Final Exam Review  Name: _____________ blk: ___________  

Section 1: Polynomials

1. Which two numbers have the following properties?
   • Their GCF is 12.
   • Their LCM is 72.

   A. 2 and 3  
   B. 24 and 36  
   C. 48 and 72  
   D. 72 and 864

2. Given that the area of the rectangle below is $2x^2 + 9x - 5$, determine the length of the rectangle.

   \[ A = lw \]
   \[ 2x^2 + 9x - 5 = (x + s)(w) \]
   \[ l = \frac{(2x^2 - x + 10x - 5)}{x(2x + 1) + 5(2x - 1)} \]
   \[ (2x - 1)(x + 5) \]

   A. $2x - 1$  
   B. $2x + 1$  
   C. $2x + 9$  
   D. $2x^2 + 8x - 10$

3. Expand and simplify: $(x - 4)^3$

   A. $x^3 - 12x^2 + 48x - 64$  
   B. $x^3 + 12x^2 + 48x + 64$  
   C. $x^3 - 4x^2 + 16x + 64$  
   D. $x^3 - 64$

4. Katie simplified the expression $(x + b)(x + c)$, where $b < 0$ and $c < 0$, to the form $x^2 + gx + k$.
   What must be true about $g$ and $k$?

   A. $g < 0$ and $k > 0$  
   B. $g < 0$ and $k < 0$  
   C. $g > 0$ and $k > 0$  
   D. $g > 0$ and $k < 0$
5. Which of the following diagrams best represents the expansion of \((x+3)(x+1)\) pictorially?

(A) 

(B) 

(C) 

(D) 

6. How many integer values are there for \(k\) for which \(4x^2 + kxy - 9y^2\) is factorable?

\[
\begin{align*}
1 + 36 &= -35 \\
18 - 2 &= 16 \\
3 - 12 &= -9 \\
12 - 3 &= 9 \\
4 - 9 &= -5 \\
9 - 6 &= 3 \\
6 - 6 &= 0
\end{align*}
\]

\[x \pm 36 = \pm 35 \]

\[18 - 2 = 16 \]

\[12 - 3 = 9 \]

\[9 - 6 = 3 \]

\[6 - 6 = 0 \]

\[\therefore\text{ the values of } k \ \text{are} 0, \pm 5, \pm 9, \pm 16, \pm 35, \quad 9 \text{ values.}\]
7. Factor: \( y^2 - 81 \)
   \[ a^2 - b^2 = (a+b)(a-b) \]
   \[ = (y-9)(y+9). \]
   
   A. \( (y-9)^2 \)
   B. \( (y+9)^2 \)
   C. \( (y+9)(y-9) \)
   D. \( (y+3)(y-3)(y+9) \)

8. Which of the following expressions have a factor of \( x + 2 \)?

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>I.</td>
<td>( x^2 - 4 )</td>
<td>( x - 2 )(( x + 2 ))</td>
</tr>
<tr>
<td>II.</td>
<td>( 2x^2 - x - 10 )</td>
<td>( 2(x^2 - 5x + 4x - 10) )</td>
</tr>
<tr>
<td>III.</td>
<td>( 5x + 10 )</td>
<td>( 5(x + 2) )</td>
</tr>
</tbody>
</table>

   A. I only
   B. III only
   C. I and III only
   D. I, II and III

9. Expand and simplify: \( (4x-3)^2 \)
   \[ (4x-3)(4x-3) \]
   \[ 16x^2 - 12x - 12x + 9 \]
   \[ 16x^2 - 24x + 9 \]

   A. \( 16x^2 + 9 \)
   B. \( 16x^2 - 12x + 9 \)
   C. \( 16x^2 - 24x - 9 \)
   D. \( 16x^2 - 24x + 9 \)

10. Pam expanded and simplified \( (x-3)(x^2 + 2x - 4) \), as shown below.

<table>
<thead>
<tr>
<th>Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. ( x(x^2 + 2x - 4) - 3(x^2 + 2x - 4) )</td>
</tr>
<tr>
<td>II. ( x^3 + 2x^2 - 4x - 3x^2 - 6x - 12 )</td>
</tr>
<tr>
<td>III. ( x^3 - x^2 + 2x - 12 )</td>
</tr>
</tbody>
</table>

   In which step is Pam's first error?
   
