

FA Module 6: Free cash flow – practice problems

(The attached PDF file has better formatting.)

Exercise 6.1: Free cash flow to the firm and to equity

A firm has the following figures for its GAAP financial statements:

- Operating cash flow = 330
- Interest paid = 40
- Tax rate = 20%
- Non-cash charges (depreciation and amortization) = 25
- Fixed capital expenditures = 120
- Working capital expenditures = 44
- Shareholder dividends paid = 50
- New borrowing during the year = 70
- Debt repayment during the year = 60

- A. What is the free cash flow to the firm?
B. What is the free cash flow to equity?

Part A: The free cash flow to the firm =

$$\text{cash flow from operations} + \text{interest paid} \times (1 - \text{the tax rate}) - \text{fixed capital investments} = \\ 330 + 40 \times (1 - 20\%) - 120 = 242.$$

Question: Why don't we add the non-cash charges of 25?

Answer: The non-cash charges were already added to net income to derive the operating cash flow.

Question: Why don't we subtract the working capital expenditures of 44?

Answer: The working capital expenditures were already subtracted from net income to derive the operating cash flow.

Question: Why don't we subtract the shareholder dividends of 50?

Answer: Shareholder dividends are part of the free cash flow to the firm.

Part B: The free cash flow to equity =

$$\text{cash flow from operations} - \text{fixed capital investments} + \text{net borrowing (or} - \text{net debt repayment)} = \\ 330 - 120 + (70 - 60) = 220$$

Exercise 6.2: Free cash flow to the firm

A firm has the following figures for 20X2:

- Operating cash flow (for the choice below) = 300
- Interest paid = 40
- Tax rate = 20%
- Net investments in fixed capital = 200
- Interest income received = 20
- Dividend income received = 10
- Shareholder dividends paid = 25

We consider four choices for the classification of cash flows:

	<i>Interest Paid</i>	<i>Interest & Dividends Received</i>	<i>Shareholder Dividends Paid</i>
#1	operating cash flow	operating cash flow	financing cash flow
#2	financing cash flow	operating cash flow	financing cash flow
#3	operating cash flow	investing cash flow	financing cash flow
#4	operating cash flow	operating cash flow	operating cash flow

Choice #1 is required by GAAP: interest paid is an operating cash flow; interest and dividends received are operating cash flows; and shareholder dividends paid are a financing cash flow.

Choices #2, #3, and #4 are optional under IFRS: interest paid is an operating or a financing cash flow; interest and dividends received are operating or investing cash flows; and shareholder dividends paid are an operating or financing cash flow.

Note: The practice problem gives the operating cash flow = 300, but the operating cash flow differs for the four choices. The total cash flow of the firm differs for the four choices.

- A. What is the free cash flow to the firm under Choice #1 above?
- B. What is the free cash flow to the firm under Choice #2 above?
- C. What is the free cash flow to the firm under Choice #3 above?
- D. What is the free cash flow to the firm under Choice #4 above?

Question: Why does free cash flow to the firm depend on the classification choices for the cash flow statement?

Answer: The free cash flow to the firm (FCFF) does not depend on the classification choices. But the formula we use for FCFF begins with operating cash flow, which depends on the classification choices. We adjust the formula for the optional IFRS choices.

Part A: The free cash flow to the firm (FCFF) =

$$\begin{aligned} & \text{operating cash flow} \\ + & \text{interest paid} \times (1 - \text{tax rate}) \\ - & \text{fixed capital investments} \end{aligned}$$

Intuition: The free cash flow to the firm is the amount available to creditors and investors after the firm pays for fixed capital investments.

In this problem, $\text{FCFF} = 300 + 40 \times (1 - 20\%) - 200 = 132$

Question: All the interest paid is available to creditors; why do we multiply by $(1 - \text{tax rate})$?

Answer: For the interest paid of 40, the firm paid (after-tax) only $40 \times (1 - 20\%) = 32$. The remaining 8 is a tax offset to net income.

Part B: If interest paid is classified as a financing cash flow (instead of an operating cash flow), we do not add interest paid $\times (1 - \text{tax rate})$ to the operating cash flow, since it was never removed: $\text{FCFF} = 300 - 200 = 100$

Question: The full 40 of interest paid was classified as a financing cash flow, not just 32.

Answer: If interest paid of 40 is classified under IFRS as a financing cash flow, then the tax offset of 8 is also classified as a financing cash flow.

Part C: If interest income received of 20 and dividend income received of 10 are classified as investing cash flows, we must add them to the operating cash flow in the formula for FCFF:

$$\text{FCFF} = 300 + 30 + 40 \times (1 - 20\%) - 200 = 162.$$

Part D: If shareholder dividends paid of 25 are classified as operating cash flows and were subtracted in the reported operating cash flow of 300, we must add them to the operating cash flow in the formula for FCFF:

$$\text{FCFF} = 300 + 25 + 40 \times (1 - 20\%) - 200 = 157.$$

Exercise 6.3: Free cash flow to equity

A firm has the following figures for 20X2:

- Operating cash flow = 300
- Interest paid = 40
- Tax rate = 20%
- Net investments in fixed capital = 200

We consider two scenarios:

- Scenario #1: Net borrowing in 20X2 is 30.
- Scenario #2: Net debt repayment in 20X2 is 30.

- A. What is the free cash flow to equity in Scenario #1 above?
B. What is the free cash flow to equity in Scenario #2 above?

Part A: Free cash flow to equity (FCFE) = operating cash flow – fixed capital investments + net borrowing =

operating cash flow
– fixed capital investments
+ net borrowing

$$= 300 - 200 + 30 = 130$$

Part B: The free cash flow to equity = operating cash flow – fixed capital investments – debt repayment =

operating cash flow
– fixed capital investments
– debt repayment

$$= 300 - 200 - 30 = 70$$