Foundations 12: Ch1 Pretest
Answer Section

MULTIPLE CHOICE

1. ANS: B PTS: 1 DIF: Grade 12 REF: Lesson 1.1
   OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest.
   TOP: Simple interest KEY: simple interest | principal | future value
2. ANS: A PTS: 1 DIF: Grade 12 REF: Lesson 1.1
   OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest.
   TOP: Simple interest KEY: simple interest | principal | future value
3. ANS: D PTS: 1 DIF: Grade 12 REF: Lesson 1.1
   OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest.
   TOP: Simple interest KEY: simple interest | principal
4. ANS: D PTS: 1 DIF: Grade 12 REF: Lesson 1.1
   OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest.
   TOP: Simple interest KEY: simple interest | principal | rate of return
5. ANS: B PTS: 1 DIF: Grade 12 REF: Lesson 1.1
   OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest.
   TOP: Simple interest KEY: simple interest | principal | rate of return
6. ANS: B PTS: 1 DIF: Grade 12 REF: Lesson 1.2
   OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest.
   TOP: Exploring compound interest
   KEY: simple interest | compound interest | principal | future value
7. ANS: D PTS: 1 DIF: Grade 12 REF: Lesson 1.3
   OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest. | 1.2 Identify situations that involve compound interest. | 1.3 Graph and compare, in a given situation, the total interest paid or earned for different compounding periods. | 1.8 Solve a contextual problem that involves compound interest.
   TOP: Compound interest: future value KEY: compound interest | compounding period
8. ANS: C PTS: 1 DIF: Grade 12 REF: Lesson 1.3
   OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest. | 1.2 Identify situations that involve compound interest. | 1.3 Graph and compare, in a given situation, the total interest paid or earned for different compounding periods. | 1.8 Solve a contextual problem that involves compound interest.
   TOP: Compound interest: future value KEY: compound interest | principal | future value

9. ANS: B PTS: 1 DIF: Grade 12 REF: Lesson 1.3
OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest. | 1.2 Identify situations that involve compound interest. | 1.3 Graph and compare, in a given situation, the total interest paid or earned for different compounding periods. | 1.8 Solve a contextual problem that involves compound interest.
TOP: Compound interest: future value
KEY: compound interest | principal | future value | Rule of 72

10. ANS: B PTS: 1 DIF: Grade 12 REF: Lesson 1.4
OBJ: 1.2 Identify situations that involve compound interest. | 1.8 Solve a contextual problem that involves compound interest. TOP: Compound interest: present value
KEY: compound interest | future value | present value

11. ANS: C PTS: 1 DIF: Grade 12 REF: Lesson 1.4
OBJ: 1.2 Identify situations that involve compound interest. | 1.8 Solve a contextual problem that involves compound interest. TOP: Compound interest: present value
KEY: compound interest | future value | present value

12. ANS: B PTS: 1 DIF: Grade 12 REF: Lesson 1.4
OBJ: 1.2 Identify situations that involve compound interest. | 1.8 Solve a contextual problem that involves compound interest. TOP: Compound interest: present value
KEY: compound interest | future value | principal

13. ANS: A PTS: 1 DIF: Grade 12 REF: Lesson 1.4
OBJ: 1.2 Identify situations that involve compound interest. | 1.8 Solve a contextual problem th involves compound interest. TOP: Compound interest: present value
KEY: compound interest | future value | present value

14. ANS: D PTS: 1 DIF: Grade 12 REF: Lesson 1.5
OBJ: 3.2 Determine, using technology, the total value of an investment when there are regular contributions to the principal. | 3.5 Determine, using technology, possible investment strategies to achieve a financial goal. | 3.8 Solve an investment problem.
TOP: Investments involving regular payments
KEY: compound interest | future value

15. ANS: A PTS: 1 DIF: Grade 12 REF: Lesson 1.5
OBJ: 3.2 Determine, using technology, the total value of an investment when there are regular contributions to the principal. | 3.5 Determine, using technology, possible investment strategies to achieve a financial goal. | 3.8 Solve an investment problem.
TOP: Investments involving regular payments
KEY: compound interest | future value

