earnings per share?

Answer: Company F has the greatest earnings per share.

2. Which company shows the least earnings per share?

Answer: Company B has the lowest earnings per share.

3. What is the difference in earnings per share between the company with the greatest earnings per share and the least earnings per share?

Answer: Company F – Company B = \$50.00 - \$9.00 = \$41.00

The difference between the greatest and lowest earnings per share is \$41.00.

4. Which companies have greater earnings per share than Company A?

Answer: Companies C, E, and F all have greater earnings per share than Company A.

5. Which companies have earnings per share that are less than \$25?

Answer: Companies A, B, and D have earnings per share less than \$25.00.

COMMUNICATING QUANTITATIVE INFORMATION

Pretend that you are a financial advisor and one of your clients has come to you looking for advice. She wants to sell some investments in order to pay a \$5,000 tuition bill. Here is a list of her stocks.

Stock	Current Price	Number of Shares	Price 1 Year Ago	Dividend*
A	\$40	200	\$31	-
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D	\$68	250	\$63	\$1.50/quarter
E	\$52	100	\$54	-

*Dividends have been paid four times over the course of the investment and will be paid again in two weeks.

1. Calculate the gain per share (or loss per share) for each stock.

gain per share = (current price) – (price one year ago)

*Answer: Stock A: \$40.00 - \$31.00 = +\$9.00, Stock B: \$102.00 - \$100 = +\$2.00,
Stock C: \$36.00 - \$32.00 = +\$4.00, Stock D: \$68.00 - \$63.00 = +\$5.00,
Stock E: \$52.00 - \$54.00 = -\$2.00 (\$2.00 loss per share of stock)*

2. Calculate the overall gain or loss for each stock, not including dividends.

overall gain = (gain per share) (number of shares)

*Answer: Stock A: \$9.00 X 200 = \$1,800.00, Stock B: \$2.00 X 125 = \$250.00,
Stock C: \$4.00 X 150 = \$600.00, Stock D: \$5.00 X 250 = \$1,250.00,
Stock E: -\$2.00 X 100 = -\$200.00 (a loss)*

3. The client wants to sell the stock that showed the smallest growth over the past year. Which stock would that be?

Answer: Stock B had a small profit of \$250.00. However, Stock E actually had a negative growth of -\$200.00. Therefore, Stock E has had the lowest growth rate over the past year.

4. Now calculate the gain or loss for each stock, but include profit from dividends.

quarterly dividend payment over 1 year = (dividend) (number of shares) (4).

*Answer: Stock A: \$1,800.00, Stock B: \$250.00 + \$1,250.00 = \$1,500.00,
Stock C: \$600.00, Stock D: \$1,250.00 + \$1,500.00 = \$2,750.00,
Stock E: -\$200.00*

5. Which stock now has the smallest profit?

Answer: Stock E has a negative profit (-\$200). Stock C has the smallest positive profit (\$600.00).

6. Which stock would you advise your client to sell? Why?

Possible Answer: Assuming there are no broker's fees, I would advise the client to sell Stock A, Stock C, and Stock D. When you add the gains of these three stocks (\$1,800.00 + \$600.00 + \$2,750.00), the overall gain is \$5,150.00. This would give the client the \$5,000.00 that she needs to pay off the tuition bill. I might advise her to wait a couple of weeks because of the upcoming quarterly dividend payment.

TACKLING COMPLEX PROBLEMS

1. On April 3, 2006, Sarah bought 4,900 shares of American International Group, Inc. (AIG), stock for \$65.67 per share. AIG paid a dividend of \$0.15 on May 31, 2006. She sold 1,000 shares of the stock on August 2, 2006 for \$60.28 each, but the remaining stock earned a dividend of \$0.165 on August 30, 2006. On November 29, 2006, her stocks paid another \$0.165 dividend, and on February 2, 2007, Sarah sold all her remaining AIG stock for \$69.07.

Assuming that Sarah paid a 2% broker's fee for every transaction, how much money did Sarah earn or lose on her investment from April 3, 2006 to February 2, 2007?

Answer: Sarah lost \$3,136.72 on her investment activities.

