Combine and simplify as much as possible the following expressions:

Questions

1) \( \frac{1}{a + b} - \frac{2a}{a^2 - b^2} \)

2) \( \frac{x^2 + 2x + 1}{2x^2} \div \frac{x + 1}{x + 2} \)

3) \( -\frac{a + b}{ac + bd} \)

4) \( \frac{(2a)^3}{a^5} \)

5) \( (0.2a^2)^4 \)

6) \( \frac{8y^n}{-2y^{n-1}} \)

Answers

1) 

2) 

3) 

4) 

5) 

6)
7) \( \sqrt[3]{-64y^{27}} \)

8) \( \sqrt{a^2 + b^2} \)

9) \((a + b)^3\)

10) \((\sqrt{x} + 3\sqrt{y})(\sqrt{x} - \sqrt{y})\)

Solve the following equations for \( x \):

11) \( x^3 - x^2 - 6x = 0 \)

12) \( x^2 + 7x = -3 \)

Now check your answers on the next page!
Answer the following questions without calculators or trig tables. (Leave answers like $53\pi$ or $\sin 13^\circ$ as is.)

**Questions**

1)

(a) $30^\circ =$

(b) $\frac{3\pi}{2}$ radians =

(c) $127^\circ =$

2)

(a) $\sin 60^\circ =$

(b) $\tan \left(-\frac{3\pi}{4}\right) =$

(c) $\sec \left(\frac{\pi}{2}\right) =$

3) Sketch the graph of $\sin x$.
   (Make your vertical scale as large as possible.)

4) Given $\tan \theta = \frac{6}{7}$, find $\sin \theta$
5) Solve the following right triangle:
   (i.e., determine missing sides and angles.)

   \[ AB = \text{_______} \]
   \[ AC = \text{_______} \]
   \[ \angle A = \text{_______} \]

6) Relate to \( \sin \theta \) and \( \cos \theta \)
   
   (a) \( \cos(-\theta) = \text{_______} \)
   
   (b) \( \sin\left(\frac{\pi}{2} - \theta\right) = \text{_______} \)
   
   (c) \( \sin 2\theta = \text{_______} \)

7) Express in terms of \( \sin \) and \( \cos \) of \( A \) and \( B \)

   \( \sin(A - B) = \text{_______} \)

8) \( \frac{d}{dx}(\cos 3x + \tan x) = \text{_______} \)

9) \( \cos^{-1}\left(\frac{\sqrt{3}}{2}\right) = \text{_______} \)

Check your answers on the next page!