   A. Step I
   B. Step II
   C. Step III
   D. There is no mistake.
11. Determine an expression to represent the shaded area below.

\[ A_{\text{shaded}} = A_{\text{Big}} - A_{\text{Small}} \]

\[ A_{\text{Big}} = (2x+11)(x+5) = 2x^2 + 10x + 11x + 55 = 2x^2 + 21x + 55. \]

\[ A_{\text{Small}} = (x-2)(x-6) = x^2 - 2x - 6x + 12 = x^2 - 8x + 12. \]

\[ A_{\text{shaded}} = 2x^2 + 21x + 55 - x^2 + 8x - 12 = x^2 + 29x + 43. \]

A. \(x^2 + 43\)  
B. \(x^2 + 13x + 67\)  
C. \(x^2 + 29x + 43\)  
D. \(3x^2 + 13x + 67\)

12. Determine the greatest common factor of \(12x^2y, 4x^2y^2\) and \(6x^3y^4\).

A. \(2xy\)  
B. \(2x^2y\)  
C. \(4x^2y^2\)  
D. \(12x^3y^4\)

\[ \text{GCF} = 2x^2y \]

13. Which of the following expressions is a factor of \(x^2 - 8x - 20\) ?

A. \(x - 2\)  
B. \(x - 4\)  
C. \(x - 5\)  
D. \(x - 10\)

\[-10 + \frac{2}{x} = -8 \quad -10 \cdot \frac{2}{x} = -20 \]

14. When completely factored, how many factors does \(2x^4 - 24x^2 - 128\) have?

A. 2  
B. 3  
C. 4  
D. 5

\[ 2\left((x^2 - 16)(x^2 + 4)\right) = 2((x-4)(x+4)(x^2 + 4)) \]
Joe was asked to factor $6x^2 + x - 15$ and represent it with math tiles.

$$-9 + 10 = 1$$
$$\frac{-9}{\times 10} = -90$$
$$6x^2 - 9x + 10x - 15$$
$$3x(2x - 3) + 5(2x - 3)$$
$$(3x+5)(2x-3).$$

What additional tiles would he need to represent the total area of the two factors?

A. 8 each of and
B. 9 each of and
C. 10 each of and
D. 11 each of and

**Section 2: Exponents and Radicals**

16. A bacteria culture doubles every hour. If there are 10,000 bacteria now, how many bacteria were there 4 hours ago? Answer to the nearest bacterium.

$$10,000(2)^{-4} = \frac{10,000}{16} = 625 \text{ bacteria 4 hours ago.}$$

17. What is the least common multiple of 18 and 24?

NC A. $2 \times 3$
B. $2^2 \times 3^3$
C. $2^3 \times 3^2$
D. $2^4 \times 3^3$

LCM: $2^3 \times 3^2$

18. What is the greatest common factor of 12, 24, 30, 72?

NC A. 360
B. 12
C. 6
D. 2

GCF: $2 \times 3 = 6$. 
19. Express $2\sqrt{5}$ as an entire radical.