Step-by-step solution:

(a) initial investment = (shares purchased)(price per share) = (4,900)(65.67) = \$321,783.00

(b) broker's fee = (value of transaction) (0.02) = (\$321,783.00) (0.02) = \$6,435.66

*(c) net cost of initial investment = initial investment + broker's fee
= \$321,783.00 + \$6,435.66 = \$328,218.66*

*(d) May 31 dividend payment = (dividend per share) (number of shares)
= (\$0.15) (4,900) = \$735.00*

*(e) net value of August 2 transaction = (shares sold) (price per share) - (broker's fee)
= (1,000) (\$60.28) - (1,000) (\$60.28) (0.02) = \$60,280.00 - \$1,205.60 = \$59,074.40*

(f) August 30 dividend payment = (\$0.165) (3,900) = \$643.50.

(g) November 29 dividend payment = (\$0.165) (3,900) = \$643.50.

*(h) net value of February 2 transaction = (3,900) (\$69.07) - (3,900)(69.07) (0.02)
= \$269,373.00 - \$5,387.46 = \$263,985.54*

*(i) net gain of Sarah's investment activity
= net value of 2 sale transactions + 3 dividend payments - net cost of initial investment
= (\$59,074.40 + \$263,985.54) + (\$735.00 + \$643.50 + \$643.50) - \$328,218.66
= \$323,059.94 + \$2,022.00 - \$328,218.66 = \$325,081.94 - \$328,218.66 = -\$3,136.72*

When all of her transactions are taken into account, Sarah lost \$3,136.72.

2. On November 7, 2006, Emilio bought 23,500 shares of AT&T Incorporated (T) stock for \$34.30 a share. On January 8, 2007, he received a \$0.355 dividend, which he reinvested in more shares of AT&T, which were then valued at \$33.81.

Assuming there are no broker's fees, how many new shares of AT&T did Emilio buy?

Answer: Emilio can buy 246.75 shares of AT&T stock with his dividend payment.

Step-by-step solution:

*initial Investment = (number of shares) (price per share)
= (23,500) (\$34.30) = \$806,050.00*

*January 8 dividend payment = (dividend per share) (number of shares)
= (\$0.355) (23,500) = \$8,342.50*

*number of shares he can buy = (January 8 dividend payment) ÷ (price per share)
= \$8,342.50 ÷ \$33.81 = 246.75*

How many shares does he now have?

Answer: He now has 23,746.75 shares of AT&T Stock. 23,500 + 246.75 = 23,746.75

TACKLING COMPLEX PROBLEMS

He wants to sell enough shares to make back the amount of money he used to buy the original batch of AT&T stock. How many shares should he sell if they are currently valued at \$38.84 on April 14, 2007?

Answer: He would have to sell 20,753.09 shares to earn his original investment back.

Step-by-step solution:

$$\begin{aligned} \text{number of shares to sell} &= \text{initial investment} \div \text{current price per share} \\ &= \$806,050.00 \div \$38.84 = 20,753.09 \end{aligned}$$

3. For a Valentine's Day present, Peter bought his new wife 5,000 shares of Honeywell International Inc. (HON) stock for \$40.51 per share. The stock paid four dividends, each worth \$0.227, and each time Peter took the money and bought more stock on behalf of his wife. The prices of the stock at the time he reinvested were \$41.43, \$42.00, \$38.77, and \$43.32. Two days before Valentine's Day the next year, he sold all the stock (to purchase a new house for his family) when each share was valued at \$49.06. Use the table below to keep track of your calculations.

	Investment	Broker's Fee	Total Number of Shares at Time of Dividend	Dividend Paid	Total Amount Gained from Dividend	New Price per Share	Number of Shares Bought with Dividend Payments (whole units)
Initially	\$202,550.00	\$4,051.00	----	----	----	----	----
First Payment			5,000	\$0.227	\$1,135.00	\$41.43	27
Second Payment			5,027	\$0.227	\$1,141.13	\$42.00	27
Third Payment			5,054	\$0.227	\$1,147.26	\$38.77	29
Fourth Payment			5,083	\$0.227	\$1,153.84	\$43.32	26
Sale	\$250,647.54	\$5,012.95	----	----	----	----	----

Assuming that Peter paid the same 2% broker's fee for every transaction (excluding the receipt of the dividend), how much money did Peter gain or lose during the course of his investment?

Answer: Peter will have a net gain of +\$39,033.59.

$$\begin{aligned} \text{net gain} &= \text{value of final sale} - \text{cost of initial investment} - 2 \text{ broker's fees} \\ &= \$250,647.54 - \$202,550.00 - \$4,051.00 - \$5,012.95 \\ &= \$39,033.59 \end{aligned}$$

[Note: If we also subtract the 2% broker's fee on each of the four transactions when Peter used his dividend payments to buy new shares, his net gain would be +\$38,942.04.]