16. ANS: D PTS: 1 DIF: Grade 12 REF: Lesson 1.5
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TOP: Investments involving regular payments
KEY: compound interest | future value

17. ANS: D PTS: 1 DIF: Grade 12 REF: Lesson 1.5
OBJ: 3.2 Determine, using technology, the total value of an investment when there are regular contributions to the principal. | 3.5 Determine, using technology, possible investment strategies to achieve a financial goal. | 3.8 Solve an investment problem.
TOP: Investments involving regular payments
KEY: compound interest | future value

18. ANS: B PTS: 1 DIF: Grade 12 REF: Lesson 1.6
OBJ: 3.1 Determine and compare the strengths and weaknesses of two or more portfolios. | 3.2 Determine, using technology, the total value of an investment when there are regular contributions to the principal. | 3.3 Graph and compare the total value of an investment with and without regular contributions. | 3.4 Apply the Rule of 72 to solve investment problems, and explain the limitations of the rule. | 3.5 Determine, using technology, possible investment strategies to achieve a financial goal. | 3.6 Explain the advantages and disadvantages of long-term and short-term investment options. | 3.7 Explain, using examples, why smaller investments over a longer term may be better than larger investments over a shorter term. | 3.8 Solve an investment problem.
TOP: Solving investment portfolio problems
KEY: compound interest | principal | future value | portfolio

19. ANS: C PTS: 1 DIF: Grade 12 REF: Lesson 1.6
OBJ: 3.1 Determine and compare the strengths and weaknesses of two or more portfolios. | 3.2 Determine, using technology, the total value of an investment when there are regular contributions to the principal. | 3.3 Graph and compare the total value of an investment with and without regular contributions. | 3.4 Apply the Rule of 72 to solve investment problems, and explain the limitations of the rule. | 3.5 Determine, using technology, possible investment strategies to achieve a financial goal. | 3.6 Explain the advantages and disadvantages of long-term and short-term investment options. | 3.7 Explain, using examples, why smaller investments over a longer term may be better than larger investments over a shorter term. | 3.8 Solve an investment problem.
TOP: Solving investment portfolio problems
KEY: compound interest | principal | future value | portfolio | rate of return

20. ANS: D PTS: 1 DIF: Grade 12 REF: Lesson 1.6
OBJ: 3.1 Determine and compare the strengths and weaknesses of two or more portfolios. | 3.2 Determine, using technology, the total value of an investment when there are regular contributions to the principal. | 3.3 Graph and compare the total value of an investment with and without regular contributions. | 3.4 Apply the Rule of 72 to solve investment problems, and explain the limitations of the rule. | 3.5 Determine, using technology, possible investment strategies to achieve a financial goal. | 3.6 Explain the advantages and disadvantages of long-term and short-term investment options. | 3.7 Explain, using examples, why smaller investments over a longer term may be better than larger investments over a shorter term. | 3.8 Solve an investment problem.
TOP: Solving investment portfolio problems
KEY: compound interest | principal | future value | portfolio | rate of return

SHORT ANSWER

1. ANS:
   Paul: $67.50
   Simon: $84.00
   Simon earns $16.50 more interest than Paul.

   PTS: 1 DIF: Grade 12 REF: Lesson 1.1
   OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest.
   TOP: Simple interest KEY: simple interest | principal | future value
2. ANS:
   $27 777.78

   PTS: 1 DIF: Grade 12 REF: Lesson 1.1
   OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest.
   TOP: Simple interest KEY: simple interest | principal | future value
3. ANS:
   Noor: $8160.00
   Midori: $8511.11
   Midori earned $351.11 more interest.