NC
A. $\sqrt{10}$
B. $\sqrt{20}$
C. $\sqrt{50}$
D. $\sqrt{100}$

20. Order the numbers from the smallest value to the largest value.

NC

<p>| | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>I</td>
<td>$-3\sqrt{2}$</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>$\sqrt{9}$</td>
<td>$= 3$</td>
</tr>
<tr>
<td>III</td>
<td>$2\sqrt{3}$</td>
<td>$= \sqrt{12}$</td>
</tr>
<tr>
<td>IV</td>
<td>$-2\sqrt{7}$</td>
<td>$= -\sqrt{28}$</td>
</tr>
</tbody>
</table>

A. I, IV, II, III
B. I, IV, III, II
C. IV, I, II, III
D. IV, I, III, II

21. Simplify: $(2x^3)^3 \cdot 3x^4$

NC
A. $24x^{36}$
B. $24x^{13}$
C. $18x^{36}$
D. $6x^{13}$

22. Which one of the following sets of numbers contains only rational numbers?

A. $\left\{ \frac{3}{4}, 7.1, \sqrt{16} \right\}$
B. $\left\{ \frac{1}{2}, -6, \sqrt{\frac{5}{2}} \right\}$
C. $\left\{ -3, 4\sqrt{3}, 4.121314... \right\}$
D. $\left\{ \sqrt{10}, 3\sqrt{9}, \pi \right\}$
23. Simplify: $\sqrt[3]{1080}$
   A. $2\sqrt[3]{135}$
   B. $3\sqrt[3]{40}$
   C. $6\sqrt[3]{5}$
   D. $6\sqrt[3]{30}$

24. Simplify: $(3a^2)^3 (4a^3)^3 = 1$
   A. $9a^6$
   B. $27a^6$
   C. $36a^8$
   D. $108a^9$

25. Which expression is equivalent to $\left(-c^2\right)^{-\frac{1}{3}}$?
   A. $\frac{1}{\sqrt[3]{-c^2}}$
   B. $\frac{1}{\sqrt[3]{c^2}}$
   C. $\frac{1}{\sqrt{-c^2}}$
   D. $\frac{3}{\sqrt[3]{c^2}}$

26. Simplify: $\sqrt[3]{x^3} + \frac{3}{2}\sqrt[4]{x^4}$
   A. $\sqrt[3]{x}$
   B. $\sqrt[3]{x^3}$
   C. $\sqrt[3]{x^3}$
   D. $\sqrt[3]{x}$
27. Which of the following statements are true?

<table>
<thead>
<tr>
<th>NC</th>
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</thead>
</table>
| **I.**  
| \( \sqrt{4} = 2 \) since \( 2 \times 2 = 4 \) ✔  
| **II.**  
| \( \sqrt{8} = 4 \) since \( 4 \times 4 = 8 \) ✗  
| **III.**  
| \( \sqrt{27} = 3 \) since \( 3 \times 3 \times 3 = 27 \) ✔  
| **IV.**  
| \( \sqrt{81} = 9 \) since \( 9 \times 9 = 81 \) ✗  

A. I and III only  
B. I and IV only  
C. II and III only  
D. II and IV only

28. Which of the following statements are true?

<table>
<thead>
<tr>
<th>NC</th>
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</thead>
</table>
| **I.**  
| The factors of 24 are 2, 3, 4, 6, 8 and 12. ✔  
| **II.**  
| The prime factorization of 24 is \( 2^3 \times 3^1 \). ✔  
| **III.**  
| The prime factors of 24 are 2 and 3. ✔  
| **IV.**  
| \( \sqrt{24} \) is an irrational number. ✔  

A. I and IV only  
B. II and III only  
C. II, III and IV only  
D. I, II, III and IV

29. Simplify: \( \sqrt{72} \)

<table>
<thead>
<tr>
<th>NC</th>
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</thead>
</table>
| **A.**  
| \( 2\sqrt{6} \)  
| **B.**  
| \( 6\sqrt{2} \) ✔  
| **C.**  
| \( 18\sqrt{2} \)  
| **D.**  
| \( 36\sqrt{2} \)  

30. Evaluate: \( 16^{-\frac{3}{4}} \)

<table>
<thead>
<tr>
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</thead>
</table>
| **A.**  
| \(-8\)  
| **B.**  
| \( \frac{1}{8} \) ✔  
| **C.**  
| \( \frac{1}{2} \)  
| **D.**  
| \( 2 \)  

\[ (2^4)^{-\frac{3}{4}} = 2^{-3} = \frac{1}{8} \]
31. Which pattern could be used to predict $3^{-4}$?

