EXAM REVIEW QUESTIONS…All units except quadratics.

1. Melodie has $3280 to invest. She wants her principal to grow to $4000 in 6 years to help with a down payment on a condo. What simple interest rate will allow her to meet her goal?

2. Determine the difference in the interest earned at maturity on these two investments. Who earned the most interest?
   • Noor invested $6000 in a GIC for a term of 6 years with a simple interest rate of 6%, paid annually.
   • Midori invested $6000 in a GIC for a term of 6 years with a compound interest rate of 6%, paid annually.

3. How many compounding periods are there for $400 invested for 35 years at 6% compounded semi-annually?

4. Consider these rates:
   • Bank A offers 5.4%, compounded annually.
   • Bank B offers 5.35%, compounded quarterly.
   • Bank C offers 5.2%, compounded monthly.
   Rank the rates from greatest to least return on an investment of $8000 for a term of 5 years.

5. Harro has invested $160 at the end of each month, at 5.59% compounded monthly, for 5 years. What is the investment's future value?

6. Brenda has invested $7000 every six months, at 4.7% compounded monthly, for 15 years. How much interest has she earned?

7. What interest rate, compounded daily, is required to make daily payments of $1 grow to $770 in 2 years?

8. This portfolio was started 20 years ago. How much interest has the portfolio earned?
   • Annually investments of $1500 into GICs earning 3.5%, compounded annually
   • A $6000 investment averaging 6.42%, compounded monthly

9. Star claims that whenever you add an odd integer to the square of an odd integer, the result is an odd number. Is her conjecture reasonable? Briefly justify your decision.

10. What conjecture could you make about the product of three odd integers?

11. Tyler made the following conjecture:
    A polygon with more than two right angles must be a rectangle.
    Do you agree or disagree? Briefly justify your decision with a counterexample if possible.

12. Try the following calculator trick with different numbers. Make a conjecture about the trick.

    • Start with your age.
    • Multiply it by 3.
    • Multiply it by 7.
    • Multiply it by 37.
    • Multiply it by 13.

13. What type of error occurs in the following deduction?
    Briefly justify your answer.

    Let $x = y$.
    $$x^2 = xy$$
    $$x^2 + x^2 = x^2 + xy$$
    $$2x^2 = x^2 + xy$$
    $$2x^2 - 2xy = x^2 + xy - 2xy$$
    $$2x^2 - 2xy = x^2 - xy$$
    $$2(x^2 - xy) = 1(x^2 - xy)$$
    $$2 = 1$$

14. Draw the next figure in this sequence.
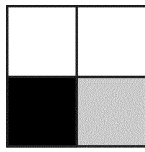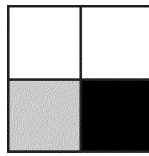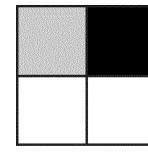

Figure 1   Figure 2   Figure 3

15. Jody must now pay $30 000 to pay off her bank loan, which she borrowed 8 years ago. The loan was compounded quarterly at an interest rate of 6.1%. How much did Jody originally borrow?

16. Arianna needs to buy supplies for her business. The supplies cost $3900 and she intends to pay for the cost by using a credit card and by making regular monthly payments of $225. She has two different credit cards:
• Card A charges 15.7%, compounded daily, but Arianna gets 2% off of all purchases.
• Card B charges 13.4%, compounded daily.
What is the total cost of the cheaper option?

17. Winston needs a boat for his job as a fisherman. He can buy a new boat for $44 000. He will finance the purchase with a bank loan at an interest rate of 3.6%, compounded monthly, and he will make regular monthly payments for 6 years. After 6 years, the boat will have a salvage value of $5000. He can lease a boat for $750 per month with a yearly down payment of $800. He can rent a boat for $50 per day. He only needs the boat 4 days a week. If he only needs a boat for 6 years, what is the total cost of renting the boat?

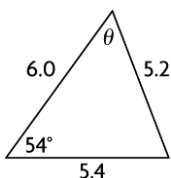**18.** Given $QP \parallel MR$, determine the measure of $\angle OPN$.
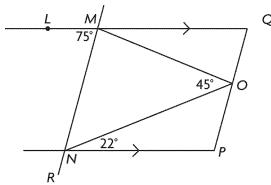
19. Determine the sum of the measures of the interior angles of a seven-sided polygon.
Show your calculation.
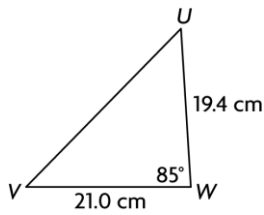
20. Determine the value of d.
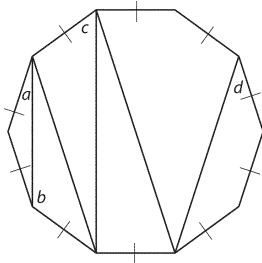
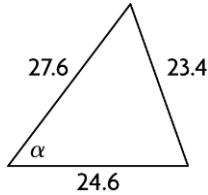**21.** Determine the length of c to the nearest tenth of a centimetre.
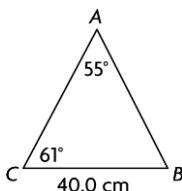
22. Determine the measure of θ to the nearest degree.