   PTS: 1 DIF: Grade 12 REF: Lesson 1.2
   OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest.
   TOP: Exploring compound interest
   KEY: simple interest | compound interest | principal | future value
4. ANS:
   10

   PTS: 1 DIF: Grade 12 REF: Lesson 1.3
   OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest. | 1.2 Identify situations that involve compound interest. | 1.3 Graph and compare, in a given situation, the total interest paid or earned for different compounding periods. | 1.8 Solve a contextual problem that involves compound interest.
   TOP: Compound interest: future value KEY: compound interest | compounding period

5. ANS:
Bank A: $570.66, Bank C: $518.72, Bank B: $444.05

PTS: 1 DIF: Grade 12 REF: Lesson 1.3
OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest. | 1.2 Identify situations that involve compound interest. | 1.3 Graph and compare, in a given situation, the total interest paid or earned for different compounding periods. | 1.8 Solve a contextual problem that involves compound interest.
TOP: Compound interest: future value KEY: compound interest | principal | future value

6. ANS:
Answers may vary. Sample answers:
a) 24 years
b) 16 years

PTS: 1 DIF: Grade 12 REF: Lesson 1.3
OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest. | 1.2 Identify situations that involve compound interest. | 1.3 Graph and compare, in a given situation, the total interest paid or earned for different compounding periods. | 1.8 Solve a contextual problem that involves compound interest.
TOP: Compound interest: future value
KEY: compound interest | principal | future value | Rule of 72

7. ANS:
Answers may vary. Sample answers:
a) 144 years
b) 36 years

PTS: 1 DIF: Grade 12 REF: Lesson 1.3
OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest. | 1.2 Identify situations that involve compound interest. | 1.3 Graph and compare, in a given situation, the total interest paid or earned for different compounding periods. | 1.8 Solve a contextual problem that involves compound interest.
TOP: Compound interest: future value
KEY: compound interest | principal | future value | Rule of 72

8. ANS:
4.5%

PTS: 1 DIF: Grade 12 REF: Lesson 1.4
OBJ: 1.2 Identify situations that involve compound interest. | 1.8 Solve a contextual problem that involves compound interest. TOP: Compound interest: present value
KEY: compound interest | future value | principal

9. ANS:
1.438

PTS: 1 DIF: Grade 12 REF: Lesson 1.4
OBJ: 1.2 Identify situations that involve compound interest. | 1.8 Solve a contextual problem that involves compound interest. TOP: Compound interest: present value
KEY: compound interest | future value | present value

10. ANS:
21.62

PTS: 1 DIF: Grade 12 REF: Lesson 1.4
OBJ: 1.2 Identify situations that involve compound interest. | 1.8 Solve a contextual problem that involves compound interest. TOP: Compound interest: present value
KEY: compound interest | future value | present value

11. ANS:
$3935.52

PTS: 1 DIF: Grade 12 REF: Lesson 1.5
OBJ: 3.2 Determine, using technology, the total value of an investment when there are regular contributions to the principal. | 3.5 Determine, using technology, possible investment strategies to achieve a financial goal. | 3.8 Solve an investment problem.
TOP: Investments involving regular payments
KEY: compound interest | future value

12. ANS:
$4.32

PTS: 1 DIF: Grade 12 REF: Lesson 1.5
OBJ: 3.2 Determine, using technology, the total value of an investment when there are regular contributions to the principal. | 3.5 Determine, using technology, possible investment strategies to achieve a financial goal. | 3.8 Solve an investment problem.
TOP: Investments involving regular payments
KEY: compound interest | future value

13. ANS:
21.44 years

PTS: 1 DIF: Grade 12 REF: Lesson 1.5
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TOP: Investments involving regular payments
KEY: compound interest | future value

14. ANS:
$28 011.82

PTS: 1 DIF: Grade 12 REF: Lesson 1.6
OBJ: 3.1 Determine and compare the strengths and weaknesses of two or more portfolios. | 3.2 Determine, using technology, the total value of an investment when there are regular contributions to the principal. | 3.3 Graph and compare the total value of an investment with and without regular contributions. | 3.4 Apply the Rule of 72 to solve investment problems, and explain the limitations of the rule. | 3.5 Determine, using technology, possible investment strategies to achieve a financial goal. | 3.6 Explain the advantages and disadvantages of long-term and short-term investment options. | 3.7 Explain, using examples, why smaller investments over a longer term may be better than larger investments over a shorter term. | 3.8 Solve an investment problem.
TOP: Solving investment portfolio problems
KEY: compound interest | principal | future value | portfolio