<table>
<thead>
<tr>
<th></th>
<th>NC</th>
<th>B.</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>3^3</td>
<td>27</td>
<td>3^3</td>
</tr>
<tr>
<td></td>
<td>3^2</td>
<td>9</td>
<td>3^2</td>
</tr>
<tr>
<td></td>
<td>3^1</td>
<td>3</td>
<td>3^1</td>
</tr>
<tr>
<td></td>
<td>3^0</td>
<td>1</td>
<td>3^0</td>
</tr>
<tr>
<td></td>
<td>3^{-1}</td>
<td>$\frac{1}{3}$</td>
<td>3^{-1}</td>
</tr>
<tr>
<td></td>
<td>3^{-2}</td>
<td>$\frac{1}{9}$</td>
<td>3^{-2}</td>
</tr>
<tr>
<td></td>
<td>3^{-3}</td>
<td>$\frac{1}{27}$</td>
<td>3^{-3}</td>
</tr>
</tbody>
</table>
33. Chantal made a mistake in her simplification of \( \frac{(3a^5)^{-2}}{a^4} \).

<table>
<thead>
<tr>
<th>Steps</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. ( \frac{1}{(3a^5)^3(a^4)} )</td>
</tr>
<tr>
<td>II. ( \frac{1}{(3^2)(a^5)^2(a^4)} )</td>
</tr>
<tr>
<td>III. ( \frac{1}{(9a^2)(a^4)} )</td>
</tr>
<tr>
<td>IV. ( \frac{1}{9a^{28}} )</td>
</tr>
</tbody>
</table>

Which step contains her first mistake?

A. Step I  
B. Step II  
C. Step III  
D. Step IV

34. Simplify: \( \left( \frac{25x^a}{125x^3} \right)^3 \)

A. \( \frac{x^{3a-9}}{125} \)  
B. \( \frac{x^{a-3}}{5} \)  
C. \( 125x^{3a-9} \)  
D. \( \frac{x^{37a}}{5} \)

35. A research assistant calculated the brain mass, \( b \), of an 8 kg cat. She used the formula 
\( b = 0.01m^{\frac{2}{3}} \), where \( m \) is the total mass of the cat.

<table>
<thead>
<tr>
<th>Steps</th>
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<tbody>
<tr>
<td>I. ( b = 0.01(8)^{\frac{2}{3}} )</td>
</tr>
<tr>
<td>II. ( b = 0.01\sqrt[3]{64} )</td>
</tr>
<tr>
<td>III. ( b = 0.01(2.52) )</td>
</tr>
<tr>
<td>IV. ( b = 0.025 )</td>
</tr>
</tbody>
</table>

In which step did the research assistant first make a mistake?

A. Step I  
B. Step II  
C. Step III  
D. Step IV
Section 3: Measurement and Surface Area

36. A road sign says to turn right in 1000 feet. Approximately how far is this distance in kilometres?
   NC  
   A. 0.3 km  
   B. 0.6 km  
   C. 1 km  
   D. 1.5 km

\[
\frac{1000 \text{ ft}}{3 \text{ ft}} = 333.3333 \text{ m} = 0.33 \text{ km}
\]

37. Which of the following calculations converts 4 yards into centimetres?
   NC  
   A. \(4 \text{ yd} \times \frac{2.54 \text{ cm}}{1 \text{ in}}\)  
   B. \(4 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} \times \frac{2.54 \text{ cm}}{1 \text{ in}}\)  
   C. \(4 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} \times \frac{12 \text{ in}}{1 \text{ ft}} \times \frac{2.54 \text{ cm}}{1 \text{ in}}\)  
   D. \(4 \text{ yd} \times \frac{1 \text{ ft}}{3 \text{ yd}} \times \frac{1 \text{ in}}{12 \text{ ft}} \times \frac{2.54 \text{ cm}}{1 \text{ in}}\)

