Source B for Question 2

H Limited manufactures toys. To produce a new product, the company needs to purchase a new machine (Machine A) costing $180 000 from a local company. Machine A's estimated useful life is four years and it will have zero scrap value.

The new product's life is four years. The estimated revenue and costs are as follows:

<table>
<tr><th>Sales revenue</th><th>Costs</th></tr>
<tr><td>Unit selling price $100

Sales (in units)
<table>
<tr><th>year</th><th>units</th></tr>
<tr><td>1</td><td>2000</td></tr>
<tr><td>2</td><td>3000</td></tr>
<tr><td>3</td><td>4000</td></tr>
<tr><td>4</td><td>1000</td></tr>
</table>
</td><td>Direct materials – $15 per unit
Direct labour – $24 per unit
Fixed overhead (excluding depreciation) – $90 000 per annum</td></tr>
</table>

H Limited's cost of capital is 10%.

Relevant discount factors are as follows:

Year	10%	16%
1	0.909	0.862
2	0.826	0.743
3	0.751	0.641
4	0.683	0.552

2 Read Source B in the insert.

(a) Explain how the internal rate of return (IRR) can be used to make a capital investment decision.

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(b) Calculate for Machine A:

(i) the net present value (NPV)

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(ii) the internal rate of return (IRR)

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(iii) the accounting rate of return (ARR).

.... [4]

Additional information

H Limited can buy a similar machine (Machine B) from an overseas company at a cost of $160 000. Everything remains unchanged except that there will be an increase in direct materials cost and direct labour cost. The result of the investment appraisal of Machine B is:

NPV	$23 392
IRR	17.30%
ARR	20.94%

(c) Advise the directors which machine they should buy. Justify your answer.

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[Total: 25]

2(a)	**Explain how the internal rate of return (IRR) can be used to make a capital investment decision.** Internal rate of return (IRR) considers the time value of money **(1)** which gives a rate of discount that yields a zero net present value / the present value of total cash inflows equal to the present value of total cash outflows. **(1)** When capital investment has an IRR above the cost of capital rate, it will give a positive net present value **(1)** and the capital investment should be accepted. **(1)** If there are two mutually exclusively capital investments and both give an IRR above the cost of capital rate, the capital investment with higher IRR will be chosen. **(1)** **Max 4** **Accept other valid responses.**	**4**

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th></tr>
<tr><td>2(b)(i)</td><td>

Calculate:

the net present value (NPV)

<table>
<tr><th>Year</th><th>Sales
$</th><th>Machine
$</th><th>Direct materials
$</th><th>Direct Labour
$</th><th>Fixed overhead
$</th><th>Net cash
$</th><th></th><th>Discount 10%
$</th><th>Present value
$</th><th></th></tr>
<tr><td>0</td><td></td><td>(180 000)</td><td></td><td></td><td></td><td></td><td></td><td>1</td><td>(180 000)</td><td>(1)</td></tr>
<tr><td>1</td><td>200 000</td><td></td><td>30 000</td><td>48 000</td><td>90 000</td><td>32 000</td><td>}</td><td>0.909</td><td>29 088</td><td>}*</td></tr>
<tr><td>2</td><td>300 000</td><td></td><td>45 000</td><td>72 000</td><td>90 000</td><td>93 000</td><td>}(1)</td><td>0.826</td><td>76 818</td><td>}*(1)OF</td></tr>
<tr><td>3</td><td>400 000</td><td></td><td>60 000</td><td>96 000</td><td>90 000</td><td>154 000</td><td>}**</td><td>0.751</td><td>115 654</td><td>}***</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>}**(</td><td></td><td></td><td>}***(1)O</td></tr>
<tr><td>4</td><td>100 000</td><td></td><td>15 000</td><td>24 000</td><td>90 000</td><td>(29 000)</td><td>1)</td><td>0.683</td><td>(19 807)</td><td>F</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>NPV</td><td></td></tr>
<tr><td></td><td>1 000 000</td><td>(180 000)</td><td>150 000</td><td>240 000</td><td>360 000</td><td>250 000</td><td></td><td></td><td>21 753</td><td>(1)OF</td></tr>
</table>

</td><td>6</td></tr>
<tr><td>2(b)(ii)</td><td>

Calculate:

the internal rate of return (IRR)
10% +[$21 753/($21 753 + $611)]**(1)OF** × (16% – 10%) **(1)** = 15.84% **(1)OF**

<table>
<tr><th>Year</th><th>Net cash
$</th><th>Discount 16%</th><th>$</th><th></th></tr>
<tr><td>0</td><td>(180 000)</td><td>1</td><td>(180 000)</td><td></td></tr>
<tr><td>1</td><td>32 000</td><td>0.862</td><td>27 584</td><td></td></tr>
<tr><td>2</td><td>93 000</td><td>0.743</td><td>69 099</td><td></td></tr>
<tr><td>3</td><td>154 000</td><td>0.641</td><td>98 714</td><td></td></tr>
<tr><td>4</td><td>(29 000)</td><td>0.552</td><td>(16 008)</td><td></td></tr>
<tr><td></td><td></td><td></td><td>(611)</td><td>(1)OF</td></tr>
</table>

</td><td>4</td></tr>
</table>

Question	Answer	Marks
2(b)(iii)	**Calculate:** **the accounting rate of return (ARR)** Total profit $250 000 – $180 000 = $70 000 **(1)** Average profit $70 000/4 = $17 500 **(1)OF** Accounting rate of return $17 500/($180 000÷2) **(1)** = 19.44% **(1)OF**	**4**
2(c)	**Advise the directors which machine they should buy. Justify your answer.** Machine A (**Max 3**) The direct cost of Machine A is lower **(1)** The average profit of Machine A is higher than Machine B (A $17 500; B $80 000 × 20.94% = $16 752) **(1)** The after-sale service of local company should be better than overseas company **(1)** The total profit of Machine A is higher **(1)** The total net cash inflow of Machine A is higher (A $250 000; B $16 752 × 4 + $160 000 = $227 008) **(1)** Machine B (**Max 3**) Machine B has a higher NPV **(1)** Machine B has a higher IRR **(1)** Machine B has a higher ARR **(1)** The initial cost of Machine B is lower **(1)** Directors should also consider other factors such as import duty, time of delivery and foreign exchange **(1)** **Decision supported with a comment (1)** **Accept other valid responses**	**7**