15. ANS:
$28 793.84

PTS: 1 DIF: Grade 12 REF: Lesson 1.6
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TOP: Solving investment portfolio problems
KEY: compound interest | principal | future value | portfolio

16. ANS:
$240.24 per month

PTS: 1 DIF: Grade 12 REF: Lesson 1.6
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TOP: Solving investment portfolio problems
KEY: compound interest | principal | future value | portfolio

17. ANS:
$20559.41

PTS: 1 DIF: Grade 12 REF: Lesson 1.6
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TOP: Solving investment portfolio problems
KEY: compound interest | principal | future value | portfolio

18. ANS:
$44 943.77

PTS: 1 DIF: Grade 12 REF: Lesson 1.6
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TOP: Solving investment portfolio problems
KEY: compound interest | principal | future value | portfolio

19. ANS:
36.72%

PTS: 1 DIF: Grade 12 REF: Lesson 1.6
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TOP: Solving investment portfolio problems
KEY: compound interest | principal | future value | portfolio | rate of return

20. ANS:
84.12%

PTS: 1 DIF: Grade 12 REF: Lesson 1.6
OBJ: 3.1 Determine and compare the strengths and weaknesses of two or more portfolios. | 3.2 Determine, using technology, the total value of an investment when there are regular contributions to the principal. | 3.3 Graph and compare the total value of an investment with and without regular contributions. | 3.4 Apply the Rule of 72 to solve investment problems, and explain the limitations of the rule. | 3.5 Determine, using technology, possible investment strategies to achieve a financial goal. | 3.6 Explain the advantages and disadvantages of long-term and short-term investment options. | 3.7 Explain, using examples, why smaller investments over a longer term may be better than larger investments over a shorter term. | 3.8 Solve an investment problem.
TOP: Solving investment portfolio problems
KEY: compound interest | principal | future value | portfolio | rate of return

PROBLEM

1. ANS:

a) $A = P(1 + rt)$

P is \$150; r is 4% or 0.04; t is 10

$A = 150(1 + (0.04)(10))$

$A = 210$

The future value is \$210.

Determine the interest earned.

$210 - 150 = 60$

$$\text{Rate of return} = \frac{60}{150}$$

Rate of return = 0.40

The rate of return is 40%.

b) A. $A = P(1 + rt)$

P is \$150; r is 4% or 0.04; t is 10

$A = 150(1 + (0.04)(10))$

$A = 210$

The future value is \$210.

B. $A = P(1 + rt)$

P is \$150; r is 4% or 0.05; t is 10

$A = 150(1 + (0.05)(10))$

$A = 225$

The future value is \$225.

Option B yields the greatest future value.

PTS: 1 DIF: Grade 12 REF: Lesson 1.1

OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest.

TOP: Simple interest

KEY: simple interest | principal | future value | rate of return

2. ANS:
$A = P(1 + rt)$
Fatima's GIC: P is \$26 000; r is 1.7% or 0.017; t is 13
$A = 26\,000(1 + (0.017)(13))$
$A = 31\,746$
The future value of Fatima's investment is \$31 746.
Raminder's GIC: P is \$26 000; r is 2% or 0.02; t is 12
$A = 26\,000(1 + (0.02)(12))$
$A = 32\,240$
The future value of Raminder's investment is \$32 240.
Raminder's investment will have a greater future value on maturity even though the term is shorter, because the higher interest rate made a bigger difference than the longer term.

PTS: 1 DIF: Grade 12 REF: Lesson 1.1
OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest.
TOP: Simple interest KEY: simple interest | principal | future value

3. ANS:
a) $A = P(1 + rt)$
A is \$8000; r is 2.25% or 0.0225; t is 3
$8000 = P(1 + 0.0225 \cdot 3)$

$$P = \frac{8000}{1.0675}$$

$P = 7494.15$
You would need to invest a principal of \$7494.15.
b) $A = P + Prt$
A is \$16 000; P is \$7494.15; r is 2.25% or 0.0225
$16000 = 7494.15 + 7494.15(0.0225t)$

$8505.85 = 168.62t$

$$t = \frac{8505.85}{168.62}$$

$t = 50.444\ldots$
It will take about 50.5 years for the GIC to be \$16 000.