38. A cylinder with a diameter of 10 cm and a height of 12 cm is half full of water. A sphere with a diameter of 5 cm is dropped into the cylinder. How far will the water level rise once the sphere is completely under the water?
   A. 0.57 cm  
   B. 0.83 cm  
   C. 5 cm  
   D. 6 cm

\[
V_{\text{sph}} = \frac{4}{3} \pi r^3 = \frac{4}{3} \pi (2.5)^3 = 65.4498
\]

\[
V_{\text{cyl} + \text{sphere}} = 471.2389 + 65.4498 = 536.69
\]

39. Using the ruler below, determine the length of the pencil.
   A. \(5 \frac{1}{8}\)  
   B. \(5.2\)  
   C. \(5 \frac{1}{4}\)  
   D. \(7 \frac{1}{8}\)
40. Jung was told to plant trees two steps apart. Which of the following estimates is closest to “two steps apart”?
   A. 6 ft  
   B. 3 m  
   C. 60 cm  
   D. 30 in

41. Which distance below is the longest?
   0.6 mi, 1000 yd, 1 km, 900 m
   A. 0.6 mi  
   B. 1000 yd  
   C. 1 km  
   D. 900 m

42. A cone-shaped water tank has a volume of 1000 litres. Which diagram best represents the 250 L, 500 L and 750 L marks outside of the water tank?
   A.  
   B.  
   C.  
   D.  
43. The slant height of the pyramid below is 45 cm. Calculate its volume.

\[ h = \sqrt{45^2 - 15^2} = 42.23 \text{ cm} \]

\[ V = \frac{1}{3} \text{(area base)} \times \text{(height)} \]

\[ V = \frac{1}{3} (30)^2 (42.23) = 12727.92 \text{ cm}^3 \]

A. 10 062 cm³  
B. 12 728 cm³  
C. 13 500 cm³  
D. 40 500 cm³  

44. The volume of the object below is 186 cm³. Calculate the length of \( x \).

\[ V_{\text{Whole object}} = 9 \times 4 \times 6 = 216 \]

\[ V_{\text{With cutout}} = 216 - 186c \]

\[ V_{\text{Cutout}} = 30 \]

\[ 3 \times 4 \times x = 30 \]

\[ 12x = 30 \]

\[ x = 2.5 \text{ cm} \]

A. 3.1 cm  
B. 2.5 cm  
C. 1.75 cm  
D. 1.25 cm  

45. Calculate the surface area of the solid hemisphere below. Answer to the nearest square metre.

\[ SA = \frac{4\pi r^2 + \pi r^2}{2} \]

\[ = 2\pi r^2 + \pi r^2 \]

\[ = 3\pi r^2 \]

\[ = 3\pi (6)^2 \]

\[ = 108\pi \]

\[ = 339 \text{ m}^2 \]
46. On a quiz, students were asked to convert 5 lbs 4 oz to a metric weight.

<table>
<thead>
<tr>
<th>Stan’s Solution</th>
<th>Erin’s Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td></td>
</tr>
<tr>
<td>4 oz × ( \frac{1 \text{ lb}}{16 \text{ oz}} ) = 0.25 lb</td>
<td>5 lb × ( \frac{16 \text{ oz}}{1 \text{ lb}} ) = 80 oz</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
</tr>
<tr>
<td>5.25 lb × ( \frac{0.454 \text{ kg}}{1 \text{ lb}} ) = 2.3835 kg</td>
<td>84 oz × ( \frac{28.35 \text{ g}}{1 \text{ oz}} ) = 2381.4 g</td>
</tr>
</tbody>
</table>

How should the teacher mark these two solutions?