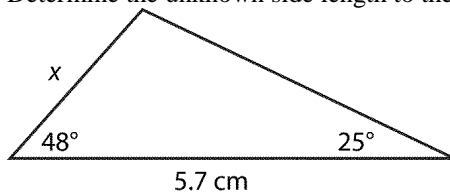**23.** Determine the length of *w* to the nearest tenth of a centimetre.

(triangle UVW with U at top, V at bottom left, W at bottom right; UW = 19.4 cm, VW = 21.0 cm, angle at W = 85°)

24. Determine the measure of α to the nearest degree.

(triangle with sides 27.6, 23.4, base 24.6, angle α at bottom left)

25. A canoeist leaves a dock on Lesser Slave Lake in Alberta, and heads in a direction S20°W from the dock for 1.5 km.
The canoeist then turns and travels north until he is directly west of the dock.
Determine the distance to the dock, to the nearest tenth of a kilometre.

26. Determine the unknown side length to the nearest tenth of a centimetre.

(triangle with side x on upper left, angle 48° at bottom left, angle 25° at bottom right, base 5.7 cm)

27. In $\triangle ABC$, $\angle A = 58°$, $a = 10.5$ cm, and $b = 11.4$ cm. Determine the number of triangles (zero, one, or two) that are possible for these measurements. Draw the triangle(s) to support your answer.

28. Is the point (0, 0) in the solution set for the linear inequality $10y - 12x > 5$?

29. Complete the graph of the solution set for the following system of inequalities.
$\{(x, y) \mid y \geq 3x, 2x + 3y \geq -3\}$
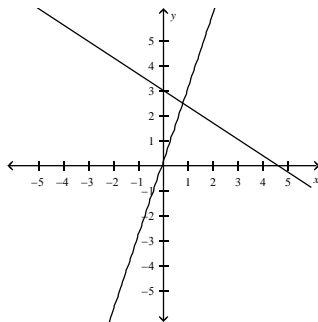
30. Graph the solution set for the following system of inequalities.
$\{(x, y) \mid x + 2y \leq 2, \quad y + 2 > x, \quad x \in R, y \in R\}$

31. A Saskatchewan farmer is planting corn and barley.
• He wants to plant no more than 800 ha altogether.
• The farmer wants at least four times as many hectares of barley as corn.
• The yield per hectare of corn averages 60 bushels, and the yield per hectare of barley averages 30 bushels.
• Corn pays the farmer $7 per bushel, and barley pays $4 per bushel.
Let *b* represent the number of hectares of barley.
Let *c* represent the number of hectares of corn.
Write the objective function to determine the combination of corn and barley that will result in the maximum profit.

32. The following model represents an optimization problem. Determine the minimum solution.
Restrictions:
$x \in W$
$y \in W$

Constraints:
$x \geq 2$
$x \leq 6$
$y \geq 2$
$2x + y \leq 20$

Objective function:
$S = x - y$

33. The posts of a hockey goal are 2.0 m apart. A player is standing at a point 4.5 m from one post and 6.0 m from the other post. Within what angle must the player shoot the puck to score a goal? Express your answer to the nearest degree. Show your work.

Solutions…

1. 3.66%
2. Noor: $8160.00
   Midori: $8511.11
   Midori earned $351.11 more interest.
3. 70
4. Bank B: $2435.03, Bank A: $2406.22, Bank C: $2369.61
5. $11 046.37
6. $90 078.65
7. 5.3%
8. $28 011.82
9. No, it is not reasonable, because, for example, $3 + 3^2 = 3 + 9$ or 12, and 12 is even, not odd.
10. For example, the product will be an odd integer.
11. For example, disagree: the following figure has more than two right angles, and it is not a rectangle.
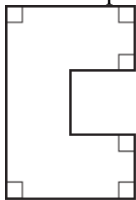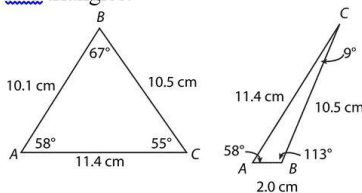

12. For example, the answer is always your age repeated three times.
13. There is an error in reasoning: in the second last step, there is division by 0, which makes the equation meaningless.
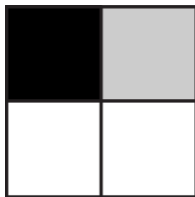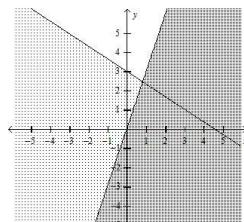
14.
15. $18 483.55
16. $4354.59
17. $62 400
18. $\angle OPN = 105°$
19. $180°(7 - 2) = 900°$
20. 36°
21. $c = 42.7$ cm
22. $\theta = 57°$
23. $w = 27.3$ cm
24. $\alpha = 53°$
25. 0.5 km
26. 2.5 cm

27. two triangles:

28. no
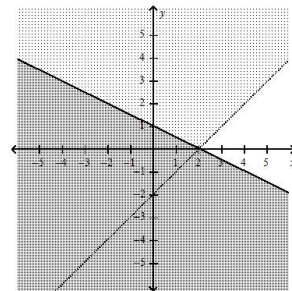
29.

30.

31. $P = (60)(7)b + (30)(4)c$ or $P = 420b + 120c$

32. (2, 16)

33. The player must shoot within a 15° angle.