PTS: 1 DIF: Grade 12 REF: Lesson 1.1
OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest.
TOP: Simple interest KEY: simple interest | principal | future value

4. ANS:
Option A: The principal is $2000.
The annual interest rate is 4.6%.
The compounding period is annual, or 1 time per year.
The term (in years) is 10.
The future value is unknown.
The value of the investment after ten years is $3135.79.
Option B: The principal is $2000.
The annual interest rate is 4%.
The compounding period is annual, or 1 time per year.
The term (in years) is 4.
The future value is unknown.
The value of the investment after five years is $2339.72.
Reinvested: The principal is $2339.72.
The annual interest rate is 5%.
The compounding period is annual, or 1 time per year.
The term (in years) is 6.
The future value is unknown.
The value of the investment after ten years is $3135.45.
Bryan should choose option A because he will earn more interest. Assume that the rate for the second 5-year GIC does not increase and that Bryan cannot reinvest the funds somewhere else at a higher rate.

PTS: 1 DIF: Grade 12 REF: Lesson 1.3
OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest. | 1.2 Identify situations that involve compound interest. | 1.3 Graph and compare, in a given situation, the total interest paid or earned for different compounding periods. | 1.8 Solve a contextual problem that involves compound interest.
TOP: Compound interest: future value KEY: compound interest | principal | future value

5. ANS:
Option A: The principal is $18 000.
The annual interest rate is 2.45%.
The compounding period is annual, or 1 time per year.
The term (in years) is 5.
The future value is unknown.
The value of the investment after five years is $20 315.72.
Option B: The principal is $18 000.
The annual interest rate is 2.2%.
The compounding period is annual, or 1 time per year.
The term (in years) is 2.
The future value is unknown.
The value of the investment after two years is $18 800.71.
Reinvested: The principal is $18 800.71.
The annual interest rate is 3.5%.
The compounding period is annual, or 1 time per year.
The term (in years) is 3.
The future value is unknown.
The value of the investment after ten years is $20 844.68.
Ms Desai should choose option B because she will earn more interest. Assume that the rate for the 3-year GIC does not decrease.

PTS: 1 DIF: Grade 12 REF: Lesson 1.3
OBJ: 1.1 Explain the advantages and disadvantages of compound interest and simple interest. | 1.2 Identify situations that involve compound interest. | 1.3 Graph and compare, in a given situation, the total interest paid or earned for different compounding periods. | 1.8 Solve a contextual problem that involves compound interest.
TOP: Compound interest: future value KEY: compound interest | principal | future value

6. ANS:

	Bronwyn	Sam
Regular Payment Amount ($)	100	1000
Interest Rate per Annum	2.5	3
Periods per Year	12	1
Number of Years	5	5
Future Value ($)	6384.05	5309.14

Difference: 6384.05 – 5309.14 = 1074.91
Sam's investment is worth $1074.91 more than Bronwyn's investment.

PTS: 1 DIF: Grade 12 REF: Lesson 1.5
OBJ: 3.2 Determine, using technology, the total value of an investment when there are regular contributions to the principal. | 3.5 Determine, using technology, possible investment strategies to achieve a financial goal. | 3.8 Solve an investment problem.
TOP: Investments involving regular payments
KEY: compound interest | future value

7. ANS:

a)

	Jackson	Raven
Future Value ($)	100 000	100 000
Interest Rate per Annum	4.25	4.8
Periods per Year	12	12
Number of Years	20	20
Regular Payment Amount ($)	265.07	248.96
Principal	63 616.80	59 750.40

63 616.80 – 59 750.40 = 3866.40
Jackson needs to invest $3866.40 more over the 20 years.

b) The regular payment amount is $265.07.
The payment frequency is monthly, or 12 times per year.
The number of payments is 240.
The payments are made at the end of each payment period.
The annual interest rate is 4.8%.
The compounding frequency is monthly, or 12 times per year.
The future value is unknown.
Raven will have $106 472.00 at the end of 20 years.