A. Only Erin’s solution is correct.
B. Only Stan’s solution is correct.
C. Both Stan and Erin gave a correct solution.
D. Neither Stan nor Erin gave a correct solution.

47. A baker gets his muffin boxes from the United States. The tallest muffins he bakes are 11 cm. Estimate the height of the smallest box in which the muffins will fit.

NC

A. 30 inches tall
B. 10 inches tall
C. 5 inches tall
D. 4 inches tall

48. Jasdeep and Kelsey converted 177 ounces into kilograms, as shown below.

<table>
<thead>
<tr>
<th>Jasdeep’s Solution</th>
<th>Kelsey’s Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>177 oz × ( \frac{28.35 \text{ g}}{1 \text{ oz}} ) × ( \frac{1 \text{ kg}}{1000 \text{ g}} ) = 5 017 950 kg</td>
<td>177 oz × ( \frac{1 \text{ oz}}{28.35 \text{ g}} ) × ( \frac{1 \text{ kg}}{1000 \text{ g}} ) = 0.0062 kg</td>
</tr>
</tbody>
</table>

Which statement below is true?

A. Only Kelsey is correct because the units cancel.
B. Only Jasdeep is correct because the units cancel.
C. Only Kelsey is incorrect because the conversion factors are incorrect.
D. They are both incorrect for different reasons.

49. As an estimation strategy, what could be used to best approximate one centimetre?

A. the length of your foot
B. the width of your hand
C. the width of your finger
D. the width of a pencil lead
50. Sarah needs to replace the exhaust pipe on her dirt bike. She uses a Vernier calliper to find the diameter of the pipe.

What is the diameter of the pipe?

A. 16.1 mm  
B. 19.2 mm  
C. 19.5 mm  
D. 29.0 mm

51. Two isosceles triangles have the same height. The slopes of the sides of triangle A are double the slopes of the corresponding sides of triangle B. How do the lengths of their bases compare?

A. The base of A is quadruple that of B.  
B. The base of A is double that of B.  
C. The base of A is half that of B.  
D. The base of A is one quarter that of B.

52. A cylinder has a surface area of 402 cm². The height is three times greater than the radius. What is the height of the cylinder?

A. 8.00 cm  
B. 10.48 cm  
C. 12.00 cm  
D. 16.97 cm

53. A bowling ball measures 264 cm in circumference. What is the volume of the smallest cube that will hold this ball?

A. approximately 75 000 cm³  
B. approximately 311 000 cm³  
C. approximately 594 000 cm³  
D. approximately 2 300 000 cm³
54. Which of the following shapes has a volume three times larger than the pyramid below?

\[ V = \frac{1}{3} \text{(area base)} \times \text{(height)} \]
\[ = \frac{1}{3} \times (160 \text{ cm}^2) \times (15) \]
\[ = (160)(5) \times 3 \text{ times bigger} \]
\[ = 3(160)(5). \]

\[ V = (160)(15) \checkmark \]

A. \[ h = 15 \text{ cm} \]
\[ \text{base area} = 160 \text{ cm}^2 \]
\[ V = (160)(15) \]

B. \[ h = 30 \text{ cm} \]
\[ \text{base area} = 160 \text{ cm}^2 \]
\[ V = (160)(30) \]

C. \[ h = 5 \text{ cm} \]
\[ \text{base area} = 160 \text{ cm}^2 \]
\[ V = \frac{1}{3} (160)(5) \]

D. \[ h = 30 \text{ cm} \]
\[ \text{base area} = 160 \text{ cm}^2 \]
\[ V = \frac{1}{3} (160)(30) \]

55. Convert 150 pounds into kilograms. Answer to the nearest kilogram.

\[ 150 \text{ lbs} \times 0.454 \text{ kg/lb} \]
\[ \approx 68 \text{ kg} \]
56. Which of the following net diagrams best constructs the cone below?

A.  

B.  

C.  

D.  