PTS: 1 DIF: Grade 12 REF: Lesson 1.5
OBJ: 3.2 Determine, using technology, the total value of an investment when there are regular contributions to the principal. | 3.5 Determine, using technology, possible investment strategies to achieve a financial goal. | 3.8 Solve an investment problem.
TOP: Investments involving regular payments
KEY: compound interest | future value | principal

8. ANS:

a) Lump sum investment: The principal is $6000.
The annual interest rate is 4.9%.
The compounding period is quarterly, or 4 times per year.
The term (in years) is 25 years.
The future value is unknown.
The investment is worth $20 273.55.
Regular payment investment: The regular payment amount is $300.
The payment frequency is monthly, or 12 per year.
The number of payments is 300.
The annual interest rate is 3.2%.
The compounding frequency is monthly, or 12 per year.
The future value is unknown.
The investment is worth $137 606.91.
20 273.55 + 137 606.91 = 157 880.46
The portfolio is worth $157 880.46.
b) Principal: 6000 + (300)(12)(25) = 96 000
Interest: 157 880.46 – 96 000 = 61 880.46

$$\text{Rate of return} = \frac{61\,880.46}{96\,000.00}$$

Rate of return = 64.46%

PTS: 1 DIF: Grade 12 REF: Lesson 1.6
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TOP: Solving investment portfolio problems
KEY: compound interest | future value | principal | portfolio | rate of return

9. ANS:

a) Lump sum investment: The principal is $8500.
The annual interest rate is 5.45%.
The compounding period is annual, or 1 time per year.
The term (in years) is 34 years.
The future value is unknown.
The investment is worth $51 641.97.
Regular payment investment: The regular payment amount is $200.
The payment frequency is monthly, or 12 per year.
The number of payments is 408.
The annual interest rate is 3%.
The compounding frequency is monthly, or 12 per year.
The future value is unknown.
The investment is worth $141 573.37.
51 641.97 + 141 573.37 = 193 215.34
The portfolio is worth $193 215.34.
b) Principal: 8500 + (200)(12)(34) = 90 100
Interest: 193 215.34 – 90 100 = 103 115.34

$$\text{Rate of return} = \frac{103\,115.34}{90\,100.00}$$

Rate of return = 114.45%

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TOP: Solving investment portfolio problems
KEY: compound interest | future value | principal | portfolio | rate of return

10. ANS:

a) GIC: The principal is $7500.
The annual interest rate is 4%.
The compounding period is quarterly, or 4 times per year.
The term (in years) is 1.25 years.
The future value is unknown.
The GIC is worth $7882.58.
The amount he needs in his savings account is:
12 500 – 7882.58 = 4617.42
Account: The payment frequency is monthly, or 12 per year.
The number of payments is 15.
The annual interest rate is 2.45%.
The compounding frequency is monthly, or 12 per year.
The future value is $4617.42.
The regular payment amount is unknown.
The regular payment amount is $303.45.
Mark needs to save $303.45 per month.

PTS: 1 DIF: Grade 12 REF: Lesson 1.6
OBJ: 3.1 Determine and compare the strengths and weaknesses of two or more portfolios. | 3.2 Determine, using technology, the total value of an investment when there are regular contributions to the principal. | 3.3 Graph and compare the total value of an investment with and without regular contributions. | 3.4 Apply the Rule of 72 to solve investment problems, and explain the limitations of the rule. | 3.5 Determine, using technology, possible investment strategies to achieve a financial goal. | 3.6 Explain the advantages and disadvantages of long-term and short-term investment options. | 3.7 Explain, using examples, why smaller investments over a longer term may be better than larger investments over a shorter term. | 3.8 Solve an investment problem.
TOP: Solving investment portfolio problems
KEY: compound interest | future value | principal | portfolio