57. Polar Company has designed an ice block in the shape of a cube. The volume of the cube is 15,265 cm$^3$. Which of the following dimensions is the smallest opening of an ice dispenser that will accommodate length AB?

A. 25 cm wide  
B. 40 cm wide  
C. 45 cm wide  
D. over 50 cm wide  

$V = lwh$  
$15265 = S^3$  
$S = 25$  

A right triangle with sides:  
25  
25  
25  

$25^2 + 25^2 = c^2$  
$625 + 625 = c^2$  
$c = 35.355$  

$x^2 = 25^2 + 35.355^2$  
$x = 43.3$
Section 4: Trigonometry

58. Determine the ratio of $\cos A$.

A. $\cos A = \frac{2}{3}$  
B. $\cos A = \frac{\sqrt{5}}{3}$  
C. $\cos A = \frac{\sqrt{13}}{3}$  
D. $\cos A = \frac{3}{\sqrt{5}}$

59. The angle of elevation of the sun is $15^\circ$. How long is the shadow of a 64 m tall building?

A. 17 m  
B. 66 m  
C. 239 m  
D. 247 m

60. As Tracey is driving, she sees a sign telling her the road has a 7% grade (i.e., a rise of 7 metres for a horizontal change of 100 m). Which of the following expressions will calculate the angle between the road and the horizontal?

A. $\tan\left(\frac{7}{100}\right)$  
B. $\sin\left(\frac{7}{100}\right)$  
C. $\tan^{-1}\left(\frac{7}{100}\right)$  
D. $\sin^{-1}\left(\frac{7}{100}\right)$
61. Mission's outdoor club collected the following data to determine the height of a cliff.

\[ \tan 74^\circ = \frac{x}{7} \]
\[ x = 24.41 + 1.68 \]
\[ x = 26.08 \]

Calculate the height of the cliff.

A. 3.7 m  
B. 8.4 m  
C. 24.4 m  
D. 26.1 m  

62. Calculate the length of side \( x \) on the diagram below. Answer to the nearest centimetre.

\[ 26^2 - 10^2 = y^2 \]
\[ 676 - 100 = y^2 \]
\[ 576 = y^2 \]
\[ y = 24 \text{ cm} \]
\[ \sin(32^\circ) = \frac{24}{x} \]
\[ x = \frac{24}{\sin(32^\circ)} \]
\[ x = 45.3 \text{ cm} \]

63. In \( \triangle ABC \), \( \angle C = 90^\circ \), \( AB = 17 \text{ cm} \) and \( AC = 15 \text{ cm} \). Calculate the measure of \( \angle ABC \).

A. 28°  
B. 41°  
C. 49°  
D. 62°  

\[ \sin \theta = \frac{15}{17} \]
\[ \sin^{-1} \left( \frac{15}{17} \right) \]
\[ \theta = 61.9^\circ \]
64. Using a protractor, measure one of the unknown angles and determine the length of side x.

Note: This diagram is drawn to scale.

\[
\sin(20°) = \frac{x}{14}
\]

\[
x = 5 \cdot \sin(20°) \cdot 14
\]

\[
x = 4.8 \text{ m}
\]

A. 3.5 m  
B. 4.8 m  
C. 5.1 m  
D. 13.2 m

65. A 10 metre tall farmhouse is located 28.0 m away from a tree with an eagle’s nest. The angle of elevation from the roof of the farmhouse to the eagle’s nest is 30°.

\[
\tan(30°) = \frac{x}{28}
\]

\[
x = 28 \cdot \tan(30°)
\]

\[
x = 16.17 + 10
\]

\[
x = 26.17 \text{ m}
\]

C. 16 m  
B. 24 m  
C. 26 m  
D. 48 m

66. A ramp is set up using a rectangular piece of plywood (shaded region) as shown below.

Calculate the area of the plywood. Answer in square metres to one decimal place.

\[
\text{Area} = lw
\]

\[
= (5.11)(2)
\]

\[
= 10.2 \text{ m}^2
\]